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INNOVATIVE MARKETS FOR SUSTAINABLE AGRICULTURE

How innovations in market institutions encourage sustainable agriculture in developing countries

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Rome, 2016

Recommended citation
FAO/INRA. 2016. *Innovative markets for sustainable agriculture – How innovations in market institutions encourage sustainable agriculture in developing countries*, by Loconto, A., Poisot, A.S. & Santacoloma, P. (eds.) Rome, Italy

ISBN 978-92-5-109327-6

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Foreword

At a time when we are facing serious threats to global food security because of climate change, the global community is beginning to find consensus on the need to make our agriculture and food systems more sustainable than in the past. The transition to sustainable food systems requires concerted efforts from a wide variety of stakeholders and organizations that are involved in all those activities that bring our food from farm to table. The Food and Agriculture Organization of the United Nations (FAO) has been encouraging systems approaches to sustainability, with its renewed focus on making agriculture, forestry and fisheries more productive and sustainable and enabling inclusive and efficient agricultural and food systems. An important aspect of these systems is the role of the market in ensuring that sustainably farmed products can be preferred and valued by consumers for their intrinsic quality. Therefore, market approaches driving food systems reorganization can provide interesting and innovative ways to encourage local adaptation (and use) of sustainable practices. The case studies presented in this book provide insights into how these mechanisms work. Specifically, the book showcases 15 examples of how public, private and civil society actors are collaborating to change the institutional constraints and opportunities that can lead to wide-scale spread of sustainable agriculture. FAO, as a knowledge organization, encourages coproduction and sharing of knowledge about bottom-up and grassroots innovations for sustainable agriculture.

This book is the result of a participatory process whereby innovators, practitioners and researchers were involved in discussing, writing and sharing experiences in order to spread these ideas and practices. Collaborative research, as in writing this book, provides opportunities to bridge the divide between knowledge production and dissemination by combining these two activities into a single dual-purpose approach. This collaboration shows that significant insights can be gained by listening to the experiences of farmers, small and medium enterprises and civil society organizations that have been developing innovative approaches to creating local markets for sustainably farmed products. It is hoped that the book will inspire people to innovate in their local contexts and share their knowledge with others.

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Preface

A wealth of initiatives are ongoing in developing countries to supply local markets with sustainable agricultural products. How did such initiatives come about? How is sustainability perceived in different contexts? What are the incentives for farmers, communities, food distributors, public authorities, researchers, consumers and other actors to engage? What mechanisms and interactions have been put in place to ensure the regular supply of local markets with sustainable products?

The key issues that this volume addresses are innovations in organizational and institutional arrangements that have enabled the creation of local markets for sustainably farmed agricultural products or, rather, "institutional innovations". Institutional innovations can be described as new rules and forms of interactions. They help redefine sustainable practices locally and bring together actors in food systems who have not traditionally worked together. We claim that innovations in the field of institutions are as important as technological or agronomic innovations to support transitions towards sustainable agriculture, and that both types of innovations are closely interrelated. We focus on innovations, particularly small-scale local niche experiments, because these innovations can provide insights into the new ideas that are circulating outside the mainstream policy and market circles and might become new norms in the future. By looking at what is working in a variety of contexts, we understand how new institutional arrangements emerge and incentivize changes in practices.

This book presents 15 cases from Africa, Asia, the Near East and Latin America, mostly written by stakeholders directly engaged in implementing or supporting local initiatives. Each chapter outlines the institutional arrangements that support the featured innovation; the sustainable agricultural practices that are used; the market channels where products are sold; a description of the institutional innovation, including how it is governed and how the use of sustainable practices are ensured; and the results in terms of changes in practices. In the introduction, we present the theoretical background and study methodology that enables us to understand the drivers and mechanisms for institutional innovations in linking sustainable agricultural practices with markets. The meta analysis presented in the concluding chapter explores why and how these innovations encourage the local adaptation (and use) of sustainable practices.

The purpose of this volume is to provide FAO member countries with insights into institutional change and how a different type of market incentive contributes to the redefinition and adoption of sustainable practices by farmers. It contributes to FAO's normative work on sustainable agrifood chains and voluntary standards by providing an institutional analysis of innovation systems. This analysis focuses our attention on the important organizational work of local-level actors in setting up networks that link research, technology development, education, community development, certification, price committees and seed networks together while creating local markets for sustainably farmed products.

The audience for this book is technical experts working on innovation systems, institutional change, value chains, market development, community development and transitions to sustainable food systems more generally. However, practitioners and policy-makers may find the detailed case studies useful for understanding how these initiatives have been set up. University professors and students will also find this book helpful for exploring institutional innovations and case study methodologies in a learning environment.

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Acknowledgements

This book is truly a collective project, benefiting from the contributions of many people. First, the editors wish to acknowledge the important contributions of the case study authors, who dedicated significant time both on their chapters and on hosting field visits by FAO staff. We also want to acknowledge the analytical support for the entire book provided by Marcello Vicovaro (ESN/AGP, FAO). Acknowledgements specific to each case study are found in the separate chapters.

Second, the contents of this book underwent a rigorous peer review and we would like to recognize the contributions of the peer reviewers. They include: Myriam Paredes (FLASCO Ecuador), Mathew John (Keystone Foundation, India), P.V.S.M. Gouri (APEDA, India), Bambang Sayaka (Research Center for Agricultural Social Economy, Indonesian Ministry of Agriculture), Khatoon Abadi (Isfahan University of Technology, Islamic Republic of Iran), Olugbenga O. AdeOluwa (University of Ibadan, Nigerian Organic Agriculture Network [NOAN]), Charito Medina (MASIPAG, Philippines), Orachos Artachinda (Kasetsart University, Thailand), Marcello Vicovaro (ESN, FAO), Bill Vorley (IIED) and David Neven (SP4, FAO). In addition, the publication was subject to double-blind peer review; the inputs and dedication of the reviewers are gratefully acknowledged.

Thanks are also extended to those who commented on earlier drafts or contributed insights to the process: William Settle (AGP, FAO), Florence Tartanac (ESN, FAO), Emilie Vandecandelaere (ESN, FAO), Ignacio Rivera (FAOSLM), Marc Barbier (INRA), Marianne Cerf (INRA), Pierre-Benoît Joly (INRA), Alban Thomas (INRA), Marcia Ostrom (Washington State University), Erika Quendler (Federal Institute of Agricultural Economics, Austria) and Anna Maria Augustyn (Hungarian Academy of Sciences).

Finally, we thank Larissa D'Aquilio and Stefania Maurelli for coordinating the publication production process, Simone Morini for the layout and cover design, Roberta Mitchell for copy editing, Andrea Broom for the Spanish to English translation of some of the cases, John Baker for the French to English translation of others and Giuseppe Provenzano for proofreading.

The work on the book was carried out within FAO's Strategic Objective 4: "Enable more inclusive and efficient agricultural and food systems at local, national and international levels". Specific funding was received through the allocation for the study on innovations in linking sustainable agricultural practices with local markets in developing countries. Extrabudgetary funding for the study was provided by the European Union (EU) through the EC/FAO Global Programme "Improved Global Governance for Hunger Reduction" [GCP/INT/130/EC]; and the Res-AGorA project (Responsible Research and Innovation in a Distributed Anticipatory Governance Frame: a Constructive Socio-normative Approach) under the EU's Seventh Framework Programme for research, technological development and demonstration [grant agreement no. 321427].

Abstract

Between 2013 and 2015, FAO (specifically the Plant Production and Protection [AGP] and the Nutrition and Food Systems [ESN]* divisions) and the French National Institute for Agricultural Research (INRA) undertook a survey of innovative approaches that enable markets to act as incentives in the transition towards sustainable agriculture in developing countries. Through a competitive selection process, 15 cases from around the world provide insights into how small-scale initiatives that use sustainable production practices are supported by market demand, and create innovations in the institutions that govern sustainable practices and market exchanges. These cases respond to both local and distant consumers' concerns about the quality of the food that they eat. The book evidences that the initiatives rely upon social values (e.g. trustworthiness, health [nutrition and food safety], food sovereignty, promotion of youth and rural development, farmer and community livelihoods) to adapt sustainable practices to local contexts, while creating new market outlets for food products.

Specifically, private sector and civil society actors are leading partnerships with the public sector to build market infrastructure, integrate sustainable agriculture into private and public education and extension programmes, and ensure the exchange of transparent information about market opportunities. The results are: (i) system innovations that allow new rules for marketing and assuring the sustainable qualities of products; (ii) new forms of organization that permit actors to play multiple roles in the food system (e.g. farmer and auditor, farmer and researcher, consumer and auditor, consumer and intermediary); (iii) new forms of market exchange, such as box schemes, university kiosks, public procurement or systems of seed exchanges; and (iv) new technologies for sustainable agriculture (e.g. effective micro-organisms, biopesticides and soil analysis techniques). The public sector plays a key role in providing legitimate political and physical spaces for multiple actors to jointly create and share sustainable agricultural knowledge, practices and products.

* This work was carried out within the Rural Infrastructure and Agro-Industries Division (AGS), which was dissolved in December 2015. The work stream continues in AGP and in ESN.

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Acronyms

AFRISCO	Africa's farms certified as organic
ACT	Agricultural Council of Tanzania
AESA	Agro-ecosystem analysis
AGRECOL Andes	AGRECOL Andes Foundation
AOPEB	Bolivian Association of Organic Farmers' Organizations
ASDP	Agricultural Sector Development Programme
BoD	Board of Directors
Bolicert	Bolivia's organic certification body
CANEB	National Chamber of Exporters of Bolivia
CBO	Community-based organization
CCT	Technical Coordination Committee
CEPROBOL	Bolivian Promotion Centre
CGEMA	Agro-ecological guarantee committee of Achocalla municipality
CIALCO	Alternative marketing channels
CONFEAGRO	National Agricultural Confederation of Bolivia
COPISA	Plurinational and Intercultural Conference on Food Security and Sovereignty
CORACA	Smallholder agricultural corporation
CSCB	Trade Union Confederation of Original Settlers of Bolivia
CSUTCB	Trade Union Confederation of Rural Workers of Bolivia
EGM	Emamzadeh Gassem Market
ERPE	Ecuador Community Radio Schools
ESMF	Environmental and Social Management Framework
ETP	Ethical Tea Partnership
EU	European Union
FECAFEB	Federation of Coffee Exporting Producers of Bolivia
FFS	Farmer Field School(s)
FLO	Fairtrade Labelling Organizations International
FVMO	Fruit and Vegetable Markets Organization
GADs	Decentralized autonomous governments
GAP	Good agricultural practice
GDP	Gross domestic product
GMO(s)	Genetically modified organism(s)
GoT	Government of Tanzania
HACCP	Hazard analysis and critical control point
HM	Holistic management
ICS	Internal control system
IFOAM	International Federation of Organic Agriculture Movements
IGRA	Institute for Green Rural Advancement

ILO	International Labour Organization
INIAF	National Agriculture and Forestry Innovation Institute
IOIA	International Organic Inspectors Association
IPM	Integrated Pest Management
IRIPP	Iranian Research Institute of Plant Protection
ISIRI	Institute of Standards and Industrial Research of Iran
LGA	Local government authority
MACA	Ministry of Rural and Agricultural Affairs
MAEB	Agro-ecological Movement in Bolivia
MAGAP	Ministry of Agriculture, Livestock, Aquaculture and Fisheries
MAWF	Namibian Ministry of Agriculture, Water and Forestry
MDRAMA	Ministry of Rural Development, Agriculture and Environment
MDS	Ministry of Sustainable Development
MPD	Ministry of Development Planning
MPM	Ministry of Production and Micro-enterprise
MREC	Ministry of Foreign Affairs and Religion
MRL	Maximum residue level
MTC	Mufindi Tea Company
NAP	National Agriculture Policy
NEMC	National Environment Management Council
NGO	Non-governmental Organization
NGO(s)	Non-governmental Organization(s)
NIMP	National Irrigation Master Plan
NOA	Namibian Organic Association
NOCR	National Organization for Civil Registration
NSGRP	National Strategy for Growth and Reduction of Poverty
OECA	Farmers' economic organization
PGS	Participatory Guarantee System
POCI	Persian Organic Certification Institute
PPO	Plant Protection Organization
PPP	Public-private partnership
PRA	Participatory rural appraisal
RA	Rainforest Alliance
RSTGA	Rungwe Smallholder Tea Growers' Association
SAGCOT	Southern Agricultural Growth Corridor of Tanzania
SAN	Sustainable Agriculture Network
SC	Steering Committee
SEDES	Departmental Health Service
SENASAG	National Service for Animal and Plant Health and Food Safety
SGP	Small Grants Programme
SISAN	National System for Food and Nutrition Security
SLAs	Local food systems
SRESA	Strategic Regional Environmental and Social Assessment
TAFSIP	Tanzania Food Security Investment Plan
TAT	Tea Association of Tanzania
TATEPA	Tanzania Tea Packers
TBT	Tea Board of Tanzania

TCB	Tanzania Cotton Board
TDV	Tanzania Development Vision
TFCG	Tanzania Forest Conservation Group
TOT	Training of trainers
TRIT	Tea Research Institute of Tanzania
TSHTDA	Tanzania Smallholder Tea Development Agency
TSTGA	Tanzania Smallholder Tea Growers' Association
UAC-CP	*Unidad Académica Campesina-Carmen Pampa* [rural campus of the Catholic University of Bolivia]
UC-CNAPE	Coordination Unit of the National Council for Agro-ecological Production
UMSA	*Universidad Mayor de San Andrés* [Higher University of San Andrés]
UNDP	United Nations Development Programme
URT	United Republic of Tanzania
WATCO	Wakulima Tea Company
WHO	World Health Organization

Chapter 1
Introduction

Allison Loconto, Anne Sophie Poisot and *Pilar Santacoloma*

1.1 CONTEXT

When looking forward to the 2050 horizon, the world is faced with the complex problem of a growing and increasingly urban population that will create an even faster growing demand for food (FAO, 2012b). This is coupled with environmental and climate pressures that threaten agricultural productivity and current land use practices (IPCC, 2014), which render the need for equitable, socially, environmentally and economically sustainable development all the more pressing (IAASTD, 2009). To address these concerns, FAO is building a common vision for sustainable food and agriculture and promoting save and grow methods (FAO, 2011a) and technologies for production that are based on "an ecosystem approach that draws on nature's contributions to crop growth" (FAO, 2014a).

Over the years, convincing evidence has accumulated, indicating that agricultural production can be intensified in a sustainable manner (Conway, 2012; FAO, 2011a). In other words, growth in production and farmer incomes can be achieved at lower environmental costs. For example, integrated pest management (IPM) reduces the use of synthetic pesticides and improves natural biological pest control as an ecosystem service. Although these and other sustainable agricultural practices are slowly spreading, there is a need to increase and improve the provision of goods and services from agriculture, forestry and fisheries in a way that ensures not only environmental, but also economic and social sustainability.[1]

> *"Sustainability, therefore, is much more than ensuring protection of the natural resource base. To be sustainable, agriculture must meet the needs of present and future generations for its products and services, while ensuring profitability, environmental health, and social and economic equity. Sustainable agriculture would contribute to all four pillars of food security – availability, access, utilization and stability – in a manner that is environmentally, economically and socially responsible over time."*
>
> (FAO, 1988; 2014a, p. 12)

[1] We refer to the Bruntland definition of sustainable development that focuses on the three pillars of social, economic and environmental sustainability in order to meet the needs of today without compromising those of future generations.

Nonetheless, how to farm sustainably remains open to debate. The definition of sustainable practices differs greatly from one agro-ecosystem to the next, and between stakeholder groups, making a global definition challenging or even undesirable to standardize. Moreover, some academics question the relationship between some of the proposed solutions to farming in the face of other societal grand challenges related to the food system, such as food security for all (cf. Elzen *et al.*, 2011; Garnett *et al.*, 2013; Levin *et al.*, 2012). Because of the lack of consensus on this issue, sustainable agriculture provides a priority area for making iterative improvements, or incremental innovation, to current agrifood systems (Busch, 2012; Grin, Rotmans and Schot, 2010). Specifically, sustainable agrifood systems are needed to ensure that the negative environmental effects of production are limited while also providing economic benefits and socially appropriate solutions to the challenges of food security (FAO, 2014a,b). However, within the space of political commitment to sustainable agriculture, more evidence is needed on how farmers and organizations transition towards practising sustainable agriculture and, more specifically, what the motivations and driving forces are for them to do so.

1.2 JUSTIFICATION

Among the range of incentives that might motivate farmers to adopt more sustainable practices, we focus here on the role that *markets* could play in the transition towards sustainable agriculture. We view markets as the "collective devices that allow compromises to be reached, not only on the nature of goods to produce and distribute but also on the value to be given to them" (Callon and Muniesa, 2005). In other words, markets are the rules-based exchanges of value in specific contexts where the rules can come from public regulations, private contracts, civic norms or cultural customs (Callon, 1998). This means that we are studying the rules of exchange and the actors who are part of these exchanges. Put simply, our objects of analysis are the new market institutions that enable the exchange of sustainably produced food.

Policy pressures to urge "climate-smart" agricultural solutions, and the rise of consumer demand for "sustainable" products (e.g. organic, fairtrade, "green" labels) have created market outlets for sustainable food, textiles and energy in developed countries. Indeed, multistakeholder sustainability standards and their accompanying systems of certification have been referred to as "one of the most innovative and startling institutional designs of the past 50 years" (Cashore, Auld and Newsom, 2004, p. 4). Often emerging from alternative agrifood networks (Allen *et al.*, 2003; Bowen and Mutersbaugh, 2014; Goodman, 2004; Goodman, DuPuis and Goodman, 2012), sustainability standards have become increasingly institutionalized through

> *"We must learn from farmers' experience [...]. At the end of the day, sustainable intensification will be the result of the collective action of millions of small-scale farmers, who through their daily decisions determine the trajectory of agricultural ecosystems across the world."*
>
> José Graziano da Silva, Director-General, Food and Agriculture Organization of the United Nations (FAO), February 2014

growing collaboration and recognition among a range of actors and existing institutions (Loconto and Fouilleux, 2014). This demand has provided opportunities for some commercial producers in lesser developed countries (LDCs) to become included in global value chains for sustainable products (Blackman and Rivera, 2011; FAO, 2007, 2008, 2014c). While studies show that access to global value chains can incentivize the adoption of good and sustainable agricultural practices, the investment needed and the risks involved in focusing on export crops often make these value chains undesirable or unachievable for many producers (ITC, 2011a,b). Instead, FAO (2014c) found that institutional arrangements, including the current rules in place and the support activities of extension agents and Non-governmental Organizations (NGOs) as well as the resources that were mobilized through these arrangements, were most often the determining factor in whether or not small-scale producers gained access to these markets. This poses the question as to whether global value chains provide the only market incentives for producers in developing countries to adopt sustainable practices. Therefore, we ask, *are there other market mechanisms that can link sustainable practices with local or domestic markets?*

A small, but emerging, body of research suggests that demand for sustainable products is rising in the domestic markets in LDCs (e.g. Adasme-Berrios *et al*., 2011; Ahmad and Juhdi, 2010; Aryal *et al*., 2009; Oudewater *et al*., 2013; Roitner-Schobesberger *et al*., 2008; Sherwood *et al*., 2013). Some studies show that markets for sustainably produced food in developing countries is an elite phenomenon, relegated to niche, upscale markets for socially and environmentally conscious consumers (Adasme-Berrios *et al*., 2011; Ahmad and Juhdi, 2010; Aryal *et al*., 2009; Li, 2014; Roitner-Schobesberger, 2008; Sacchi, Caputo and Nayga, 2015), which reflects the beginning of the organic movement in developed country markets. In China, which is now the third largest single market for organic products in the world, the demand has been linked to food safety concerns (Li, 2014; Willer and Lernoud, 2015). However, the International Federation of Organic Agriculture Movements (IFOAM) claims that the value of the organic consumer market in regions outside the European Union (EU) and the United States of America reached US$6 billion in 2013 (of the US$72 billion for the global market) (Willer and Lernoud, 2015). Based on FAO's experience in field projects, there seems to be a number of little studied initiatives that are providing sustainable products for developing country markets (FAO, 2015a; FAO/UNEP, 2014).

While small and certainly not mainstream, we believe that there is scope for exploring how these markets work and what role they actually play in the decisions that producers make to farm sustainably, because it is at the small scale that we can identify types of innovations that may become the norm for the future. For example, recent experimentation in food systems that rely upon sustainable production methods pushes the boundaries of the traditional roles of institutional and market intermediaries. Both old and new actors are taking on a wider range of roles in linking farmers with markets for their produce (Vorley, 2013). These intermediaries are part of local infrastructural and institutional environments and include a range of organizations that provide support for producers to learn sustainable techniques and to market sustainably produced products and services. For example, within organic agriculture systems, one approach is the participatory guarantee system (PGS), in which the oversight systems are created by producers, researchers and consumers who collectively ensure that agreed sustainable practices are adopted (FAO, 2013; IFOAM, 2008).

In other contexts, well-established farmer-supported marketing cooperatives are taking on new roles in supporting the adoption of more sustainable practices and technologies. There are also a number of instances where public research and farmer advisory services are beginning to incorporate marketing aspects in farmer field school (FFS) methodology – a participatory farmer education approach focusing on agro-ecosystems and sustainable agriculture and used in over 90 countries. Private traders are also beginning to invest upstream in their value chains to provide infrastructural and organizational support for small-scale producers. In recent years, a number of innovations in business models, value chain organization, institutional arrangements and farmer support services in LDCs have been recognized as possibly providing incentives to producers in developing countries for increasing food production using sustainable practices, and improving the provision of sustainable goods to local consumers (FAO, 2010, 2011a, 2012a).

These examples suggest that the strengthening of local infrastructure and institutions is important for enabling small and medium producers and enterprises in LDCs to increase their share of value for sustainably farmed products. However, a gap remains in the literature on these innovations in LDCs and particularly on how successful they are in promoting the adoption of sustainable practices for local and domestic markets. To fill this gap, FAO undertook a survey of innovative institutional approaches that enable markets in developing countries to act as incentives for the local adaptation (and use) of sustainable practices. To that end, we launched a call for proposals on detailed case studies on innovative approaches (public, private and/or civil society) designed to link sustainable crop production practices with local markets for sustainable products in developing countries. This book presents 15 case studies that explain small- and medium-scale initiatives in 14 different countries and enable us to answer the core research question of this book: *how do markets work to create incentives for the adoption of sustainable practices in developing countries?*

1.3 INSTITUTIONAL ARRANGEMENTS IN INNOVATION PROCESSES

The question of why farmers adopt or adapt new technologies and different methods of farming is well explored in the literature on innovations and farming systems, yet it remains a complex question to this day (Bingen, Serrano and Howard, 2003; Darnhofer, Gibbon and Dedieu, 2012; Dixon *et al*., 2001; FAO, 2014a; Pamuk, Bulte and Adekunle, 2014). The classic model of the diffusion of innovation (Rogers, 2003 [1962]) separates knowledge and technology production from their diffusion by creating two distinct institutional domains, where the second follows the first in a linear pattern. The commercialization of products that are cultivated with new technologies are often considered in separate studies that focus on market dynamics without necessarily linking these to the institutions that enable the innovation process to unfold. Following advances made in science and technology studies, we consider that an innovation occurs when “new ideas, new technical devices or new forms of organization meet their users” (Joly, 2011, p. 3). In other words, it is a journey of back and forth interactions between technologies and those people who are involved in various stages of their development and use (Van de Ven, 1999).

In the case of sustainable agriculture, a suite of knowledge, skills, practices, technologies and organizational arrangements must be mobilized for farmers to be able to practise sustainable intensification. Many of these technologies are based on "old" knowledge or tradition, but they are new in the sense that they may be new combinations of old techniques or they have not been used by a particular farmer or farming system before.

Let us take integrated pest management (IPM) as an example. In order to be able to introduce IPM on a farm, farmers must first believe that using IPM will bring a benefit to the farm (i.e. resolve a pest issue, enable the farmer to meet market or regulatory requirements, reduce costs, etc.) or they must be willing to try. Second, farmers must be able to acquire the knowledge necessary about interactions between different types of plants and pests or between insects themselves; they need to acquire skills to observe the agro-ecosystem and scout pest and beneficial insects in the field. It will be necessary to implement a series of agronomic practices such as intercropping or associations with repellent plants. Some technical devices can be introduced here that will help in the detection of pests, as well as biocontrol agents, biopesticides or low-toxicity pesticides to help with pest management. To gain access to these devices, farmers often need finance and the ability to purchase, rent or share different technologies and inputs. Finally, information about what the new technologies can do must be shared and farmers must learn how to use these technologies. In developing countries, this type of learning is increasingly encouraged through FFS and other experiential methodologies that require the engagement of farmers, researchers, extension workers and NGOs. These schools use a portion of a farmer's field to dedicate to practical experiments and may require a reorganiza-

KEY CONCEPTS

Institutions. We follow Ostrom's definition of institutions (2009, p. 3) as "formal and informal rules that are, in fact, followed by most affected individuals. Such rules structure incentives in human exchange, whether political, social or economic. Incentives include the rewards and punishments that are perceived by individuals to be related to their actions and those of others". Institutions are both the structures that constrain action and the resources that enable actors to make changes in society (DiMaggio and Powell, 1991).

Institutional arrangements "are the policies, systems and processes that organizations use to legislate, plan and manage their activities efficiently and to effectively coordinate with others in order to fulfil their mandates" (UNDP, 2015).

Institutional innovations are new rules and ways of organizing the relationships between different actors in a system. They take place when people and organizations (actors) strategically mobilize others through network relationships in order to repair or replace institutions. They help redefine sustainable practices locally and bring together actors in food systems who have not traditionally worked together (cf. Hargrave and Van de Ven, 2006).

tion of the physical farm landscape as well as the type of people and organizations entering this space on a daily basis. FFS provide a space for joint learning, dialogue, cooperation and coproduction of knowledge, whose impact has extended far beyond agricultural production – reducing conflicts within households and communities, stimulating individual and community empowerment and significantly improving livelihoods.

In other words, "innovation is not limited to technological innovation. In fact, most so-called technological innovations are really sociotechnical innovations, because organizational competencies, business-to-business linkages and value chains and industry structures more broadly have to be renewed as well" (Felt *et al.*, 2007, p. 21). In sum, we argue that innovations are essentially collective and require a system or network of individuals and organizations in order to ensure that new practices and processes are successfully adopted (Akrich *et al.*, 2002; Schumpeter, 1962 [1934]). Since we take this recognition of the interdependencies between technological and organizational innovations as a fundamental aspect of innovation processes, we claim that we will find answers to the question about why farmers adopt new practices if we look at the institutional relationships.

A common approach in the literature is to understand why innovations or new technologies are not adopted (e.g. Vanloqueren and Baret, 2008). Our approach explores why innovations have taken place, specifically by looking at why and how changes in market institutions seem to have played an important role in this change. Edquist and Johnson (1997, p. 51) argue that institutions serve three main functions in an innovation system: "reducing uncertainty by providing information, managing conflicts and cooperation, and providing incentives for innovation," which are not always monetary. There is a tradition of work in economics that tries to understand the appropriate incentives for encouraging the adoption of new rules for food and agriculture (e.g. Henson and Holt, 2000). Indeed, a significant amount of the literature focuses on how incentives can be provided through institutional arrangements. For example, some scholars focus on the ways in which informal regulation (Pargal and Wheeler, 1996) and community pressure (Blackman and Bannister, 1998) can work as incentives.

Ostrom (2009) reminds us that "institutions are defined as formal and informal rules that are, in fact, followed by most affected individuals. Such rules structure incentives in human exchange, whether political, social or economic. Incentives include the rewards and punishments that are perceived by individuals to be related to their actions and those of others" (Ostrom *et al.*, 2001, p. xiv). Vitale (2010) demonstrates that there is an interdependent relationship between incentives and institutions where "institutions replace incentives in the actors' plan of action. Here, institutions play a constituent role in individual interests: incentives only work with appropriate institutional constraints" (p. 61). In the case of market incentives and institutions, one could say that the money received from the sale of a product is both the institution of the market (the rule agreed upon by the parties as the legitimate form of compensation for exchange) and the incentive for action (monetary reward for production). What we look at in this book are other types of market institutions and incentives – specifically organizational ones. In other words, we show that when new rules and legitimate relationships for producing and exchanging goods that have been sustainably produced are put into place, the ability to participate in the group and make changes to the rules provide the incentives to producers and consumers for following them. This theoretical framework enables us to look at the institutions that structure the case study networks and the actors who are important in carrying out a variety of functions within these systems to promote production and marketing of sustainable agriculture. In sum, institutional arrangements and the actors who construct them are important for explaining how markets work to incentivize the local definition and adoption of sustainable agriculture practices.

1.4 STUDY METHODOLOGY

This study is based on collaborative work between INRA (French National Institute for Agricultural Research) and FAO under the project entitled: "Responsible innovation in sustainable agrifood systems – explorations of the intersections between voluntary standards and value chains". Funding for the study came from FAO's regular budget under Strategic Objective 4: "Enable more inclusive and efficient agricultural and food systems at local, national and international levels"; the EU through the EC/FAO Programme: Improved Global Governance for Hunger Reduction (GCP/INT/130/EC); and the Res-AGorA project (Responsible Research and Innovation in a Distributed Anticipatory Governance Frame: a Constructive Socio-normative Approach) under the EU's Seventh Framework Programme for research, technological development and demonstration (grant no. 321427).

We adopted a case study methodology (Yin, 1984) for this book. Data collection was initiated through a call for case study proposals on innovations in linking sustainable practices with markets in developing countries. We received 87 proposals, from which we selected 15 cases written by the innovative actors/organizations. Case studies were selected during a two-round selection process. First, all 87 proposals were evaluated, based on the following discriminating criteria: (i) they were focused on crop agriculture; (ii) described an existing initiative in a developing country; and (iii) included a clear link between sustainable practices and the market. Within our call, we requested the authors to explain why they thought their practices were sustainable (according to what metrics) and what sustainability meant in their context. In selecting the cases, we selected those that followed practices in line with those recognized in the FAO *Save and grow* publication (2011b). Hence, we were able to keep the sustainable practices within a range of techniques that are well documented in the literature as meeting this FAO definition of sustainability; nevertheless, these practices vary from case to case and are explored in the concluding chapter.

The first round of elimination left us with a shortlist of 42 case studies. These case studies were examined further, based on ten additional criteria (with weighted values) that allowed a qualitative assessment of the proposed case studies. We prioritized those cases written by the innovators themselves and those that have been in successful operation for more than five years, which provided primary data for looking at the institutionalization process and exciting new organizational designs.[2]

[2] The evaluation criteria were the following: EU priority country [ACP country] (0=No, 1=Yes); priority country for EC project GCP/INT/130/EC [the Niger, Mali, Burkina Faso, Ethiopia, Kenya, Somalia, South Sudan, Uganda, Mozambique, Guatemala] (0=No, 1=Yes); priority case for FAO/INRA field visit (0=No, 1=Yes); already published (0=Yes, 1=No); submitting party

By working directly with the innovators, we were able to apply participatory qualitative research methods to this study, which more accurately capture dynamic processes than quantitative surveys (DeWalt and DeWalt, 2002). There were a total of 31 points possible for each case and we selected 16 cases that had attained between 24 and 29 points. The authors of each of these 16 cases were requested to elaborate their cases into 6 000-word chapters that focused on a description of the history of the innovation, sustainable practices used and mechanisms for ensuring their adaptation and use, markets for products and enabling institutional context.

We received 15 completed case studies and one of these was dropped from the study because the full write-up did not meet our original criteria for sustainable practices and markets. As a result, we selected an additional case from the short list to reach a total of 15 case studies. We took into account geographic balance in our selection and in the end we arrived at four cases from Latin America and the Caribbean (Bolivia [Plurinational State of], Colombia, Ecuador, Trinidad and Tobago); six cases from Africa (Benin, Namibia, Nigeria, Uganda [two], United Republic of Tanzania); and five cases from the Near East, Asia and the Pacific (India, Indonesia, Islamic Republic of Iran, the Philippines, Thailand). The authors are primarily the implementing organizations (ten), southern researchers together with implementing partners (four), an implementing donor organization (one) and a northern researcher with implementing organization (one).

Since the focus of the study is on understanding how institutions are changing in order to accommodate the linkages between sustainable agricultural practices and markets for their products, we categorized the cases according to the sustainable practices and institutional innovations for linking farmers to markets. The cases included more than 32 different sustainable agriculture practices, which were identified by the authors as part of organic farming systems (ten), IPM approaches (two), and integrated production systems (IPS) (three). The bias towards organic agriculture in our case studies is a selection bias that comes from the distribution of the call for case studies, which was sent through FAO; organic, sustainability standards; and academic networks where there is generally greater attention paid to organic farming than to other sustainable agriculture techniques.[3] We recognize that certified organic agriculture represents only 0.98 percent of total agricultural land and thus is still very much a niche in the agricultural landscape. However, the percentage of studies focusing on organic (69 percent) reflects its unequal representation in the distribution of sustainable agriculture practices found in the first round

(5=implementing org., 4=southern researcher with implementing co-author, 3=implementing donor, 2=southern researcher, 1=northern researcher with implementing co-author, 0=northern researcher); sustainability over time (2= >5 years, 1= 2–5 years, 0= <2 years); fit with the purpose of the call (1–5, 5= closest fit); feasibility (1–5, 1=not feasible, 2= not likely feasible, 3= maybe, 4=feasible, 5=highly feasible); quality (1–5, 5=excellent quality); innovative (1–5, 5=most exciting new idea). Maximum score possible was 31 points.

[3] We announced the call through the following LISTSERVs: FAO departmental lists, ISEAL IMPACTS, IFOAM (PGS list), INRA (UMR Sad-Apt, UR SenS), CIRAD, EGFAR, Altersyal, Rural Finance Learning Centre, ISA RC40 (Research Committee on Agriculture), Food for the Cities, PRODARNET, Global FFS Review, E-forum 2, POET Com, East African Organic Movement Organizations.

of submissions (46 percent) and the shortlist (62 percent) of eligible case studies. Moreover, the countries with the largest numbers of organic certified producers are India, Uganda and Mexico, and the percentage of total agricultural land increased by an average of 6.5 percent in Africa and Asia in 2013 (Willer and Lernoud, 2015, p. 43). Therefore, this method of sustainable production is becoming more visible in developing countries as compared with others (see FAO, 2015b). Moreover, we recognize that there is important analytical value found in exploring microlevel experiments, particularly those that have expanded beyond their original area of influence, which is undoubtedly the case of organic agriculture.

The institutional innovations examined in the study include participatory guarantee systems (PGS) (six), multistakeholder innovation platforms (IPs) (six), and community-supported agriculture (CSA) (three). We came up with these categories following analysis of the cases; they were not criteria for inclusion in the study. Each category of innovation is a type of mechanism that was identified based on an analysis of the role of actors in fulfilling various functions in an innovation system (see final chapter). The cases are thus classified as one of these three types of institutional innovations; the grouping of cases by institutional innovation enables us to conduct intercase comparisons that are important in the meta-analysis level of case studies (Yin, 1984).

The case development process has been an iterative, qualitative case study approach (Yin, 1984), where the book editors developed a structured outline with guiding analytical questions for the case studies. Within the case study approach, we relied upon triangulation to ensure the reliability and validity of the data. This included review of secondary literature on the cases (previously published reports and Web sites), discourse analysis of the texts written by the chapter authors (to conduct the functional analysis), field visits, key informant interviews and expert peer review.

Elaboration of the cases was carried out in four phases. The first drafts received detailed comments by the book editors and the first revision of the text follow-up consisted of either field visits (for eight of the cases), where the book editors conducted interviews with case study authors and other important actors between November 2013 and May 2015, or by video conference interviews with the authors. Each case study included in this book went through a single-blind peer review process by the three editors of the book, which itself went through a rigorous peer review process. The eight cases that received field visits were reviewed by the editorial team and in the six cases where field visits were not possible, peer reviewers from each case study country who were knowledgeable about the case and its context were identified to review the cases. A single-blind peer review was conducted whereby peer reviewers completed standardized evaluations not only of the quality of the text, but also of the veracity of the presentation of the case, based on the peer reviewer's direct knowledge of the innovation. In a third phase of the project, we facilitated an online discussion forum with the case study authors and those people who had submitted proposals to our original call. In June 2015, we conducted a workshop with the case study authors, where they presented their cases and discussed the innovative institutional mechanisms they had developed (Vicovaro *et al.*, 2015). With this rigorous method of triangulation, we avoided any bias related to the innovators' interpretation of the data presented in each case.

1.5 ORGANIZATION OF THE BOOK

What makes this study unique is its approach to using a case study methodology, and its authors. Based on the originally requested 1 000-word abstract, we selected case studies that were written by the "innovators" themselves. This approach allowed us to engage with the innovators in an iterative way and to work together over the span of two years to write up their experiences in a reflexive manner. The result is a rich volume of experiences that provide details and reflections on the types of sustainable practices used in each case. This approach allowed the authors to explain what sustainability means in their specific context and provided them with the space to explain the intricacies of institutional change. As is evident in the following sections of this book, institutional innovation is a long process.

We have organized the book theoretically, according to the conceptualization of institutional innovations. Hargrave and Van de Ven (2006) refer to collective action processes as the contested political process through which innovations emerge. These processes include the ways in which solutions are framed, how the network of actors is engaged and the political and market opportunities that exist at a particular moment. There are generally *three phases* that can be distinguished in the progress of collective action in an institutional innovation: *emergence* (pioneering innovative ideas), *development* (developing the innovation so that the institutions can be easily differentiated from conventional approaches) and *convergence* (where a critical mass of actors are converging around the new rules, frames of reference and activities) (cf. Hargrave and Van de Ven, 2006). We can thus discuss whether these innovations are currently considered legitimate solutions by the range of involved stakeholders to the problem of unsustainable agricultural practices. We have organized the book into three sections that group together those case studies that can be considered to be at these different stages.

The first section presents those innovations that are still in an emergent stage, where their market linkages and institutional arrangements are not yet stabilized. The Indonesian, Namibian and Nigerian cases are considered to be in the phase of emergence because sustainable agriculture practices are in the process of being introduced, the horizontal network linkages are not fully integrated with other initiatives nationwide, the size of the initiatives (in terms of numbers of producers and consumer involved) are still somewhat limited, or the political project driven by the innovators has not yet achieved institutional change beyond their local contexts and close networks. These case studies are important to analyse because they provide three experiences that are quite innovative, particularly in terms of the actors involved and the different types of roles they are taking up in terms of linking research with market construction. Since these cases are at the emergent stage, they provide insights into the challenges faced when introducing institutional innovations for sustainable agriculture.

The second section contains the majority of our cases. Building on the language from innovation studies, we characterize the status of nine of the institutional innovations in our survey as being in an "era of incremental change" (Anderson and Tushman, 1990) or in the developmental phase. Based on a timeline from their official creation, the innovations have been in existence for ten to 15 years. Their forms and governance structures have converged over time towards more formalized organizations with delegation of rights and responsibilities assigned to professional staff (in most cases). They have markets, mostly at local level, which they supply consistently. They have gained public recognition of their sustainable practices, which have been achieved through the mobilization of networks. Private recognition, in terms of consumers and market actors, is also developing alongside public sector recognition and is actually the driving force for pursuing political solutions that can facilitate access to market outlets.

In the third section, we see the cases in Benin, the Plurinational State of Bolivia and the United Republic of Tanzania as entering into the convergence phase, which means they have reached a critical mass of adherents in public, private and civil society sectors of their countries. In Benin, the Songhai Centre model of integrated production has been in existence for over 20 years. The agricultural methods are well established with a strong training curriculum. Their model has been replicated outside the country and, in 2014, Songhai received political commitment from the government to establish Songhai centres in each district of the country. In Bolivia, there has been continued investment by public and civic actors over the past 20 years in the promotion of organic crops. Ten years ago, a new national agency was created to provide training and support for the development of PGS, and to manage institutional linkages with the food safety authority. Biofairs (organic farmers' markets) have become a mainstay in a number of urban centres, and activities are ongoing to link PGS producers with school feeding programmes in rural areas. The government has also made commitments to finance organic extension officers at municipal level. In the United Republic of Tanzania, the sustainable agriculture network (SAN) methods that are required for Rainforest Alliance (RA) certification have only been taught over the past five years, but the institutional actors in the tea sector have been collaborating for almost 20 years. Moreover, we see changes in national regulations and mandates for both public and private actors through collaboration in sustainable agriculture practices. The current policy of government agencies is to ensure that all smallholder tea farmers in the country will be practising RA-certified sustainable agriculture over the next five years. This is supported by the private sector and farmers, since sustainable tea has become a *de facto* mandatory market requirement in the global tea industry (Loconto, 2010, 2014).

The concluding chapter is a meta-analysis of the 15 experiences presented in this book. The authors focus their analysis on how the different innovative mechanisms work in terms of an innovation system. Using an analytical framework that combines the analysis of institutional innovation dynamics (Hargrave and Van de Ven, 2006) with that of the functions of innovation systems (Hekkert *et al.*, 2007), they explain the roles of different public, private and civil society actors in effectively creating market incentives for local definition and adoption of sustainable farming practices. One of the key conclusions of this analysis is that, while the incentives come through market demand and are valued through a price mechanism, it is the way in which the market linkages are created (e.g. through autonomous market strategies and establishing flexible rules) that provides the true incentives. These market linkages bring knowledge (creation and training), markets, resources and policy support into local networks that engage with national and international organizations. The purpose of these linkages is typically not only to create a market, but rather to create a collective entity that provides ecosystem and cultural services beyond the market. In this way, these institutional innovations provide spaces for dialogue around technologies and ways to commercialize products, which are fundamental to a strong functioning of an innovation system (Hekkert *et al.*, 2007).

These conclusions are used to draw lessons about how markets can be mobilized to support local adaptation and use of sustainable practices. For instance, policy-makers can create enabling environments by promoting multilevel support for these local initiatives within national institutions. It is clear that municipal-level governments have an important role to play, both in promoting these initiatives and by providing physical and political spaces for them to flourish.

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Chapter 2
Business-oriented outreach programmes for sustainable cocoa production in Indonesia: an institutional innovation

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2.1 INTRODUCTION

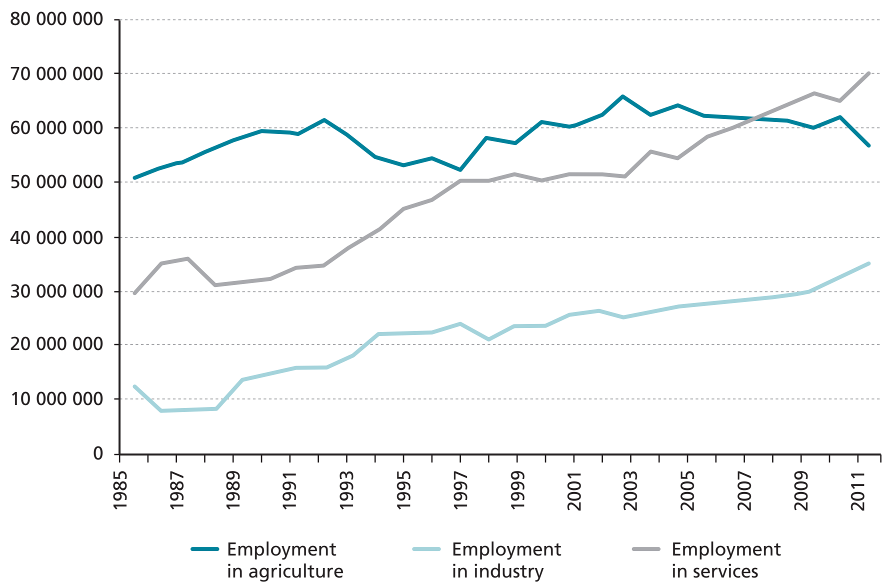
This chapter introduces a business-oriented farm extension outreach system that has emerged in the Sulawesi cocoa sector in response to industry concerns over the long-term sustainability of global cocoa supplies. This innovation is timely. Agriculture in Indonesia is in transition, as the traditional model of subsistence farming alongside land-extensive commodity production is challenged by shifting livelihood aspirations, off-farm employment opportunities and the physical limitations of ongoing farm expansion. While the Indonesian Government assumed a crucial role in the widespread adoption of green revolution technologies in the 1970s and 1980s, particularly for rice, the role of agribusinesses operating along globalized value chains is increasingly set to shape future agricultural systems in the country.

Indonesia is a major world producer of numerous globally important agricultural commodities. According to FAOSTAT (2014), in 2012, Indonesia was the largest producer of palm oil, coconuts, cinnamon and cloves; the second largest producer of cocoa, natural rubber, pepper, cassava, areca nut and vanilla; and the third largest producer of rice, coffee and tropical fruit. While many agricultural commodities are produced for the export market, the Indonesian Government is also acutely aware of the need to ensure an adequate supply of basic foodstuffs to the world's fourth most populous nation (with more than 250 million inhabitants). The public debate on agriculture within Indonesia has focused overwhelmingly on two main issues: (i) how to ensure national-level self-sufficiency in basic food products, especially rice, beef, sugar, maize and soybeans; and (ii) how to encourage the downstream processing of agricultural products within Indonesia to capture a greater share of value added. While issues of sustainable agriculture have been less widely discussed, former President Yudhoyono publicly promoted the country's ambitions to develop a green agricultural economy, and President Joko Widodo has pledged support for organic farming.

The expansion of agricultural production in Indonesia has occurred at the expense of natural forest cover. FAO (2010) estimated that this had declined from 118 million ha in 1990 to 94 million ha in 2010. In particular, large-scale conversion of forest areas to oil-palm plantations has been widely reported across Indonesia, resulting in a consumer backlash in some key consuming countries in western Europe and North America (Schouten and Glasbergen, 2011). Smallholder farmers have also played a less significant role in forest conversion for crops such as coffee and cocoa.

The importance of agriculture within the Indonesian economy has gradually declined since the 1960s, coinciding with wide-ranging industrialization through both import substitution and export-oriented manufacturing. Figure 2.1 indicates that while agriculture continues to provide employment to a large share of the total workforce (40 percent, according to the 2010 National Census), the total number of farm households has been in decline for more than a decade (BPS, 2013). Employment in agriculture is less than in services and trade, and more Indonesians now live in urban rather than rural areas (World Bank, 2014). These closely related processes of industrialization and urbanization reflect, and contribute to, a growing disillusionment with agriculture as a pathway out of poverty for many rural households. More and more rural Indonesians are choosing to leave agriculture altogether or to take up off-farm rural employment and business opportunities, with the agricultural sector dominated by the poorly educated individuals "left behind" (Jaelani and Agustiyanti, 2011). This declining interest in agriculture is considered a problem for domestic self-sufficiency in food production, as well as for international buyers of Indonesian commodities. Therefore, the emergence of private sector outreach programmes, such as those presented in this paper, responds to a need to stimulate farming as a profitable business activity in rural Indonesia to ensure long-term supply.

FIGURE 2.1
Changing composition of the workforce in Indonesia (1985–2012)



Source: World Bank, 2014.

After Côte d'Ivoire and Ghana, Indonesia is the next most important cocoa producer in the world. It is therefore a strategically important source region for the global chocolate industry, which is actively involved in ensuring a sustainable supply of beans from the country. In contrast to other export-oriented agricultural commodities in Indonesia, such as palm oil and rubber, cocoa is overwhelmingly a smallholder crop with approximately two-thirds of national production taking place on the island of Sulawesi. An estimated one million farm households produce 90 percent of the crop (Ditjenbun, 2012a). Cocoa farming performs an important social security function within these communities by injecting cash into otherwise impoverished rural areas, where there have historically been few alternative employment options. The typical cocoa farmer on Sulawesi cultivates a small plot of less than 2 ha in an isolated region with poor access to social services, and with an income that oscillates either side of the poverty line depending on world market conditions. Our household surveys from 2011 found that cocoa was the main source of household income for more than 90 percent of households (contributing around 70 percent of average household income). Cocoa production at national level, however, has actually declined across Indonesia from an estimated 550 000 tonnes in 2009/10 to 405 000 tonnes in 2013/2014 (based on ICCO, 2011, 2014).

The introduction and expansion of cocoa production in Sulawesi during the 1980s occurred, to a large extent, through processes of forest conversion (Ruf, Ehret and Yoddang, 1996). Ruf's (1987) model of cocoa cycles, moreover, argues that cocoa booms are facilitated by the existence of scarcely populated virgin forest areas that are relatively easy to clear. This, it is argued, enables the vital "forest rent" to be captured in the initial phases of cocoa cultivation. Forest rent refers to the economic advantages provided by recently cleared land resulting from enhanced soil fertility and soil moisture, and reduced levels of pests, diseases and weeds compared with mature cocoa fields. It is the ability of producers in forest frontiers to operate at far lower costs than producers in mature areas that dictates the shifts between major supply centres. Clearly, the continued expansion of cocoa production into forested areas is inherently unsustainable, and the business-oriented extension approach discussed in this paper seeks to address this concern by enhancing the productivity and profitability of existing cocoa farms in Sulawesi.

Various low-cost methods to address declining cocoa productivity and unsustainable farm practices have been introduced by a range of different public and private sector organizations across Indonesia since the 1990s, although the uptake by farmers of these practices has been limited. Farmers have, instead, widely adopted the intensive use of insecticides, which are both ubiquitous and poorly regulated. The partial shift away from land-extensive production systems towards intensified production has therefore been associated with a new set of sustainability challenges: the increased use of agrochemicals and soil degradation. Furthermore, our 2012 survey suggested that compliance with certification requirements for sustainability was associated with increased labour demand, adding a further challenge of potential labour shortages (Hafid *et al.*, 2013). The apparent failure of past technology transfer programmes to drive a shift towards more sustainable cocoa farm practices suggests a demand for innovative approaches to farmer-oriented knowledge exchange systems, such as those outlined in this chapter.

In its current state, the Indonesian cocoa sector is ecologically unsustainable and existing institutional arrangements are unable to encourage farmers to adopt sustainable practices successfully. In summary, we identify at least three core challenges to the long-term sustainability of cocoa production in Indonesia.

1. Cocoa production continues to expand at the expense of natural forest, especially on the islands of Sulawesi and Sumatra, with implications for hydrological functioning, soil erosion, landslides, biodiversity conservation and terrestrial carbon storage. Degradation of the natural resource base will, in the long term, restrict agriculture-based livelihood strategies and ultimately impact upon broader societal well-being. For cocoa farming to be sustainable in Sulawesi, new approaches to the profitable rehabilitation of existing plantations are urgently needed.
2. Chemical use on cocoa farms for pest and disease management, and for weeding, has been widely reported in Sulawesi (Perdew and Shively, 2009; Wanger, Rauf and Schwarze, 2010; Siswanto and Karmawati, 2012), although there has been no published evidence of harmful environmental or health impacts. Despite limited scientific evidence of impacts, it is reasonable to predict long-term impacts on agrobiodiversity and farmer health if usage is excessive and unregulated. Responsible chemical use as part of integrated pest and disease management is vital to long-term sustainability.
3. Soil nutrient depletion and degradation are caused by excessive dependence on synthetic fertilizers, poor land management practices and the removal of organic matter from the farm (Hartemink, 2003). Declining soil health appears causally related to the increased incidence of plant disease on Indonesian cocoa farms (McMahon, 2012) and ultimately leads to plot abandonment and ongoing forest clearing. Developing new, cost-effective techniques to maintain and improve soil health on existing cocoa plantations is urgently needed to ensure long-term sustainability in the sector.

This chapter examines the emergence of new institutional forms that are being promoted to encourage sustainable practices to address these challenges in the Indonesian cocoa sector. It draws on an extended six-year research engagement with the cocoa sector, funded by the Australian Centre for International Agricultural Research (ACIAR) (Keane *et al*., 2014) entitled "Improving the sustainability of cocoa production in eastern Indonesia through integrated pest, disease and soil management in an effective extension and policy environment". Mixed methods were applied, including two rounds of household livelihood surveys across three provinces on the island of Sulawesi (in 2008 and 2012), engaging 596 households, an action-research activity involving experimental extension approaches in West Sulawesi (the *Partisipasi Inovasi Petani* [PIP]); a pilot impact assessment of a sustainability programme in West Sulawesi with 158 respondents (Hafid *et al*., 2013); and ongoing monitoring of the business-oriented farmer outreach programme implemented by Mars Inc., a partner in the ACIAR project.

2.2 INSTITUTIONAL LANDSCAPE: COCOA FARMING IN SULAWESI

Cocoa is a relatively new crop to Sulawesi, being widely cultivated only in the 1980s. When initially planted, cocoa required little management: soils were fertile, hybrid cocoa planting material was available, and pest and disease problems were insignificant, thereby resulting in high yields averaging 1 700 kg/ha (Ruf and Yoddang, 2001). Good financial returns led to expansion of the crop by smallholders who frequently migrated from more densely populated regions of Indonesia to participate in the boom, inevitably encroaching upon what were previously forest lands. Akiyama and Nishio (1997) explained the initial boom in cocoa planting as facilitated by the "hands-off" approach of the Indonesian Government, allowing space for smallholder dynamism and a highly competitive marketing system. Farmers generally obtained knowledge on farming practices and planting material through informal social networks (Ruf and Yoddang, 2001), and the government did not develop the effective capacity to deliver agronomic or technical support to most farming communities.

However, this era of plentiful cocoa with minimal inputs could not be sustained and, over time, productivity fell. In a pattern consistent with Ruf's (1987) conceptualization of stages in a cocoa cycle, soil fertility declined, the tree stock started to age, and pest and disease problems mounted as the forest rent was exhausted. Productivity losses become apparent during a severe drought in 1997, coinciding with outbreaks of cocoa pod borer (CPB) (*Conopomorpha cramerella*), and were followed by increasing damage caused by black pod disease *(Phythopthora palmivora)* and vascular-streak dieback (VSD) (*Oncobasidium theobromae).* Various methods were tried to minimize CPB damage in particular, including plastic pod sleeving; *rampasan* (indiscriminately harvesting all pods on a farm or village to break the life cycle); use of ants as biological predators; night smoking with coconut fibre or grass; and painting oil on the pods. Integrated pest management (IPM) through non-chemical control methods was also promoted by a package of control practices, widely known by the Indonesian acronym PsPSP (a combination of frequent harvesting, pruning, pod sanitation and fertilization). Adoption of these labour-intensive practices, however, which were evidently inconsistent with prevailing rural livelihood strategies, was not widespread.

In order to maintain production levels, farmers were apparently faced with three options: they could either abandon existing farms and clear new plots elsewhere; they could increase the use of chemical pesticides and synthetic fertilizers; or they could exit from cocoa. Sulawesi cocoa farmers did all three. Insecticides saved labour and, by the time of a survey across three Sulawesi provinces in 2008 (Neilson *et al.*, 2011), when on-farm production levels were averaging around 400 kg/ha, 80 percent of farmers were using insecticides to control CPB. Average use was ten applications per year, and the misuse of insecticides was widely reported.

The institutional landscape within which cocoa farming is embedded across Indonesia has changed significantly since the "hands-off" days of the 1980s and 1990s. From 2000, there has been increasing focus from government, NGOs, industry and development agencies towards supporting cocoa production in Sulawesi. In 2000, the Success Alliance programmes (funded by the United States Department of Agriculture [USDA] and United States Agency for International Development [USAID]) introduced the PsPSP package to farmers through a farmer field school (FFS) approach. By 2005, the project claimed to have trained approximately 100 000 cocoa smallholders across Sulawesi (www.thesuccessalliance.org). USAID followed this (from 2007 to 2012) with the Agribusiness Market and Support Activity

(AMARTA), which worked closely with large cocoa buyers to improve market access and continued intensive training of a further 20 000 smallholders across Sulawesi. Starting in 2003, the International Finance Corporation (IFC) sought to attract wider financial commitments to industry development via public and private sector investments, leading to its support for establishing the Cocoa Sustainability Partnership (CSP) in early 2006. CSP is a forum for private sector actors, the donor community and government agencies to coordinate cocoa research, farmer empowerment and technology transfer. Other international donor agencies with active farmer support programmes in the Indonesian cocoa sector include Swisscontact, VECO Indonesia, Mercy Corps, the Ford Foundation and the Sustainable Trade Initiative (IDH).

The Government of Indonesia, through the Ministry of Agriculture, launched the National Cocoa Rehabilitation Program (GERNAS) for improving productivity and revitalizing the cocoa sector in 2009, which was operational until 2014. The programme had the ambitious aim of improving 450 000 ha of smallholder cocoa through rejuvenation (replanting), rehabilitation (side grafting) and intensification (enhanced fertilization), and marked the first major government support programme for the cocoa sector (Ditjenbun, 2012b). The budget for this programme was substantial, with the national government allocating more than US$100 million per year during the initial phase (Manggabarani, 2011). Despite this attention, results have been disappointing because of the distribution of poor-quality planting material and the absence of well-trained technical support (Gusli *et al*., 2012). The Indonesian Government has shown further willingness to intervene actively in the sector through a recently mandated system of regulated domestic trade (Permentan, 2014), although implementation of this quality-oriented regulation will be challenging and may paradoxically discourage the kind of private sector investment described in this chapter. As mentioned above, national-level production actually appears to have declined over this period despite these interventions.

The production landscape has been influenced further by the increasing non-state regulation of the global cocoa industry through certification schemes for sustainability (Fold and Neilson, 2016). The drive for sustainable certification – particularly Utz Certified and Rainforest Alliance – has been a contributing factor for encouraging private sector involvement at farm level in Sulawesi. Certification schemes in Indonesia have tended to be exporter led and replicate a top-down approach, whereby farmers are trained on how to comply with scheme requirements rather than being empowered to address what they themselves identify as agronomic priorities. Moving ahead, a crucial element determining the effectiveness of such schemes will be the extent to which service delivery to farmers (such as access to finance, improved markets and agronomic advice) can be successfully embedded within the schemes. In parallel with certification programmes, various sustainability programmes have been initiated by large chocolate manufacturers that are becoming directly involved in providing farmer support. These include Mars' Sustainable Cocoa Initiative, Mondelēz' Cocoa Life programme, Nestlé's Cocoa Plan and Hershey's CocoaLink. The active involvement, at farm level, by international cocoa grinders and chocolate manufacturers presents an exciting opportunity to develop innovations in knowledge exchange that can be promoted to improve cocoa sustainability in Indonesia.

2.3 INSTITUTIONAL INNOVATION: A BUSINESS-ORIENTED AND FARMER-DRIVEN OUTREACH PROGRAMME

Most farmer support programmes in Indonesia include an extension component, where demonstration plots, farmer training and field visits are used in an attempt to transfer agronomic knowledge from researchers to farmers. While most projects have some participatory elements for research and innovation diffusion, participatory research approaches are uncommon and extension agents rarely possess the appropriate incentives (or support structures) to ensure effective two-way knowledge exchange. Instead, the majority of interventions focus on a conventional, top-down "technology transfer" approach with a serious gulf between extension agents and farmers. Most cocoa farmers across Sulawesi have now been exposed to new technologies to varying extents, and yet farmers do not respond to this information in expected ways. Some successes are evident, but most cocoa smallholders continue to struggle with the challenges of pest and disease infestation, ageing cocoa trees and poor market access. Ironically, the failure of extension programmes is often blamed on the perceived unwillingness of farmers to adopt "good technological solutions". As one researcher working for an international cocoa buyer in Sulawesi argued:

> *"I don't understand why they don't apply good agricultural practices. We know for sure that it is always more profitable for farmers to apply good practices".*

Interventions still tend to assume that Sulawesi smallholders are either unaware or inefficient, rather than question the appropriateness of the technology within household livelihood strategies or consider ways to work with farmers' inherent capacity to innovate.

The institutional innovation outlined here seeks to develop an improved knowledge exchange platform that is embedded within the broader value chain for cocoa. The business-oriented farmer outreach programme builds on prior research funded by ACIAR, in collaboration with Mars Inc., which developed locally applicable, farmer-participatory methodologies for selecting and testing promising cocoa genotypes on farm (McMahon *et al*., 2009, 2010).

Business-oriented farmer outreach

Mars Inc. has been particularly active in cocoa farmer engagement across Sulawesi and is now one of a number of private sector actors seeking more effective models to encourage sustainable farm practices. The company has developed a hub-and-spoke model of knowledge diffusion, where Cocoa Development Centres (CDCs) are knowledge hubs linked to Cocoa Village Clinics (CVCs), set up by cocoa doctors as the spokes (Mars, 2012, 2013). This is promoted as a business-oriented farm extension outreach system that harnesses the entrepreneurial spirit of rural households; nurtures agricultural service providers as viable business models within farm communities as knowledge exchange spokes; and motivates growers to adopt sustainable productivity interventions.

CDCs are established as outreach centres for training, experimentation and demonstration of latest technologies, for developing regionally appropriate techniques, and to test the local suitability of improved planting material. In Sulawesi, CDCs are further supported and networked together by a Mars-funded Cocoa Academy, which functions as a centralized field-training centre in good agricultural practices and business management and is strongly indicative of the trend towards corporate investment in supply systems. CDCs are operated directly by large cocoa buyers – both grinders and manufacturers – and employ supervisors (normally local villagers with advanced education in agriculture) who act as farmer facilitators. The centres are established and funded by the companies at an estimated start-up cost of US$35 000. Unlike previous donor-funded initiatives in Sulawesi, and indeed various "project-oriented" government interventions, the companies tend to have a longer-term interest in sustainable supply, and consequently appear committed to longer-term investments. CDCs are responsible for identifying potential cocoa doctors living within cocoa communities to establish CVCs as business-oriented spokes. Unlike some other extension approaches, such as FFS, CDCs provide the knowledge agents (cocoa doctors) with ongoing access to cocoa expertise and ensure continued engagement with farmers. Critically, CDC facilitators are demand-responsive to the specific needs of the cocoa doctors.

CVCs themselves are designed to be economically self-sustaining rural enterprises, with continuous technical support from CDCs. Initial costs for establishing a CVC are approximately US$11 000, which is commonly provided in partnership with microfinance institutions, although risk-minimizing mechanisms implemented by CDCs ensure that effective risk exposure is less than US$3 000. CVCs are managed and owned by a cocoa doctor, who is trained by a CDC in both technical and business skills, and who demonstrates the financial benefits of applying an improved productivity package on their own farms. In the cultural context of Sulawesi, where women are frequently responsible for managing household finances, women are actively involved in the management of CVC business. CVCs generate income from farm production by offering rehabilitation and agronomic services (such as side-grafting or responsible pesticide use); selling products such as seedlings from their own nurseries, fertilizers and farming tools; and establishing composting stations for the benefit of other farmers – their clients. While monitoring from the CDC helps to address the possible conflict of interest arising from CVCs marketing products such as pesticides, this particular institutional arrangement is still evolving in Sulawesi. There is no externally imposed business model and each CVC is able to respond to the specific needs of the surrounding community. The development of viable farmer-run nurseries offering improved cocoa planting materials across Sulawesi is the most successful aspect of the innovation, and is in stark contrast with previous failed attempts to distribute planting material through centralized, top-down institutional models. It is envisaged that CVCs will also provide administrative services to certification programmes, operating as internal control system (ICS) managers, which may provide a further incentive for longer-term corporate investment through the CDCs.

The strength of the model resides in the way that incentive structures are aligned among different actors. In a broader social landscape where cocoa production is declining, and where farmers are exposed to various other livelihood options, cocoa buyers are increasingly conscious of the need to intervene to encourage cocoa farming as part of an attractive livelihood strategy. As a result, important actors along the cocoa and chocolate value chain are motivated to invest in the establishment of CDC training centres as a means to ensure long-term supply sustainability. While a

CDC requires ongoing investment by an institute or company, the CVC will generate its own revenue and is effectively cost neutral for the sponsor. The profit motive for more and repeat business means that CVC owners, as knowledge brokers, are incentivised to reach as many farmers as possible and deliver high-quality services.

The innovation also considers the development of social capital by facilitating a network of cocoa doctors who are connected through a CDC, which helps develop personal relationships and the identity of being part of a larger, dynamic cocoa community. Generation of skilled employment within the CDCs and nurturing business opportunities through the CVCs respond to the changing social and economic realities of rural Indonesia as the country undergoes a profound agrarian transition away from agriculture. It seeks to address the continued slide of agriculture into a “sector of last resort”.

As of early 2014, four CDCs had been established in Sulawesi, alongside a total of 33 CVC businesses, which were collectively serving more than 600 farmer clients (Hussin Purung, pers. comm., 2014). Mars has ambitious plans to expand this network to 16 more CDCs and 120 CVCs serving 12 000 farmers by 2017, such that considerable potential exists to scale up the initiative. The CDC-CVC model is easily replicated. Although Mars has pioneered the model, it has also actively encouraged and facilitated other collaborators (including cocoa-grinding companies) and donors to apply the model elsewhere in Indonesia, and indeed the world (the approach has already been scaled up in Côte d’Ivoire, where 17 CDCs have been built by Mars and with grinder collaborators such as ECOM and Barry Callebaut).

Farmer-driven experimentation

In addition to managing CVCs as viable business units, the model also involves cocoa doctors acting as extension agents – or preferably “knowledge brokers” – for their farmer clients. As active farmers living within the cocoa-growing community, the cocoa doctors are able to communicate more effectively with their farmer clients than conventional extension officers. They have strong credibility, as they will be managing a highly visible, and highly productive cocoa farm of their own, thereby responding to broader field-based evidence of the effectiveness of farmer-to-farmer knowledge exchange (Poncet, Kuper and Chiche, 2010). The cocoa doctors are further supported to undertake experimentation and field-based observations.

Each CVC is actively supported to establish a trial garden to assess the local suitability of different clonal varieties, which are subsequently used as a budwood garden for later grafting and nursery sales. The advantage of this approach is that farmer clients are able to observe directly the strengths and weaknesses of each variety and make an informed decision on how to allocate their own resources to replanting, building on earlier research on participatory farmer clonal trials (McMahon *et al.*, 2009, 2010). While existing CVCs have focused their attention on clonal testing, an associated ACIAR initiative in West Sulawesi is trying a broader method of farmer-driven experimentation designed to be applied by CVCs in the future. This, as mentioned earlier, is the PIP (*Partisipasi Inovasi Petani*) approach, where farmers are identifying and undertaking their own farm-level crop management experiments with external technical support.

PIP design draws upon insights from both the theory and practice of farmer-driven research and experimentation, and is based upon innovation systems thinking, where communication, knowledge management and collective learning all play important roles (FAO, 1995). It also draws upon concepts of participatory research, where innovations are co-created through interactions between local and external actors (Fisher and Carberry, 2008). Numerous observers, such as Biggs (1990) and Kristjanson *et al.* (2009), have drawn attention to the fact that farmers are capable of producing knowledge for innovation. Rather than convince farmers to change practices, this family of approaches aims to build farmers' capacity to seek out and test new possibilities that suit their circumstances. In many cases, farmers' knowledge has continued to be undervalued by academic researchers and the rhetoric of demand-led research has not always been matched in practice.

PIP promotes sustainable agriculture through the development of the farmers' own capacity to experiment and innovate with farm management practices. Three separate trials were initially identified, and subsequently established, by farmers in the PIP village: (i) an extension of earlier clonal trials for superior planting material; (ii) four different management systems for integrated pest and disease management; and (iii) a comparison of the effects of organic and inorganic fertilizers on an ageing plot. Farmers are assisted to design the trials using basic scientific principles in a way that other variables can be controlled and the effects on productivity can be reasonably attributed to specific treatments.

While PIP is still a highly experimental activity at this stage, it has been designed to be easily incorporated within the broader CDC/CVC model in the future. PIP is an adaptive and decentralized model where innovation intermediaries (such as CDCs) can interact within a knowledge network to support farmers' own experiments and the dissemination of new ideas. It was designed to create a knowledge platform, rather than a demonstration site. PIP is an innovative addition to the CDC/CVC model in that it is trying out a model of participatory approaches within the emergent environment of enhanced corporate engagement with farm production.

Sustainable practices in the cocoa sector

The three primary challenges to cocoa sustainability mentioned earlier (forest clearing, pesticide use and soil degradation) need to be addressed through a combination of scientific solutions alongside innovative institutional arrangements whereby farmers have access to reliable knowledge networks. The business-oriented farmer outreach programme is essentially an institutional innovation, through which knowledge and skills are being shared within farm communities. An important aspect of sustainability in this model involves the financial viability of the CVC business units, and training is being provided in business administration (including basic accounting), planning, monitoring, documentation and marketing. Similarly, the cocoa farm environment is highly dynamic and will continue to experience changes in terms of environmental conditions, agronomic challenges and shifts in the availability and cost of labour in the future. Farmers will need to be equipped with the necessary skills to innovate and adapt their practices to these changing conditions, and PIP is specifically targeted at supporting this long-term sustainability challenge.

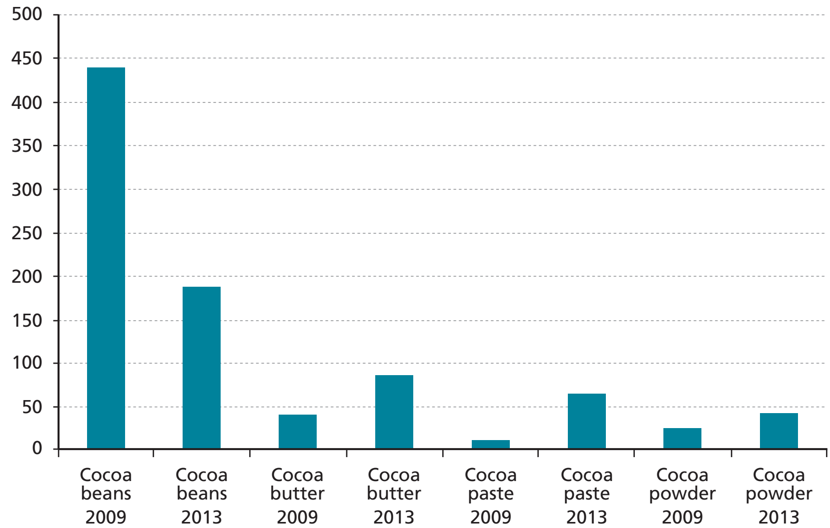
While the innovation described here is primarily institutional, sustainable farm practices are being encouraged through this process. CDC/CVCs have been effective in encouraging the rehabilitation of existing cocoa farms with improved planting material (through replanting and side grafting). The prevention of further cocoa-related deforestation on the islands demands that the pattern of abandonment and forest clearing be immediately addressed. This requires the profitability of existing farms to be maintained, and the rehabilitation activities of CVCs are performing a critical role in this respect. The emergence of spraying-related service provision by CVCs, where trained cocoa doctors (wearing adequate safety equipment) are responsible for pesticide application across a number of farms is resulting in less frequent, and more effectively targeted, use of chemicals. This system is partially replacing the prevailing haphazard approach, where poorly trained individuals use chemicals excessively as advised by unscrupulous providers with no external monitoring. Finally, solutions to soil degradation are being explored through the establishment of composting business models, where the production and conversion of organic material into fertilizers is encouraging integrated cropping with shade trees and livestock (particularly goats).

Markets for sustainable products and services: value chain dynamics in the Indonesian cocoa sector

Sulawesi cocoa has conventionally been traded on the global market as unfermented, bulk beans for their butter content. Processors and manufacturers generally use Sulawesi beans as a "filler" and blend them with other fermented beans that are able to add flavour to chocolate products. There has historically been insufficient price differentiation to encourage farmers to invest in producing higher-quality cocoa beans (e.g. through fermentation), and even poor-quality cocoa beans seem to find a ready market from Indonesia (Ruf and Yoddang, 1998). Intense competition among buyers meant that, in the 1990s, Indonesian cocoa farmers were receiving a much higher share of the international price (89 percent) compared with farmers in Côte d'Ivoire (50 percent) and Ghana (63 percent) (Akiyama and Nishio, 1997). There appears since to have been some convergence in this indicator across these origins, but the relative efficiency of the cocoa supply chain in Indonesia still holds.

In the past, Indonesia predominantly exported raw beans, but this is changing. Since the introduction of an export tax on raw beans in 2010, Indonesian cocoa is increasingly sold to domestically located cocoa grinders (both local and foreign owned), with Indonesian grindings more than doubling from 130 thousand tonnes in 2009/2010 to 295 thousand tonnes in 2013/2014 (ICCO, 2011, 2014). Correspondingly, exports of cocoa butter and paste have increased, while bean exports have fallen (Figure 2.2). While Indonesia's large domestic consumer market holds enormous growth potential for chocolate products, the apparent consumption of cocoa products within Indonesia, measured as grindings plus net imports of cocoa and chocolate products in beans equivalent, has remained a mere 3 percent of production (ICCO, 2014). It is primarily the relocation of international, export-oriented grinders to Indonesia that has reshaped the value chain in recent years towards greater domestic integration. New investments by Barry Callebaut and Cargill are encouraging enhanced integration up the chain and the forging of closer relationships with farmers (Fold and Neilson, 2016). This reflects a broader shift towards greater corporate governance in the Indonesian cocoa sector that is driving the types of institutional innovations described in this chapter.

FIGURE 2.2
Exports of cocoa products from Indonesia (volumes in '000 tonnes)



Source: http://comtrade.un.org/

Cocoa grinding worldwide is highly concentrated in the hands of a few large multinational companies, with Euromonitor International (2012) estimating that 60 percent of processing is now conducted by just three companies: Cargill (United States of America), Barry Callebaut (Switzerland) and Archer Daniels Midland (United States of America), all of whom are establishing a presence in Indonesia. This restructuring of the value chain has placed a higher premium on quality, as grinders need to find a market for taste-sensitive cocoa powder, and has caused greater competition among buyers as the installed grinding capacity now exceeds current supply (Neilson, Meekin and Fauziah, 2013). Cocoa grinders perform a turnkey function in the value chain by operating as contract manufacturers to the branded chocolate companies, while also offering other intermediate products to alternative markets. They thus perform a critical role in the cocoa value chain (Fold, 2002). Indeed, some of these grinders have demonstrated a commitment towards sustainable sourcing practices – Cargill has announced its Cocoa Promise programme, Barry Callebaut has established the Cocoa Horizons Foundation and Olam International is working with the Blommer Chocolate Company under the Grow Cocoa programme.

The single most important buyer of cocoa products continues to be the global chocolate manufacturing industry, consuming approximately 50 percent of cocoa ingredients worldwide (Euromonitor International, 2012). Some chocolate manufacturers are giant corporations in the global food industry, specializing in branding and marketing a number of different food products (Nestlé and Mondelēz International), while others are specialized in chocolate-based products (Mars, Hershey and Ferrero). Activities of these manufacturers are concentrated on the design of consumer products and marketing of global brands, and they are especially sensitive to consumer concerns over social and environmental neglect within their supply chains; many are committing to sustainability-related certification programmes. In 2009, Mars committed to buying 100 percent sustainable cocoa by 2020, and Hershey and Ferrero have since made the same commitment. Based on commitments made by most major chocolate manufacturers to source sustainably certified cocoa in the coming years, the number of Indonesian cocoa farmers involved in certification is likely to rise significantly.

Cocoa farmers across Sulawesi conventionally sell half-dried, unfermented cocoa beans to local village collectors, who then sell on to larger town traders and eventually either to large trading firms in the city of Makassar for export as raw beans or increasingly sold to the growing number of domestic processors. Our field surveys found that farmgate prices received by farmers in the Polewali district (where our PIP case study is located) range between 70 and 80 percent of prevailing world cocoa prices (based on the International Cocoa Organization indicator price). Therefore, in 2012, when the world cocoa price was US$2.4/kg, farmers were receiving the equivalent of US$1.9/kg. Considering the relatively poor quality of Indonesian cocoa, this is generally considered quite a high share. Farmers obtain slightly higher price shares when they participate in a direct-buying programme initiated by larger companies. Earlier research (Neilson, Meekin and Fauziah, 2013) found that the share of the world price received by farmers in Polewali increased from 67 percent in 2008 to 79 percent in 2012, primarily as a result of increased competition among domestic processors since the introduction of the 2010 export tax.

The institutional innovations presented in this paper are indirectly related to the marketing of sustainably certified cocoa beans. It is now estimated that 20 percent of global cocoa production is sustainably certified, with each of Rainforest Alliance and Utz Certified more than doubling the volume certified each year since 2010 (Molenaar *et al*., 2013). This is significant. At the same time, however, both chocolate manufacturers and international grinders are developing and implementing their own in-house "sustainability" programmes in origin countries, which are not always directly linked to certification schemes (e.g. Nestlé's Cocoa Plan, Mondelēz' Cocoa Life and Hershey's Cocoa Link). As a result, we see certification as part of a complex set of factors pushing larger corporate actors into partnerships with smallholder farmers in Indonesia. While there is currently little impartial evidence of the actual effects of certification programmes on smallholders (Blackman and Rivera, 2010), there is a rapidly expanding field of endeavour to undertake comprehensive impact assessments (see, for example, COSA, 2013). We recognize that certification schemes provide an important conduit for linking farmers with corporate actors in the cocoa-chocolate chain, and thereby allow an exchange of knowledge and development assistance along the value chain. However, we also foresee enhanced corporate engagement with farmers occurring in the future because of supply concerns, which are expected to intensify across a number of competing commodities, irrespective of the future growth of certification programmes.

This section has set out the broader conditions of marketing dynamics in the Indonesian cocoa sector into which the Mars Inc. business-oriented outreach system has been embedded. In addition to being one of the world's largest chocolate manufacturers (and generally sourcing intermediate cocoa products from the grinders globally), Mars actually operates its own grinding facility in Sulawesi where it produces cocoa butter, cocoa paste and cocoa powder from raw cocoa beans. Annually, this facility processes around 12 000 tonnes of cocoa beans, sourced entirely from an estimated 20 000 smallholder farmers. The CDC/CVC innovation outlined in this chapter encompassed an estimated 600 farmers in 2014 (although this number is increasing), who were able to sell their cocoa beans directly to Mars-operated buying stations strategically located within the growing region itself. As a result, the supply chain is relatively direct, and so provides benefits in terms of transparency and price.

2.4 RESULTS

The business-oriented outreach activity has created an innovative institutional mechanism that is delivering new skills and innovations to the cocoa farming community in Indonesia. Internal monitoring by Mars suggests that almost all CVCs are now operating as viable business units, deriving income primarily from nursery management, alongside other technical services, although this has yet to be subjected to an independent examination. Some units are reportedly generating profits in excess of US$13 000/year (Hussin Purung, pers. comm., 2014). Through professional management of their own farms and the distribution of improved planting material, the cocoa doctors are demonstrating to the broader farming community the potential for increasing cocoa yields. The CDC/CVC model has established a viable and potentially self-sustaining institutional mechanism whereby knowledge regarding sustainable agricultural practices can be effectively disseminated throughout the farming community. The ambitious future expansion plans for the CDC/CVC model suggest a high degree of satisfaction from major stakeholders, including other private sector partners (especially cocoa grinders) that are adopting the model as a “franchise” development.

While the business-model approach of CVCs has proved to be a financially viable model, further research will be required to ascertain the effectiveness of this mechanism in ensuring the widespread adoption of more diverse sustainable practices at farm level. The question remains whether increased production and productivity (which are clearly in the corporate interests of chocolate industry actors concerned about long-term supply) necessarily equate to enhanced agro-ecological sustainability or improved farm livelihoods. In this case study, the provision of improved planting material through CVC business units has been a first point of contact with farmers, providing a conduit for the dissemination of other sustainable farm practices, such as composting of farm waste, intercropping with fruit trees and livestock, and improved targeting of pesticides. More farmers are rehabilitating their farms with improved planting material as a result of CDC/CVC interventions and this, we suspect, is reducing pressure on further forest clearing.

Having layers of farmer engagement, from village level through CVCs and CDCs to global buyers, improves the likelihood of success, sustainability and longevity. Perhaps most important, farmers are in a position to make their own informed experimental or management decisions – a possibility that is often discouraged in traditional approaches by researchers’ doubts about the validity of farmers’ opinions. While farmers are able to test and study innovations for themselves in an iterative learning process, CDCs are also learning more about the socio-economic influences on farmers' decisions. It is early days in the development of PIP, but we believe that working with farmers, rather than simply telling them what to do, will create more innovations, greater productivity and long-term sustainability.

2.5 CONCLUSIONS AND RECOMMENDATIONS

The disappointing performance of interventions in the Indonesian cocoa sector over the last decade has reinforced our belief that relying on (researchers' perceptions of) appropriate technology alone is not enough to encourage adoption. Thanks to the widespread efforts of government, the private sector, development organizations and NGOs, many cocoa farmers possess reasonable knowledge of the types of farming practices available to them. Yet there is a big difference between being aware of an idea and being willing to apply that idea on farm. It is the crucial process of ongoing implementation (and ongoing engagement by external actors) on farm that is too often ignored or overlooked in conventional approaches to extension. In the absence of any other incentives, the choice not to adopt certain practices is often quite logical, given the constraints farmers face and the other land uses they are managing. The profitability of adopting improved practices will depend on the relative costs of the various inputs (fertilizers, pesticides, planting material and, most important, labour) relative to prevailing market prices for cocoa and the prices of other commodities that might be competing with household labour resources. In the CDC/CVC model, cocoa doctors carry out an important role in adapting good agricultural practices to local conditions.

This business-oriented outreach programme utilizes entrepreneurial farmers (cocoa doctors) as knowledge brokers in the cocoa farming community. These agents, instead of being disinterested messengers, are becoming facilitators of knowledge exchange and interaction among stakeholders, and are being presented with new incentives to facilitate knowledge exchange. Researchers and extensionists (such as CDCs) play important "network brokerage roles", especially in the early stages of the innovation process. Farmers should, however, be equal participants in networks, which allows for knowledge creation and exchange on their own terms and in a way that encourages greater farmer-driven experimentation and innovation.

Now that the mechanism has been established and proved to be financially viable, the next stage will be to ensure that cocoa doctors are performing effectively as knowledge agents. The PIP activity demonstrates a way to increase farmers' options by improving their farm management skills as well as building their participation in knowledge networks. It is developing the long-term capacity for farmers to cope with an increasingly global and dynamic market, which will persist beyond the period of external supports. Looking ahead, PIP offers a new model of farmer engagement that could be readily applied to the new opportunities being presented by enhanced private sector actors across the Indonesian cocoa landscape. It is demonstrating to others that it is time to move beyond technology transfer. So long as scientists develop research in isolation from the farmers they are ostensibly trying to help, they risk devising techniques that are not suited to the conditions of the farm or that are not relevant to the farmer's chosen livelihood strategies. The integration of business-oriented farmer outreach together with farm-level experimentation is beginning to be rolled out across Indonesia, and may offer insights into appropriate models that could be developed elsewhere.

The CDC/CVC model reflects a broader trend discernible in the global cocoa industry, but also relevant to other commodities, whereby end users of agricultural products are finding it necessary to engage directly with farmers within their supply chain. As explained by a senior sustainability manager with a global chocolate company:

> *"what was once considered to be a problem for the small farmer is increasingly becoming our problem, and we need mechanisms to address it collaboratively".*

Perhaps the most exciting, as well as the most challenging, aspect of the knowledge exchange network in Sulawesi in the future will be how to embed farmer-oriented services within sustainability programmes, especially certification schemes. There are growing concerns that the benefits for smallholder farmers of certification schemes are minimal while the costs of the schemes can be substantial, and farmers perceive limitations on their farm practices rather than solutions to their challenges. Proponents of certification schemes, and industry participants in the schemes, are often aware of these limitations, and are actively seeking solutions to ensuring that greater benefits flow to farmers and to the environment. There is a fundamental requirement to ensure that sustainability programmes in the cocoa sector are farmer-oriented and provide a platform for improved access to services that satisfy the changing livelihood strategies of rural households. The outreach programmes described in this chapter have been adapted to local conditions, and look towards an institutional model where sustainable farm practices can be developed in a partnership between smallholder farmers and corporate actors in the value chain. While the challenges are immense, the particular supply constraints found in the global cocoa sector provide an interesting set of circumstances that are encouraging such innovations that may indicate a likely future for various other agricultural commodities produced by smallholders in the developing world.

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Chapter 3
Namibian Organic Association's Participatory Guarantee System

Manjo Smith and *Stephen Barrow*

3.1 INTRODUCTION

Namibia is one of the most sparsely populated countries in the world with a population of 2.1 million people sharing an area of 825 615 km^2. It is the most arid country in sub-Saharan Africa with highly variable climatic conditions. Approximately 22 percent is classified as desert, 70 percent as arid to semi-arid and the balance as dry subhumid (Turpie *et al*., 2010). Agriculture, mining and tourism form the basis of Namibia's economy. Agriculture is the predominant land use, where 70 percent of the population depends directly or indirectly on the natural rangeland resources for their economic well-being and food security. More land is used for agriculture than any other activity, thus about 64 million ha or 78 percent of the country is used for farming, while the remaining 22 percent consists of national parks, game farms, urban areas, mineral concessions and areas too dry or remote to be used for agriculture (Mendelsohn, 2006). Table 3.1 describes the main farming systems in Namibia. Beef production is the most important livestock-related activity in the country, followed by small stock (sheep and goat) production. The Namibian commercial livestock sector has accounted for almost 70 percent of overall annual agricultural output value since 1990. This activity is almost completely dependent on the country's natural rangelands (MAWF, 2012).

Because of climatic conditions in Namibia, agricultural activities must also address different environmental concerns that greatly affect the country. Rainfall is low and variable and about 55 percent of the land receives less than 300 mm of rain per year (classified as arid); and 40 percent receives between 300 and 500 mm per year (classified as semi-arid). With such low and variable rainfall, sustainable utilization of natural resources becomes a challenge, and seen against climate change, will become increasingly so. Like agriculture, rangeland activities suffer the same limitation and the National Rangeland Management Policy and Strategy (MAWF, 2012) stated that the rangeland conditions in many areas can be described as poor to very poor. Soil erosion, bush encroachment, severe overgrazing, loss of perennial grasses, decrease in basal cover and deforestation are a result of poor rangeland management and of too many people and livestock in one place for too long (between 60 and 70 percent of Namibia's population practise subsistence agropastoralism on communal land, which constitutes approximately 41 percent of the total land area). Furthermore, land clearing for crop farming, the application of inappropriate cultivation techniques, provision of artificial watering-points and associated management practices and overexploitation linked to insecure land tenure arrangements are all factors that contribute to degrade natural resources and lower soil fertility.

TABLE 3.1
Namibian farming systems

Farming system	Main commodities	Land area	Use of production
Small-scale cereals and livestock	*Mahangu* (pearl millet), sorghum, maize, goats and cattle	Small exclusive farms and open grazing in communal land in the northern regions	Domestic consumption supplementing incomes from non-farming activities
Cattle ranching	Cattle	Large freehold farms, exclusive farms in communal land and in open grazing in northern Kunene	Beef, mainly for commercial sale to South Africa, Europe and Namibian consumers
Small stock	Sheep and goats	Large freehold farms and open grazing in communal land in the southern and western regions	Mutton and goats for commercial sale to South Africa and Namibian consumers
Intensive agriculture	Vegetables, herbs, grapes, olives, dates and other fruit	Small-scale farms, mostly irrigated	Commercial sale to export markets and Namibian consumers
	Maize, wheat, sorghum, sunflowers, lucerne and cowpeas	Dryland or irrigated freehold farms	
	Pigs and dairy	Small-scale and freehold farms	
Natural resource production	Indigenous fauna and flora, and landscapes	Mainly in game farms, community forests, conservancies, parks and reserves	Commercial sale to Namibian consumers and for export through tourism

Source: Mendelsohn, 2006.

Namibia has been classified as one of the countries most vulnerable to the impacts of climate change (GRN, 2002). The Climate Change Vulnerability and Adaptation Assessment prepared for the Second National Communication indicates that rural communities and poor people in Namibia are the most vulnerable to climate change impacts (Dirkx *et al.*, 2008; MET, 2011a, 2013). This is attributed to Namibia's natural resource-based economy, and its arid nature and high variability in climatic patterns that limit the adaptive capacity of its population. Climate-related impacts on agriculture such as droughts and floods are expected to result in declining crop yields, shifts in growing seasons and harvest losses with a resulting increase in the number of irrigation schemes in certain areas of Namibia.

The Government of Namibia implemented different policies to respond to these environmental concerns. One of the objectives of the National Agricultural Policy (MAWF, 1995) is to "promote the sustainable utilization of the nation's land and other natural resources". The policy states that: "Agricultural growth will not be pursued at the expense of the environment. All Namibians who benefit from the country's natural resources are custodians of, and must accept responsibility for, their sustainable management". "Agricultural resources include land for cultivation and grazing, underground and surface water resources, flora, wildlife and livestock ... land-use options must be compatible with the country." It is therefore clear that agriculture based on organic agro-ecological and conservation approaches, including proper natural rangelands management, supports the Government's objectives.

The Namibian Organic Association (NOA) introduced a Participatory Guarantee System (PGS) to give farmers access to local markets in a more sustainable way. Through PGS, food or other agricultural products that are produced under organic standards are labelled according to NOA PGS standard marks. This system differentiates organic, agro-ecological products from conventionally produced products so that consumers can make an informed decision if they want to purchase healthy products produced without genetically modified organisms (GMOs) and in a sustainable, ecologically sound way that supports and improves the natural environment.

The PGS system works for the benefit of farmers since they get recognition for their organic production methods on a product level. It also benefits those traders who want to attract a specific type of customer and therefore distinguish between different product categories to meet their needs for healthy organic foods. Last, the PGS system also benefits consumers by empowering them to make informed purchasing decisions, whether buying directly from farmers, or in the retail chain.

Demand for organic produce is therefore stimulated and farmers get access to sustainable markets where consumers prefer their products above conventionally produced food. Consumers are also prepared to pay a higher price for these products.

3.2 INSTITUTIONAL LANDSCAPE

Namibia is one of a few countries in the world specifically to address habitat conservation and protection of natural resources in its constitution. Quoting Article 95: "The State shall actively promote and maintain the welfare of the people by adopting international policies aimed at the following: maintenance of ecosystems, essential ecological processes, biological diversity of Namibia, and utilization of living natural resources on a sustainable basis for the benefit of all Namibians, both present and future".

In order to support the objectives of the Government and those farmers who wish to follow a more ecological way of producing food based on the latest science and technology, NOA was formed in 2009 with the aim of developing the organic agricultural sector in Namibia. There are currently no other similar initiatives in the country.

NOA is registered as an "Association with Constitution", which operates as an NGO. It comprises a Board, which makes decisions and bears responsibility for the association, an administration team, and members. Farmers, consumers and organizations with a common interest to act according to the objectives outlined in the constitution may become NOA members.

NOA's objectives are based on the Principles of Organic Agriculture of the International Federation of Organic Agriculture Movements (IFOAM). These principles are the roots from which organic agriculture grows and develops. They express the contribution that organic agriculture can make to the world and a vision to improve all agriculture in a global context. The principles apply to agriculture in the broadest sense, including the way people tend soils, water, plants and animals in order to produce, prepare and distribute food and other goods. They concern the way people interact with living landscapes, relate to one another and shape the legacy of future generations.

- *Principle of health*. Organic agriculture should sustain and enhance the health of soils, plants, animals, humans and the planet as one and indivisible.
- *Principle of ecology*. Organic agriculture should be based on living ecological systems and cycles, work with them, emulate them and help sustain them.
- *Principle of fairness*. Organic agriculture should build on relationships that ensure fairness with regard to the common environment and life opportunities.
- *Principle of care*. Organic agriculture should be managed in a precautionary and responsible manner to protect the health and well-being of current and future generations and the environment.

Stakeholders

Stakeholders recognizing NOA on a government level are the Ministry of Agriculture, Water and Forestry (MAWF), the Ministry of Trade and Industry (MTI), the Ministry of Environment and Tourism (MET), the Namibian Agronomic Board (NAB), the Meat Board of Namibia, the Agro-Marketing and Trade Agency (AMTA), the Agricultural Business Development Agency (Agribusdev), and the Namibian Standards Institution (NSI).

NOA interacts with farmers directly, and with farmer organizations such as the National Association of Horticultural Producers (NAHOP), Namibia Agricultural Union (NAU) and the Namibian National Farmers Union (NNFU), and with farmer support programmes such as the German Agency for International Cooperation (GIZ)/AgriBank Farmers' Support Programme.

NOA enjoys a good standing with traders through its participation in the National Horticulture Task Team (NHTT), which develops the wider horticultural sector in Namibia; the Namibian Association of Traders in Fresh Produce (NATFP); and direct relationships with traders and farmers' markets.

A strong relationship was also formed with the Namibia Training Authority (NTA), where NOA participated in the development of the Vocational Education and Training system to enable development of agricultural qualifications in the organic agriculture sector.

Other stakeholders include development funding agencies, the Namibian Consumer Association and the Namibian Biosafety Council, which deals with matters relating to genetically modified foods (GMOs).

Recognition of NOA includes opportunities for representation at policy-forming events concerning the environment and agriculture; operation as a media contact point for all local and international organic related matters; and annual funding received from NAB, the horticultural retail sector and other development organizations such as GIZ.

All these stakeholders are also routinely invited to attend NOA PGS assessments, in order to promote the transparency of the system and motivate them to become active NOA members.

Drivers in the development phase

The main drivers of the initiative are NOA, pioneer organic farmers and consumers demanding fresh, high-quality organic food. The establishment phase was financed by a grant from the Country Pilot Partnership Programme for Integrated Sustainable Land Management (funded by the Global Environment Facility [GEF] and the United Nations Development Programme [UNDP]).

This grant was used to develop private Namibian organic standards by adapting the Afrisco standards (Afrisco, 2009) to take into account local institutional capacity, training of farmers in the understanding of the standards and their application, and setting up the PGS system. These standards are the basis of NOA's PGS farm assessments and were equivalent to IFOAM's Basic Standards (2005) when developed.

Knowledge and technical expertise on sector development were acquired by attending an Organic Sector Development Programme in Sweden and Uganda, in 2008 and 2009 (sponsored by the Swedish International Development Cooperation Agency [SIDA]), and by attending an IFOAM PGS training course at the first West African Summit on Organic Agriculture in Nigeria, 2008.

Given the comparatively recent initiation of development in the Namibian organic sector, NOA has been able to learn from international case studies and adopt recognized best practices accordingly, since Namibia has no legislation on organic standards.

3.3 INSTITUTIONAL INNOVATION: NOA PGS

Background

The development of NOA PGS was based on a requirement to formalize the sector. Consumers wanted to make informed purchasing decisions and required labelled organic food, while farmers wanted to receive recognition for the fact that their products are different from conventional products. PGS addressed the situation in which, without appropriate Namibian legislation, standards and a certification structure, the organic market was exposed to misleading claims and subsequent abuse of consumers' trust in organic food.

The organic production sector and domestic market were too small to justify the general promotion and adoption of third-party certification. Consequently, NOA initiated a project in mid-2009 aimed at the formation and implementation of IFOAM's concept of PGS. This alternative to third-party certification was attractive given its local nature and reduced costs compared with sourcing international third-party certification, as well as its being an effective basis for the development and dissemination of Namibian specific organic knowledge and experience.

This innovation resulted in the fact that NOA PGS is unique within Namibia in all aspects. It was a chance to formalize the concept of organics, to obtain "buy-in" from producers, retailers, farmers' markets and consumers alike within a physically and numerically small, widely spread community. It was also an opportunity to adopt a leading role in the development of organic agriculture, promoting sustainable, climate-smart agriculture to government and the formal agricultural sector.

Internationally, the PGS concept was in a fledgling stage. One PGS had been established in South Africa and another was in the process of being established. NOA approached Afrisco, an internationally accredited South African third-party certifier, for assistance with setting up PGS, documentation and provision of training. Thus began a loose partnership between both organizations, whereby NOA used the Afrisco documentation as the basis for its PGS standards and procedures. Afrisco's Certification Manager acted as consultant, thereby providing insight and experience that would otherwise have taken much longer to gain.

NOA received official IFOAM PGS recognition in March 2013, which means that this PGS is endorsed by IFOAM because it operates in accordance with

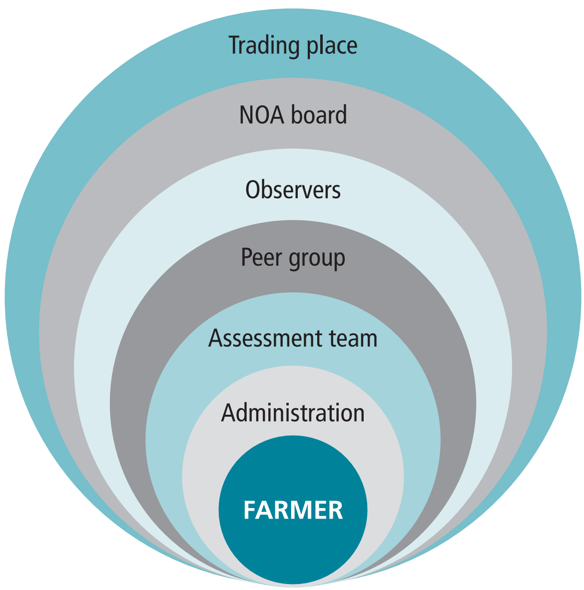
IFOAM's key PGS elements and features, and integrity *vis-à-vis* the principles of organic agriculture is verified.

PGS organizational structure

The main actors that participate in and support PGS directly are the NOA board, NOA assessment team, NOA members (consumers, traders or other parties) and farmers (Figure 3.1).

- The NOA board, which donates its time on a voluntary basis, carries final responsibility through ratification of the decisions of the assessment team, and authorizes use of the registered NOA trademark.
- The NOA administration team, which is employed by NOA, organizes basic logistics with regard to documentation, preassessments and assessment visits.
- The assessment team is a core group of members who have received formal training based on the *IFOAM/IOIA International Organic Inspection Manual* (Riddle and Ford, 2000). The team is responsible for conducting preassessments and on-farm assessments, compiling assessment documentation and making recommendations to the board.
- All NOA members are invited to act as observers to ensure transparency. They may be non-organic farmers, market representatives or consumers. They may join in the discussions but do not participate in decision-making.
- PGS relies on peer group farmers to participate in the peer review system.

FIGURE 3.1
NOA PGS organizational structure



Source: authors' elaboration.

Traders, such as farmers' markets and retail shops, recognize the NOA PGS mark as the qualification for Namibian-produced organic products. Some retailers also import organic processed products that are third-party certified.

PGS procedures

The PGS assessment process follows a sequence.

1. Submission of application form.
2. Documentation and logistical preparation by the administration team.
3. Preassessment by the assessment team, based on a remote documentation review to resolve potential issues in advance or gather necessary information.
4. Physical farm assessment, during which standard forms are completed and used for the decision.
5. Submission of the decision to the Board for ratification.
6. Board ratifies or rejects the decision, and/or makes further recommendations.
7. Farmer is informed of the decision, non-conformities and/or recommendations.
8. Permission to use the NOA PGS mark with appropriate wording is granted upon the successful resolution of non-conformities.
9. After finalization, the decision is made public and pertinent assessment documentation is open for scrutiny, thereby ensuring transparency. An appeals process still needs to be put in place.

PGS members (2015)

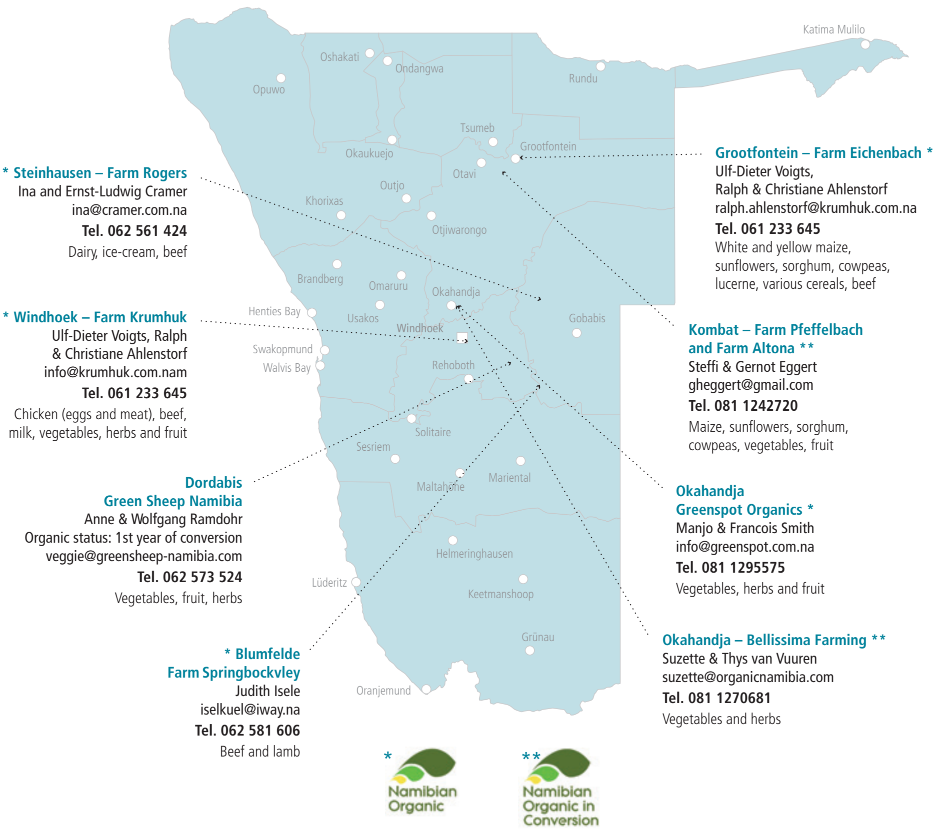
The farmers, farms, product categories and localities that are current members of and assessed by NOA PGS are shown in Table 3.2 and Figure 3.2.

TABLE 3.2
NOA PGS members, products, and production (ha)

	Products	2011	2012	2013	2014	2015
Greenspot Organics	Vegetables, herbs, fruit	6.1	none	6.1	6.1	6.1
Bellissima Farming	Vegetables, herbs, fruit	0	0	12	12	12
Farm Altona	Grain crops, vegetables, fruit	0	0	0	50	0
Farm Pfeffelbach	Vegetables, herbs, fruit, *moringa*	1	0	0	2.3	1.6
Green Sheep	Vegetables, herbs, fruit	0	0	5.5	5.5	5.5
Farm Rogers	Dairy, beef, icecream	5 066	5 066	5 066	5 066	5 066
Farm Krumhuk	Vegetables, herbs, fruit	8 000	8 000	8 000	8 000	8 000
Farm Springbokvley	Beef, lamb	0	0	9 539	9 539	9 539
Farm Eichenbach	Grain crops	400	400	400	400	400
Farm Olifantwater West	Beef, lamb	0	0	0	6 863	6 863
Farm Vredelus	Medicinal plants	0	0	0	7	7
Total		**13 473.1**	**13 466**	**23 028.6**	**29 950.9**	**29 900.2**

Source: authors' elaboration.

FIGURE 3.2
Map of NOA PGS farms in Namibia



Source: authors' elaboration.

Sustainable practices

NOA promotes the full diversity of sustainable, organic and agro-ecological practices. IFOAM defines organic agriculture as "a production system that sustains the health of soils, ecosystems and people. It relies on ecological processes, biodiversity and cycles adapted to local conditions, rather than the use of inputs with adverse effects. Organic agriculture combines tradition, innovation and science to benefit the shared environment and promote fair relationships and a good quality of life for all involved".

NOA has based its standards on Afrisco's accredited implementation of the IFOAM Basic Standards (Afrisco, 2009; IFOAM, 2006), thus implementing three types of standard:

- Namibian organic in conversion: after one year of organic farming and an assessment against NOA standards, approved farmers can use the "organic in conversion" mark.

- Namibian organic: after two to three years of organic farming and assessments according to NOA PGS organic standards, approved producers can use the "Namibian organic" mark.
- Namibian organic (brown). Approved farmers can use this brown NOA mark, if the identified ingredients are Namibian organic and processing is not certified. The logo is only valid until the end of 2016 to give farmers time to upgrade their processing facilities so that they comply with NOA standards.

In development of the standards, NOA has taken local conditions into account, such as the early development and availability of organic grains, and has therefore included a special allowance for livestock farmers regarding the use of non-organic (but non-GMO) fodder for dairy animals, pigs and poultry when there are no organic grain supplementation products available.

Holistic management (HM), formally holistic resource management, as originally developed by Allan Savory (1988) and promoted by the Namibia Centre for Holistic Management is "a decision-making framework which results in ecologically regenerative, economically viable and socially sound management of the world's grazing lands" (Savory Institute, 2014). HM works with the relationship between large herds of wild herbivores and grasslands, natural tilling of the soil and nutrient cycling. It helps farmers to "develop strategies for managing herds of domestic livestock to mimic those wild herds to heal the land". It "embraces and honours the complexity of nature, and uses nature's models to bring practical approaches to land management, and restoration" (Savory Institute, 2014).

The implementation of other ecological agricultural methods, such as permaculture, biodynamic agriculture (Steiner, 1958) and the complementary aspects of biological farming (Kinsey, 1993; Zimmer, 2000) are also recognized and promoted.

While it is acknowledged that a case-by-case implementation of these principles determines the sustainability of an enterprise, they do in essence provide guidelines by which sustainability can be achieved in the long term. Thus, considering FAO's international framework for evaluating sustainable land management (FESLM) approach (FAO, 1993) and its sustainability assessment of food and agriculture systems (FAO, 2013), but not necessarily using the listed indicators, NOA and the influence that NOA PGS has on enterprise sustainability can be assessed as follows.

Governance

- *Corporate ethics*. The NOA Constitution (NOA, 2012) forms the basis upon which the association operates. The NOA Standards (NOA, 2010) clearly define the scope of NOA PGS work, and all documentation is available for public scrutiny.
- *Accountability*. The NOA Board accepts ultimate responsibility and thus accountability for decisions made in the name of PGS.
- *Participation*. NOA is a fee-paying membership association open to all persons with a common interest in supporting the development of the organic sector in Namibia. NOA membership provides representation at the highest levels, and connects members to essential information, programmes and services. Members can participate in the annual farm assessments to obtain first-hand information about farmers' organic production systems. Members also have

access to a comprehensive library and resource system on all aspects of organic production, health matters, GMOs, etc.

- *Rule of law*. Namibia does not have laws protecting the status of organic agriculture and produce. However, NOA PGS organic standards are accepted by the Namibian community as defining organics. NOA has successfully requested the withdrawal of false certification claims made by Namibian producers. This success has been achieved either by directly approaching the producer or by refusing a producer the right to use the NOA mark. In some instances, retailers have assisted by refusing to accept produce if the labels give false claims. NOA is also working with importers and traders of organic products to inform them of false claims so that they can then stop importing the produce.
- *Holistic management*. While NOA promotes the principles of HM (Savory, 1988), PGS assessments do not necessarily adopt a holistic approach. This is because only the production aspects of an enterprise that are covered by the standards are assessed. However, PGS requirements have helped producers to develop records and adopt standard operating procedures that improve managerial practices.

Environment

- *Atmosphere*. Numerous documents describe research and experience on how carbon can be sequestrated from the atmosphere by the soil through organic agricultural and "grass farming" methods, as well as estimates which, if realized, could reduce, stop and even reverse climate change (e.g. Niggli, 2009; Pearce, 2011; Savory Institute, 2013). Thus, through the promotion of organic and HM agricultural practices, NOA is contributing towards addressing global warming concerns.
- *Water*. Namibian crop farmers typically implement water-saving measures, such as drip or micro irrigation and shade houses whenever possible. Organic farmers take water-saving measures further through the use of green manure, mulch and compost.
- *Land*. Both the geology and climate of Namibia vary greatly from north to south and west to east, resulting in a range of soils. Generally, however, soils are sandy and more than 90 percent of the country is classified as desert to semi-arid. Water conservation and the addition of organic matter are the two primary practices that enable the development of sustainable crop production systems. Standard organic agricultural practices, promoted through NOA's activities, aim to enhance protection and facilitate restoration and building up soil and water reserves.
- *Materials and energy*. The underlying nature of organic agriculture through the recycling of waste plant materials as animal feed or compost ensures optimal utilization of farm-generated as well as externally derived inputs. This is particularly important in Namibia where costs of external inputs are high, given the transport costs to cover the vast distances travelled.
- *Biodiversity*. The range of environments, together with the influence of the cold Benguela current, result in a wide biodiversity across the country (Cubitt and Joyce, 1999; Mendelsohn *et al.*, 2009). Biodiversity addresses

aspects such as intercropping, crop rotation and mixed farming (crops and livestock). Biodiversity is also achieved by the linkages created within and between enterprises, such as the waste from one enterprise (e.g. chicken manure) being used as an input into another (e.g. compost making), which in turn may be used in a third (e.g. vegetable production). Except for the product that is sold off farm, the cycle is closed when the vegetable residues are fed back to the chickens.

Economy

- *Investment and vulnerability*. One of the significant impacts of NOA PGS is that demand for produce generally exceeds supply. Therefore, producers can be reasonably sure of selling their produce at market-related prices at least, if not better. Payment turnaround is typically quick, since many sales are cash based, thereby enhancing cash flow. These aspects justify the investment of human and financial capital in an enterprise, while reducing the associated risks.
- *Product quality and information*. Much of Namibia's so-called fresh produce is imported from South Africa, usually arriving on supermarket shelves either unripe (with little chance of ripening properly, given the early harvest in the developmental stages of the produce) or otherwise damaged after a number of days in transit. The cold chain transport costs also inflate prices to the point where it hardly seems worthwhile buying the produce. On the other hand, NOA PGS produce is picked, packed and delivered to the retail outlets typically with a maximum of one night's cold storage. Demand for the produce has much to do with its freshness. The transparency of the NOA PGS system, labelling of produce, consumer contact at markets and exhibitions, and annual publication of the NOA newspaper, *Living in Organic Times*, all contribute to the consumer being able to make informed purchasing decisions.
- *Local economy*. NOA PGS is domestically based, ensuring that money is cycled within the local economy, thereby providing much needed employment and scope for business development.

Social acceptability

- *Decent livelihoods*. With the consistent downward pressure on food prices and narrowing margins experienced in chemical agriculture, farmers are often hard pressed to make a decent livelihood. While there are no published figures to substantiate claims, Namibian organic consumers create a demand and are prepared to pay prices that give organic producers a fair return for their efforts. However, some Namibian organic farmers may not have the economies of scale to claim a decent economic livelihood solely from their organic enterprises. Capacity development has been a mainstay of NOA PGS because it is a forum for producers to learn from each other and exchange ideas, and for consumers to gain an understanding of organic production first hand. Some organic farmers also provide employment to students who have recently qualified from tertiary academic and vocational training organizations.
- *Fair trading practices*. Transparency and accountability are cornerstones of the PGS system, ensuring that consumers are confidently able to make well-informed buying decisions.

- *Human health and safety*. The health benefits of organic produce over the toxic residues found in chemically produced food are obvious and well documented, although perhaps still denied in some international sectors. NOA has taken a strong anti-GMO public stance, raising awareness of the threats posed by GMOs at every opportunity and successfully countering the pro-GMO lobby in a public debate held in July 2013.

Production methods and productivity

There has been no Namibian comparative research from which claims of increased production, better margins and overall economy of farms can be substantiated. However, the owner of one extensive organic beef and mutton sheep farm, Springbokvley, has compiled her ongoing production results into a series forming a case study of the farm (Isele, 2013, 2014; Isele and Külbs, 2012; Isele, Külbs and Volkmann, 2010; Volkmann, 2012). Her immaculate record-keeping is thanks largely to the HM principles that she and her late husband initiated and that resulted in increased stocking density. Judith Isele, the owner of Springbokvley, describes the benefits of HM principles in the following way:

> *"Planned grazing according to holistic management principles over the last 20 years on Springbokvley resulted in the formation of larger herds in order to try to work soil and plants as if one would work a crop field. The aim is to spread dung and urine evenly over the rangeland, to loosen the soil surface by hoof action, to break capillaries in the top layer of soil, laying down of plant material as mulch and sowing of seeds through working it into the soil. With such action, rainfall not only penetrates the soil more easily but moisture is kept in the soil for longer periods and thus growth periods are prolonged. Through the higher stock densities and frequent movement of the animals from camp to camp we also achieve long recovery periods during the growing season in order to strengthen and promote perennial grass plants and give them enough time to fully grow. As a result more plant biomass is produced and stocking rates have been increased over the years."*[4]

The implementation of HM allowed urea to cease as a feed supplement and resulted in conversion to full organic principles. Livestock are now successfully fed a lick based on milled camel thorn (*Acacia erioloba*) pods and organic grains.

Markets for sustainable products and services

Namibian consumers of organic food products are typically families with children, with a high level of education and from the higher income groups. Their primary interests are the health and well-being of the family, the environment and the conditions in which farm animals are raised and crops are produced.

The purchasing decision-maker is typically female, and a significant number of consumers speak German, since Namibia was a German colony and still enjoys economic and social ties with Germany. Namibian Germans typically have a high level

[4] J. Isele, pers. comm., 2014.

of knowledge and understanding of "organic and free-range" concepts, as established by exposure to German organic sector developments over the last decades.

Food produced without pesticides, chemical fertilizers, GMOs, hormones, drugs and antibiotics are preferred, as well as free-range livestock production systems. Organic products are seen as a solution to prevent allergies and diseases such as cancer. Recycling is important, together with supporting local farmers, and reduced ecological footprints.

This consumer segment is very sensitive regarding natural resources, as well as nature conservation and wildlife in Namibia. Environmental issues are discussed intensively and organic production is associated with the protection of soil and nature.

Outlets

Farmers supply organic products to all points in the value chain, depending on the distance, price, customer requirements and customer demand. The majority of organic producers are located in the central part of Namibia and therefore sell most of their produce to clients in Windhoek, the capital. Although there is notable customer demand for organically produced food in other areas of the country, unfortunately there is not enough production to service the needs of clients beyond the capital.

Certain products are sold as non-organic in the conventional market in cases of overproduction, or where the value chain lacks organic-certified processing facilities, certified slaughtering and meat processing facilities, and organic-certified grain milling and packing plants.

Markets may be grouped into four general categories (see Figure 3.3).

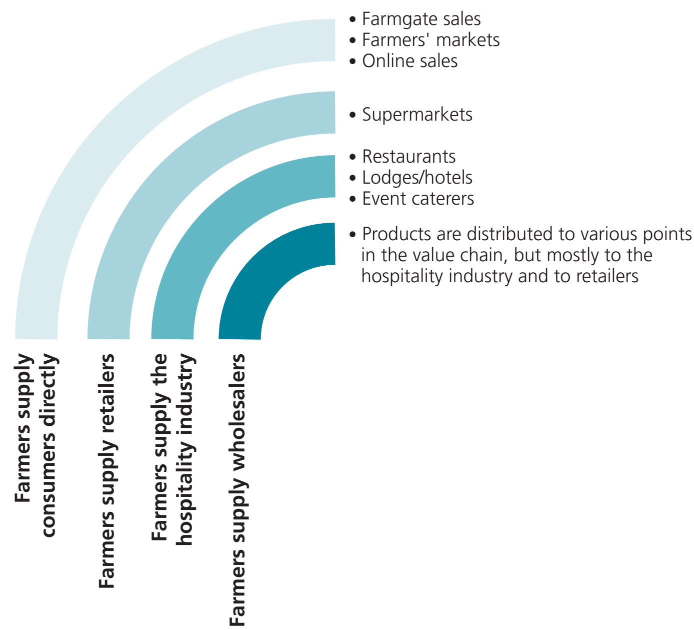
Direct to consumer: many farmers prefer selling their produce to consumers, without intermediaries, thereby realizing greater returns.

- *Farmgate sales*: farmers close to towns sell their produce directly to consumers.
- *Farmers' markets*: a weekly biomarket and a monthly *Boeremark* (farmers' market) in Windhoek give farmers the opportunity to sell products directly to consumers, who have the chance to meet producers and enter into discussion with them. These markets offer the freshest organic vegetables, herbs and fruit available, generally having been harvested the day before. Farmers pay a small percentage of the turnover to market organizers.
- *Online*: the Windhoek box scheme – Organic Box – offers NOA PGS produce as well as other non-PGS farm products to consumers. Farmers deliver their products to the organizer, who charges a commission on sales.

Retailers: Namibian consumers typically buy a large percentage of their groceries at supermarkets. Some supermarkets such as Maerua Superspar and Food Lover's Market have areas dedicated to organic and other health products. A significant amount of produce is sold via retailers.

Hospitality industry: restaurants, hotels and event caterers order products from organic farmers. They are interested in the organic integrity of the produce, the taste, quality, freshness and, in some cases, the availability of rare products.

FIGURE 3.3
Different markets for organic produce in Namibia



Source: authors' elaboration.

Wholesalers: some farmers deliver products to wholesalers that, in turn, distribute to other points in the value chain such as the hospitality industry and retailers. Wholesalers have a vast distribution network that can reach consumers who are otherwise not accessible to farmers.

Prices and organization

Current farmers in NOA PGS have the skills, knowledge and means to service the various market outlets fully in terms of packaging, labelling, pricing decisions and deliveries. Organic farmers who supply the same market, such as the farmers' markets, coordinate their production planning, thereby ensuring minimal duplication and optimizing product diversity and sales to their and consumers' mutual benefit.

Farmers receive the best price when they sell directly to consumers. Farmers decide their own prices and are typically influenced by the prices charged for similar (non-organic) produce in the supermarkets and, in the case of meat, the price offered by the Meat Company, Namibia's main buyer and exporter of livestock and meat products.

NOA enjoys a good relationship with retailers and negotiates prices on behalf of organic farmers if necessary. A high price can be negotiated because of the quality and freshness of the produce, higher organic production costs in some cases, and the fact that there is high demand and low supply of organic produce. Vegetables, herbs and fruit are typically sold out within three days at retailers, so there is no waste on the retailer's side. Retailers appreciate this, as opposed to vegetables and herbs imported from South Africa where the quality is not comparable and goods cannot be returned when the quality and freshness is not up to standard.

Farmers deliver produce weekly and, in some cases, twice a week to ensure that products on the shelves are fresh. Part-time merchandisers are also employed to ensure that the produce is well presented and packed properly on the shelves.

Labelling

Consumers can identify organic products by the following three different NOA organic certification marks (Figure 3.4).

Some producers claim that their produce is organic, despite the fact that they have neither passed nor applied for organic assessments. The word "organic" is not protected by law and therefore any farmer can make these claims. However, through increased awareness, education and transparency of NOA PGS, consumers know what guarantees to look for.

NOA PGS farmers also receive certificates indicating which products are organically assessed, and for which period.

3.4 RESULTS

Introduction of NOA PGS is changing the agricultural marketing landscape in significant ways.

- Namibian consumers are now able to purchase organic food that is verified by a credible organic assessment system and is labelled accordingly. This is the only system used in Namibia for local organic products. Imported organic products

FIGURE 3.4
NOA certification marks

Namibian Organic in Conversion	After one year of organic farming and an assessment according to NOA standards, approved farmers can use the "Namibian Organic in Conversion" mark.
Namibian Organic	After two to three years of organic farming and assessments according to NOA PGS organic standards, approved producers can use the "Namibian Organic" mark.
Namibian Organic* *Identified ingredients are Namibian Organic. Processing not certified.	Approved farmers can use this brown NOA mark if the identified ingredients are Namibian organic and processing is not certified. This logo will only be valid up to the end of 2016 to give farmers time to upgrade their processing facilities so that they comply with NOA standards.

Source: authors' elaboration.

carry third-party certification marks, but there are no local farmers using third-party certification to identify their organic products for the domestic market.

- Organic producers now have a local organic standard that can be used to guide their production methods. They can also gain recognition in the marketplace that their produce is organically produced. The alternative for farmers would be to engage the services of international third-party certifiers, which would increase the cost drastically and is often not financially feasible, unless products are exported.
- NOA PGS is supported by demand from retailers, farmers' markets and other traders who now have an organic identification system that they can rely on to distinguish between "organically assessed" by a credible organization and "self-claimed" organic products.
- Since demand for organically produced products is much higher than supply, non-organic farmers are starting to consider converting to organic methods, following NOA PGS.
- From an agricultural development viewpoint, the NOA organic standards and PGS can be used by emerging farmers in rural areas to certify their products as organic and trade within the organic sector.
- NOA PGS has introduced transparency into the process of Namibian food democracy. The fact that it is based on transparency enables other interested members to visit farms during the assessments, thereby learning from each other. This is an effective tool to convince more farmers to convert. The transparency system also gives consumers the opportunity to meet farmers and see where and how their food is produced.

3.5 CONCLUSIONS

This initiative highlights the importance of sustainable agricultural practices with regard to consumer demand and preference for organically produced products. There is a direct link between consumers and producers, contributing to a higher income received by producers, as well as meeting consumers' needs. The NOA system has been particularly successful in informing more and more farmers about sustainable ecological farming practices that improve the soil, the environment, and animal and human health. Before adoption can take place, it is extremely important for farmers to see how production works under these conditions. The motivation of farmers to try new techniques is increased when there is market demand for produce. In Namibia, where rainfed production is hampered by the effects of climate change, this initiative can introduce new agricultural practices such as conservation agriculture, which will not only help farmers to achieve increased yields, but also to access reliable markets.

Without this innovation, it is highly unlikely that consumers would enjoy access to organically assessed food; that farmers would get recognition for their organic produce; and that traders would have access to locally produced organically certified food. Therefore, through this innovation journey, we have learned a number of lessons that helped us to achieve these results.

- Markets for organic products need to exist where consumers demand products that are produced according to standards, and who appreciate the efforts of farmers when servicing their needs.

- Implementing a PGS system requires a great deal of dedication and effort by pioneer farmers, and requires long-term organizational structural support.
- Government involvement is not required to implement a successful PGS.
- A PGS takes time to develop and assumes the characteristics of the people serviced by the system.
- Designers of PGS can decide on the extent of the system, i.e. a system running close to third-party certification requirements, one that NOA PGS has chosen or one where a simple pledge of the farmer is sufficient.

A number of challenges remain within the Namibian organic sector. First, a good level of knowledge of organic standards is required to understand what needs to be assessed, as well as an understanding of the relevant inspection methods. The assessment team is often challenged by new situations that require in-depth knowledge of production systems, inputs used and the first principles of organic production. NOA PGS relies on the commitment of its members to understand the standards and to research various topics as required, as well as its ongoing relationship with Afrisco.

Second, the active participation of all producers in the peer review and assessment process is key to the success of PGS. Currently, a core group of three to five NOA PGS assessors carry out this function at their own expense. Other farmers have not reciprocated or have minimized their participation. In Namibia, the long distances associated with farm assessments are a challenge for some NOA members because travel is too time consuming and thus not feasible, e.g. spending two days including travelling for one assessment. In order to maintain the sustainability of the system, NOA has started charging all producers a minimal fee to cover some travelling expenses. There is a concern that this may be seen as a barrier to more producers joining NOA PGS assessments, but it is critical for the sustainability of PGS.

In order to supply the increased demand for organic products, more farmers need to produce according to organic standards. Currently, supply cannot meet demand and there are clear possibilities for expanding the demand into communities that are not part of the original NOA group. Therefore, farmers who use organic or agro-ecological or low-input methods – and are thus seen as "almost-organic" – need to be included in the system. For some new farmer groups, especially small-scale farmers, this will require significant funds for capacity building. This points to various resource requirements.

1. To give consumers an organic guarantee from farmers requires time, effort and money. Voluntary systems are only sustainable in the short term, whereafter they need to be maintained by dedicating resources to the overall organization of PGS. In the Namibian scenario, it is not sustainable to rely only on producers to keep the system in place. It requires the support of an organization such as NOA.
2. International organic standards change over time, and farmers are faced with new agricultural input products that claim to be approved for organic production, but require research to verify their authenticity.

Nevertheless, so long as there is local demand for organically certified or sustainably produced products, there is an opportunity to implement PGS. In Namibia, various opportunities exist for this innovation to be more widely used. The system lends itself to organization based on production areas or farmer groups, depending on the market the producers want to serve. It may be easier to roll out small-scale farmer groups where the Government can assist the groups with the implementation and maintenance of the system.

3.6 RECOMMENDATIONS

Namibia has been classified as one of the countries most vulnerable to the impact of climate change. Organic agriculture is a recognized agricultural method to mitigate climate change since it stores carbon in the soil by building organic matter, reduces greenhouse gases and minimizes energy consumption. Since Namibia has had severe droughts and floods in the last five years, organic agriculture especially helps farmers to adapt to climate change since it prevents nutrient and water loss through higher organic matter, thus making soils more resilient to droughts, floods and land degradation processes.

NOA therefore recommends the implementation of a national organic policy to mainstream organic agriculture at national level to provide a solution to the severe impact of climate change.

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Chapter 4
Community-based farming scheme in Nigeria: enhancing sustainable agriculture

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4.1 INTRODUCTION

Nigeria, which is the seventh most populous nation in the world, has witnessed many agricultural transitions from the precolonial era through the colonial to the post-colonial eras. Precolonial agriculture was largely traditional and subsistent in nature, involving shifting cultivations and long periods of bush fallows to restore soil fertility and productivity. During the colonial era (1861–1960), the emphasis was on research and extension. Early in the post-colonial administration (1960–1970), the new government ushered in aggressive conventional production systems with emphasis on the increased use of synthetic agrochemicals, including pesticides and mineral fertilizers to maximize agricultural output for self-sufficiency in food production. Consequently, accelerated agricultural development took place through the introduction of new production technologies, mechanization, processing and marketing linkages (Megudu, 2006). However, with increasing pressure on land resources in the face of industrialization and the discovery of petroleum resources, conventional agriculture could not guarantee self-sufficiency in food production because of: (i) neglect of the agricultural sector in preference for oil; (ii) environmental/soil degradation caused by pollution from agrochemicals; and (iii) lack of market incentives for agricultural produce/products. The paradigm shift to the oil sector in the economy resulted in dwindling agricultural productivity (Okuneye, 1988; Adedipe, 1999; Sanni, 2000), competitiveness, commercialization and a threat to sustainability.

Aiyelaagbe (2011) lamented that West Africa – where Nigeria accounts for one-third of the population – has become a subregion with chronic calorie deficits resulting from inconsistent agricultural policies and unsustainable production practices. While a rebase of the Nigerian gross domestic product (GDP) in April 2014 established the country as the largest economy in Africa and 26th in the world, there is public outcry that the masses are still poverty ridden (estimated at 86 percent in 2012). Agriculture remains the mainstay of the economy, accounting for 42 percent of the GDP. It is the main source of livelihood for 90 percent of the 173 million people, with over 65 percent of the economically active population employed in the sector. Thus, economic crisis cannot be isolated from agricultural constraints and challenges in Nigeria. In other words, sustainable agricultural production is critical to continuous economic stability. Yudelman (1987) bewailed the bane of deteriorating soil and agro-ecosystems on economic instability, requiring the support of the people, government and private activities to provide a lasting solution to socio-economic conditions in the country. The agricultural sector is, therefore, strategically positioned to serve as the flagship of economic development in Nigeria.

Agricultural production in Nigeria is dominated by smallholder farmers whose agricultural practices are traditional, characterized by drudgery as a result of non-mechanization, marginal soils, low yields and poor market linkages. Smallholder African farmers have limited capacity for sustainable agriculture and access to competitive markets. Although 70 percent of the world food supply currently comes from smallholder farmers, they make up 50 percent of the world's undernourished people (IFOAM, 2014).

African traditional agriculture is predominantly subsistent, characterized by low soil fertility maintenance and poor land productivity (Atungwu *et al*., 2009). There are 500 million small farm units globally supporting 33.3 percent (two billion) people. Traditional farming in Nigeria is not attractive to the multitude of restive youth, mainly because of the drudgery (as a result of the crude tools used) of the production process and its low productivity. Therefore, any innovative agricultural programmes that support smallholder farmers to increase their yields sustainably would not only meet the nutritional targets of farm families and provide surplus agricultural produce and profit for reinvestment but would at the same time attract youth to agricultural businesses.

While some schools of thought declare that expansion of cultivated land through mechanization will guarantee self-sufficiency in food production, an alternative approach proposes that improved land management through intensification of agro-chemical use is the best way to maximize food production. Today, food security, rather than self-sufficiency, is the dominant discourse in Nigeria to avert food and economic crises. Sustainable agricultural practices are germane to this new thinking. In the context of this case study, sustainable agriculture refers to the capability of a farm to produce continuously, based on the durable positive effects of various agricultural practices on soil properties and processes essential for crop productivity, and the continuing availability of inputs (Medugu, 2006). This implies that production practices must be ecologically based, profitable and ensure wealth creation for farmers and farming communities. Sustainability of agricultural production practices would ensure that farmers can produce food and fibre indefinitely without diminishing production volumes and return on investments.

Anecdotal evidence suggests that the adoption of sustainable agricultural practices with access to high-value produce markets presents an important means for achieving food self-sufficiency and improved livelihoods in Nigeria. This chapter presents the experience of the Community-Based Farming Scheme (COBFAS) of the Federal University of Agriculture, Abeokuta (FUNAAB) as an example of an innovative programme designed to link sustainable agricultural practices with markets in Nigeria. The objectives of this case study were, therefore, to assess:

- the impacts, strengths and challenges of COBFAS;
- the adoption of sustainable agricultural practices by Farm Practical Year programme trainees and smallholder farmers;
- the capacities of COBFAS and rural farmers to access high-value markets.

To achieve these objectives, a study was undertaken in the four communities hosting COBFAS as an example of an innovative programme designed to link sustainable agricultural practices with markets in Nigeria. The methodologies used included detailed field surveys, interviews and focus group discussions to elicit relevant data for the study. To ascertain impacts, with-and-without and before-and-after project comparison methods were used. Results showed the performance of the project based on measurable targets in terms of level of sustainable crop production practices adopted; total land area under organic agriculture; volume of produce marketed (indication of degree of commercialization); and level of patronage by key stakeholders. These aspects of the system are explored in detail in the following sections, which begin with an overview of the institutional landscape for sustainable agriculture in Nigeria. The chapter closes with reflections on implementation bottlenecks and adoption constraints, which provide valuable feedback and planning resources for reconfiguring strategies for promoting sustainable food production in Nigeria.

4.2 INSTITUTIONAL LANDSCAPE

Sustainable agriculture is directly linked to poverty alleviation, sustainable economic growth and development. In order to address economic constraints more effectively, successive governments in Nigeria have promoted several programmes and projects directed at fast tracking increased productivity at smallholder level. While many projects presented a well-orchestrated approach based on needs assessment of smallholder farmers, others had political undertones and failed to address the targeted needs (Idachaba, 2007). Interventions that failed were largely because of sole emphasis on increasing farm production without the corresponding market and value-adding activities' support (Phillip *et al.*, 2009; Agbonlahor, 2013). The experience gained from over 54 years of agricultural development planning in Nigeria showed that access to high-value markets is a precondition for sustainable production practices.

Recognizing that emphasis should be on smallholder producers in order to fast track growth in Nigerian agriculture, the Government of Nigeria initiated a new Agricultural Transformation Agenda (ATA), which put in place measures to make the sector as competitive as possible by repositioning the agricultural sector as a business enterprise rather than a family farm scenario. ATA not only targets input sourcing and farm production, but also the market access needed to make the sector competitive. Its focus is to promote, through guided interventions, the sustainability of smallholder farming. The sustainability component is reinforced through increased productivity, using environmentally friendly agronomic practices and increased returns to farmers through high-value market linkages.

The Government of Nigeria established specialized agriculture-based universities with tripodal mandates of teaching, research and extension to address the agricultural problems of Nigerian farming communities. These specialized universities include the Federal University of Agriculture, Abeokuta (FUNAAB) in southwest Nigeria and the University of Agriculture, Makurdi, in north-central Nigeria, both established in 1988, as well as the Michael Okpara University of Agriculture, Umudike in southeast Nigeria, which was founded in 1991.

Since its creation, FUNAAB has strived to generate knowledge, skills and sound technologies through innovative research for sustainable development. It has already produced 14 875 graduates in agriculture and related disciplines. FUNAAB was designated the World Bank's Africa Center of Excellence in Agriculture in 2013 and the second best Nigerian university in 2014. FUNAAB's COBFAS initiative aims to support sustainable farming practices by adopting sustainable land management production practices together with development of interns and, by extension, local farm communities' capacity to access high-value markets.

FUNAAB plays a pivotal role in the development of organic agriculture throughout Nigeria. In 2004, it established the Organic Agriculture Project in Tertiary Institutions in Nigeria (OAPTIN), which builds the capacities of higher education managers, researchers and farmers throughout the country. The aim was to develop a more sustainable food production system. OAPTIN's stakeholders include university lecturers, students, scientists, farmers and processors. OAPTIN has a direct link to both practising farmers and future modern farmers and implements its activities without intermediaries. The network is one of more than 732 affiliates of the International Federation of Organic Agriculture Movements (IFOAM) in 114 countries. In 2008, OAPTIN convened the first West African Summit on Organic Agriculture during which IFOAM set up a training course on participatory guarantee systems (PGS) which stimulated farmers' interest in organic food production.

In terms of institutionalization of organic agriculture within the national policy environment, a desk office was recently created in the Federal Ministry of Agriculture and Rural Development to collate and evaluate information on the state of organic agriculture in Nigeria as an overture to articulating organic agriculture policy. The current value of international trade in organic produce serves as an incentive for production. Ladoke Akintola University of Technology (LAUTECH) Agricultural Services (LAS) organic farm was the only certified organic enterprise in the country until recently, but this is based on an external private standard since there is no public law for organic agriculture in Nigeria. In fact, apart from the organic curriculum in the FPY programme instated by the FUNAAB Senate, there has been no notable change in policy as a result of organic agriculture movements in Nigeria.

Since 2004, when Nigeria joined the organic movement, organic growers transited from the traditional farming system to production systems based on the Association of Organic Agriculture Practitioners of Nigeria (NOAN) organic standard (2012) for Nigerian crop growers. The standard broadly defines organic as based on the principles of sustainable agriculture and use of low external inputs. Specifically, the organic crop standard includes:

- an organic system plan;
- detailed field history, farm maps and crop rotation;
- comprehensive plan of operation that follows organic protocols;
- record-keeping that is crucial (minimum of five years after creation);
- transition period freeing land from prohibited substances (herbicides, synthetic inputs) for at least three years in order to be certified as an organic production system;
- use of organically grown seeds, if available, or untreated non-organically grown seeds;
- use of non-organically grown seeds that have been treated with approved substance (but attempts to find certified organic seeds from at least three sources must be documented);

- not using transgenic or genetically modified organism (GMO) hybrids; and
- planting stock for fruit trees when purchased from conventional sources must be grown organically for 12 months before being sold as organic.

Organic agriculture is not yet practised on a large-scale commercial basis but rather on a small scale that supplies niche markets. It has spread to other parts of Nigeria from Abeokuta and current development shows that the sector is growing fast. Organic practices are gaining acceptance by farmers because they encourage a combination of ecologically minded production practices characterized by low external inputs. LAUTECH has established a large commercial organic farm in Ogbomosho and the University of Ibadan NOAN branch now operates an organic farmers' market in Ibadan and maintains strong links with organic fertilizer producers in Nigeria. In response to demand, Ondo, Ogun, Katsina and Oyo states now own fertilizer plants that manufacture organic fertilizers. Nevertheless, growth in the organic sector over the last nine years has been principally the result of the concerted efforts of professional and Non-governmental Organizations (NGOs) in contributing to its promotion as a sustainable food production system. OAPTIN, NOAN and other organizations have played critical roles in the development of this new emerging system, which has multiple effects on the ecosystem and the economy. Currently, the organic agriculture sector is more developed and pronounced in southwestern Nigeria than in other parts of the country because of the vigorous advocacy, training, talent seeking, research, networking, extension services and skills developments approaches facilitated by OAPTIN and other stakeholders. It is hoped that this success will help to develop organic practices in the rest of the country.

4.3 INSTITUTIONAL INNOVATION: COMMUNITY-BASED FARMING SCHEME FOR SUSTAINABLE AGRICULTURAL PRACTICES

Background and organizational structure

The future of agriculture in Nigeria depends on the youth of today (Atungwu *et al.*, 2013). Acquisition of suitable knowledge, skills and technology in innovative agricultural production, processing and entrepreneurship remain an omen for the much needed and canvassed for agricultural transformation agenda of the Nigerian Government. Universities and other higher education institutions responsible for agricultural training are all based in the cities/urban areas. Until 2009, graduates of agriculture who trained in the cities where the universities are located often did not have rural life experience, where over 90 percent of the country's agricultural land resources and activities are found. Therefore, agriculture was not attractive to many young agricultural graduates largely because of lack of amenities such as electricity, drinking-water, health facilities, recreational centres and information/communication technology in the rural farm communities where they went to practise agriculture upon graduation from university.

Organic agriculture began in FUNAAB because the university management was convinced that organic agricultural practice was innovative and could make significant contributions to food security, improved livelihoods and environmental protection in Nigeria. Consequently, in 2004, FUNAAB set up an interdisciplinary Working Group to develop technologies for engaging in organic agriculture. Research proposals were developed and the university committed funds to the

Working Group through its Institute of Food Security, Environmental Resources and Agricultural Research (IFSERAR), formerly known as the Research and Development Centre (RESDEC). After working locally for one year, FUNAAB supported the proposal that a national conference be convened to raise awareness on organic agriculture nationally, especially in higher education institutions.

It was through these efforts that the First National Conference on Organic Agriculture was held, from 25 to 28 October 2005. During the business meeting of the conference, the name Organic Agriculture Project in Tertiary Institutions in Nigeria (OAPTIN) was adopted and a coordinating team with national responsibilities was formed. The Vice-Chancellor (VC) of FUNAAB served as National Coordinator (NC), thus enabling the university to monitor the project. OAPTIN's mandate was to research, teach and demonstrate organic agriculture. Between 2005 and 2013, the network consistently organized its annual conferences, rotating among the six geopolitical zones of Nigeria. In consideration of the sustained institutional support rendered by successive VCs who served as NCs, the OAPTIN NC post has been ceded permanently to the FUNAAB VC incumbent. The decision was taken during the ninth Annual Business Meeting of OAPTIN, at the ninth National Conference on Organic Agriculture, held from 11 to 15 November 2013 in Abeokuta. Over 300 people across the country are now members of the network – an increase of 77 percent.

In practical terms, FUNAAB has supported OAPTIN by granting a partially furnished room to be used as the national secretariat of the network. Moreover, it has continued to support projects that strengthen the capacity to practise organic agriculture, such as the Work, Earn, Learn Programme (WELP), which tested the COBFAS concept. WELP was conceived in 2008 as a collaborative effort between the OAPTIN-FUNAAB Working Group and the Faculty of Business, Environment and Society, Coventry University, United Kingdom. The aim was to build entrepreneurship in organic agriculture among agriculture graduates who lacked such skills. WELP was executed in 2009, using funds provided by the Department of Innovations, Universities and Skills in the United Kingdom under Education Partnerships Africa (EPA). The programme involved retraining graduates who had been taught conventional agriculture but lacked knowledge and skills in organic agriculture. It combined four weeks of tuition and group work, and a three-week placement with practising farmers. Twenty-three out of 75 applicants were selected in the first quota to participate in the course. Enterprises covered included crops, vegetables, livestock, fisheries, food science, farm management and group dynamics.

WELP offered free follow-up advisory services to all participants and guaranteed buy-back of produce from trainees. The top three participants were offered soft loans to set up their own organic businesses. Another set of three trainees was sponsored on study trips to organic agriculture centres of excellence in the United Kingdom and at Songhai Farms in Porto-Novo, Benin. In 2009, the curriculum for teaching organic agriculture at B. Agric. level in higher education institutions was revised to give it a West African regional outlook through collaboration between FUNAAB and the West African Network for Organic Agriculture, Research and Training (WANOART). Funds were provided by the Association of African Universities (Aiyelaagbe *et al.*, 2009). This motivated FUNAAB to initiate an innovative strategy by establishing COBFAS in December 2010. Meanwhile, WELP has been modified to target undergraduates who participate voluntarily during their spare time. To date, more than 60 students (modern future farmers) have been trained. A new batch of 20 undergraduates started in March 2014, building on previous experiences. The majority of the WELP beneficiaries were pooled from the third year of study, thereby preparing them ahead of the mandatory FPY programme under COBFAS.

COFBAS targets are to:

i. train and build capacities of young agricultural undergraduates for improved and sustainable increased agricultural production and productivity;
ii. produce a generation of modern farmers who are willing to take up agriculture in rural communities and impact positively on community lives;
iii. accelerate agricultural commercialization and agro-industrial development in the communities;
iv. create job opportunities for youth in rural communities and encourage them to take up agriculture as a business;
v. promote natural resource management/organic agriculture;
vi. achieve universal food security and protect vulnerable households from hunger and abject poverty;
vii. contribute to food security and reduce poverty in the selected communities; and
viii. make the impact of the university felt in the selected communities, since the main aim of the scheme is to motivate students to take up a career in agriculture upon graduation (COBFAS, 2012).

The approach involves lectures, practical skills acquisition sessions, practical attachments with farmers and operation of an organic produce kiosk (Photo 4.1) that sells trainee produce (e.g. vegetables, fruit, medicinal plants, poultry). The scheme is a new way of training agricultural students by exposing them to the challenges of agriculture in Nigeria (COBFAS, 2012). It is innovative because the students work alongside rural farmers and compare notes on technologies and entrepreneurship. Under COBFAS, FUNAAB (Figure 4.1) provides the institutional framework and support for the students to undertake the one-year mandatory internship FPY programme in four rural/peri-urban communities in Ogun state. The collaborating communities are Isaga Orile, Iwoye-Ketu, Ode Lemo and Odogbolu, representing the four geopolitical zones of Ogun state. Annually, FPY student trainees farm on

PHOTO 4.1
Patronage of organic produce at the Federal University of Agriculture, Abeokuta, Nigeria

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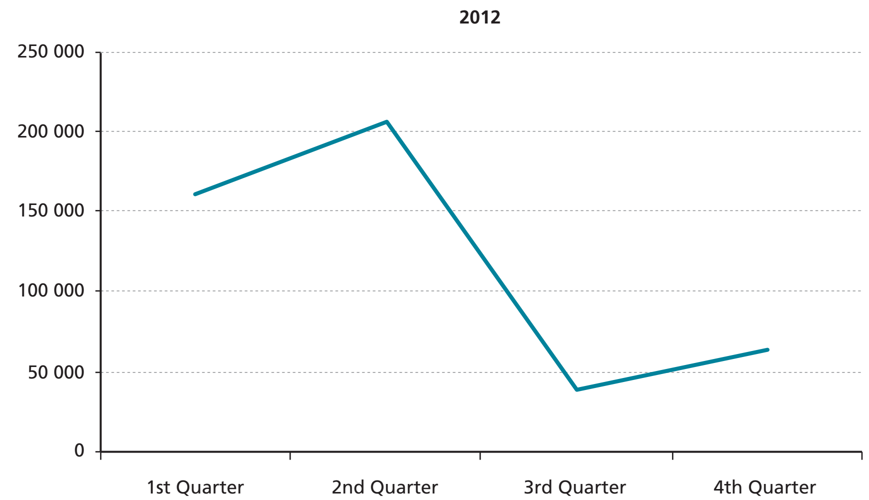
FIGURE 4.1
Quarterly investment in community-based training farms



Source: authors' elaboration based on COBFAS data.

180 ha provided by the host communities free of charge. The student training programme is a blend between traditional and modern agriculture so that students gain hands-on experience in farm management in the rural setting where most Nigerian farmers live. Interactions between the students and farmers at community level provide avenues for technology verification and updating knowledge on farm management in such a way that smallholder farmers adopt sustainable agricultural practices that increase their capacities to access high-value markets for their produce.

Sustainable practices

COBFAS is responsible for coordinating the training of agricultural students who spend one year during the penultimate stage working alongside rural farmers to gain hands-on experience and become used to rural life and living before graduation. This pedagogic approach is known as "learning-by-doing". De Clerck (2013) stressed that smallholder farmers and rural communities are essential for food security, nutrition and livelihoods. Therefore, technologies and practices that enhance sustainable farming in rural communities should be promoted. Organic agriculture upholds the principles of fairness, ecological health and soil fertility building aimed at sustainable food and fibre production. For this reason, COBFAS introduced an organic agriculture module as a sustainable system into the academic programme and training activities of students under the community-based farming scheme. Local standards such as not allowing the use of synthetic agrochemicals; soil fertility building through crop rotation, planted fallow and compost application; avoidance of tractor use; and maintenance of 50-m buffer borders were taught strictly to the interns and monitored by professors with expertise in organic agriculture, who upheld strict standards for compliance. The scheme has contributed immensely to organic agriculture research, practices, technology and sustainable development towards improved rural nutrition, poverty alleviation and improved livelihoods.

COFBAS has developed rainfed and irrigated crop farming strategies for arable crop production, nursery practices, organic farming (sustainable agriculture) and fruit crop production. It also has a module on livestock farming (poultry, ruminants, rabbits, dairy, piggeries, grasscutters, apiculture, aquaculture, production and pasture science, and production (Photo 4.2). Other modules include produce processing, packaging and marketing as well as human capital development. The essence of the enterprise-based training is to fit into the national economic transformation agenda of Nigeria, which includes job creation, innovation and business development in agriculture, poverty alleviation, and commercialization. Furthermore, to strengthen the sustainability of COFBAS, priority is given to infrastructural development, equipment and training facility support in all collaborating communities.

In the 2011/2012 academic session, organic production of vegetables was introduced by COBFAS and administered in the four communities of Ogun state, which

PHOTO 4.2
Sustainable farming trainees carrying out crop and livestock production and marketing at rural community level in Nigeria

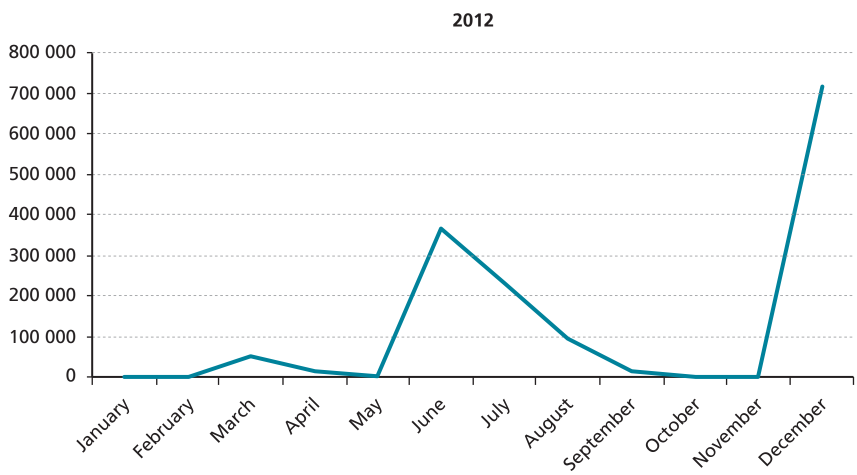
© J. Atungwu

hosted the scheme. Activities included manual land preparation of allotments, planting seedlings of leafy and fruit vegetables at recommended spacing, meeting nutrient requirements of vegetables, and preplanting applications of cured poultry manure and compost at recommended rates of 5-10 tonnes/ha, depending on the fertility status of the farms. The main leafy vegetables produced at the project locations were *Amaranthus viridis*, *Celosia argentea* and *Corchorus olitorius*. Each student cultivated a 6 x 6 m plot in two cycles of 3 x 3 m between November and February, using irrigation. Instead of synthetic pesticides, trainees used aqueous extracts of neem (*Azadirachta indica*) leaves to control pests. No external inputs were used since all inputs except the seeds were sourced from the communities.

In addition to vegetables, plantains and pineapple were cultivated. The WELP programme complemented COBFAS with the production of organic *Corchorus olitorius*, *Celosia argentea*, *Telfairia occidentalis*, *Amaranthus viridis*, *Carica papaya*, cucumbers, plantains, sweet oranges and pepper on the organic skills and demonstration plots at FUNAAB. Records of monthly sales were taken and analysed for decision-making on planting schedules (Figure 4.2).

Another high-value commodity featuring in organic agriculture at FUNAAB is sesame (*Sesamum indicum),* an oilseed crop in high demand internationally. Sesame has been produced successfully under organic production systems and processed appropriately to reduce field loss as recommended by Olowe and Adeniregun (2011). The standards usually adopted in producing organic sesame are in conformity with the international standards prescribed by the European Union (EU), IFOAM and the recently released national standards by the Association of Organic Agriculture Practitioners of Nigeria (NOAN, 2012). In teaching the students about organic sesame production, all the recommended organic production practices were followed as per

FIGURE 4.2
Monthly income from sales of farm produce from community-based training farms, 2012



Source: authors' elaboration based on COBFAS data.

the standards (from land preparation to post-harvest handling) in order to achieve higher productivity and quality of sesame. Production takes place at OAPTIN's dedicated research plots. The innovative harvesting procedure involves harvesting the sesame plants at physiological maturity (when about 90 percent of the capsules turn yellow and the lower leaves are already senescing), arranging the cut plants in bundles and threshing the dry plants twice at three and four weeks after harvest. Polythene sheets are spread underneath the bundles to collect seeds that may fall from shattered capsules. The motivating factor behind organic sesame production is that the majority of the sesame varieties (E-8, NCRIBEN-01M and NCRIBEN-02M) cultivated in Nigeria readily meet international standards for premium sesame seeds, based on colour (pearly white to white), size (1 000 seed weight greater than 3.0 g), oil content (40–50 percent) and moisture content less than 6 percent (Olowe and Adeniregun, 2010). There is evidence of international demand for organic sesame from Nigeria.

Markets for sustainable products and services

An efficient market is one that facilitates the movement of goods from the point of primary production through marketing intermediaries to the end user. For a market to be efficient, therefore, transaction costs for movement of goods must be minimal and transfer of ownership must be fast and free from any encumbrance. Agricultural products, because of their characteristic bulky and perishable nature, require specialized marketing arrangements that not only reduce transaction costs but are as efficient as possible to encourage production from the highly inelastic supply response. Every sustainable production plan is built on efficient market

TABLE 4.1
Organic vegetable production and sales by student trainees

Community	No. of students	Plot size (ha)	Quantity produced (kg)	Amount sold (naira)
		Year 2012		
Isaga Orile	199	0.18	NR	82 450.00
Iwoye-Ketu	70	0.06	492.24	38 150.00
Ode Lemo	199	0.18	1 621.00	108 500.00
Odogbolu	293	0.26	NR	150 915.00
Total	**761**	**0.68**	**2113.24**	**380 015.00**
		Year 2013		
Isaga Orile	247	0.22	1 439	100 716.00
Iwoye-Ketu	227	0.20	1 006	100 600.00
Ode Lemo	256	0.23	1 491	149 100.00
Odogbolu	290	0.26	1 284	107 000.00
Total	**1 020**	**0.91**	**5 220**	**457 416.00**

Note: NR = not reported.
Source: COBFAS, 2012, 2013.

access. Among smallholder producers, the relatively small sizes of holdings and output must be compensated by a favourable return on time and resources invested. A sustainable agricultural practice must, therefore, provide access to high-value markets to increase farmers' income and consumption welfare.

To this end, in 2007, FUNAAB granted 1 ha of land to be used as a skills and demonstration plot and approved the construction of a kiosk dedicated to marketing organic produce on a piece of land in the pedestrian area of the university. In 2010, it approved another 2 ha of land to conduct research and/or produce organic crops for sale in the kiosk. With gradual expansion, total land area dedicated to organic agriculture increased to 3.5 ha by 2014. The implication is that more produce, both in terms of variety and quantity, is being bought at the kiosk. The kiosk opens for business daily and sales are only on a cash and carry basis. Only 30 percent of the customers are regular. There is usually a way for customers to provide feedback and preferences, which are normally conveyed back to farm production activities.

The volume of produce per year at the kiosk for 2012 and 2013 is shown in Table 4.2. A total of 3 850 tonnes of organic produce was produced and marketed. Crop produce ranged from leafy vegetables (*telfairia*, amaranthus and *celosia*) to spices (pepper) and fruit (pawpaw, pineapple, cucumber, citrus and plantain/banana). Revenues from the sales of produce were banked and reinvested in farm production activities, and to pay the salary of the project assistant needed to run the project (the coordinator and board members are voluntary). The FUNAAB kiosk has been recognized as an innovative market platform for producers and consumers in southwest Nigeria (Phillip and Dipeolu, 2010). It has been sustained by emphasis on consumer satisfaction and production of specific on-demand festive sales, order and delivery, seminars, workshops and advocacy. A study conducted by COBFAS determined that in terms of low risk and high revenue crops, *telfairia* (*Telfairia occidentalis*, cucumber (*Cucumis sativa*) and pepper (*Capsicum frutescens*) topped the list. *Celosia* and pawpaw (*Carica papaya*) yield a high revenue but are also at high risk because they succumb to pests and disease for which no effective organic

TABLE 4.2
Organic produce supplied to kiosk, per year (2013–2014)

S/N	Commodity type	Quantity (kg)
1	*Telfairia*	400
2	Cucumber	250
3	Pepper (var. Rodo)	100
4	Amaranthus	150
5	*Celosia*	50
6	Pawpaw	150
7	Pineapple	2 500
8	Plantain/banana	250
	Total	**3 850**

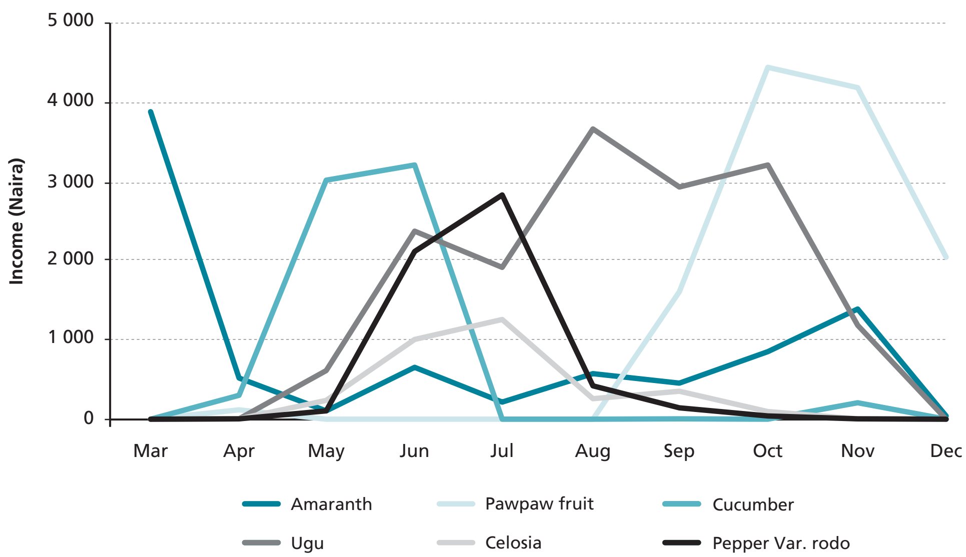
Source: authors' elaboration based on COBFAS data.

solution has been obtained. Demand was low for indigenous vegetables such as *celosia* (Table 4.2).

Table 4.1 depicts the production and sales records of organic vegetables from COBFAS student trainees' plots in Nigeria. A total of 5.22 tonnes of fresh vegetables were produced during the dry seasons in 2012 and 2013 from a total of 0.68 and 0.91 ha respectively, in four COBFAS host communities. Produce was sold to both the host communities and the university community in Abeokuta through the kiosk on campus. Comparing 2012 with 2013, number of students, area cultivated to vegetables and money from organic vegetable sales from the community increased by 25.4, 25.3 and 16.9 percent, respectively. This showed that the decision by the university to train students in organic vegetable production is sustainable. Linking the rural community-based vegetable produce to the organic kiosk in Abeokuta encouraged trainees to produce vegetables because it granted them a guaranteed high-value market for their organic produce. However, the total land area under organic production practices is still less than 1 percent.

The organizational structure of the kiosk is shown in Figure 4.6 (see page 73). It shows how the trainees involved in production are supervised by a project assistant who reports to the project coordinator, who is answerable to the project governing board. A quasi community-based business model is used to govern relationships with surrounding communities, which is important because the scheme has grown over the years by including neighbouring organic farmers as outgrowers who sell at guaranteed prices.

FIGURE 4.3
Monthly revenue of Work, Earn, Learn Programme interns in Nigeria, 2010



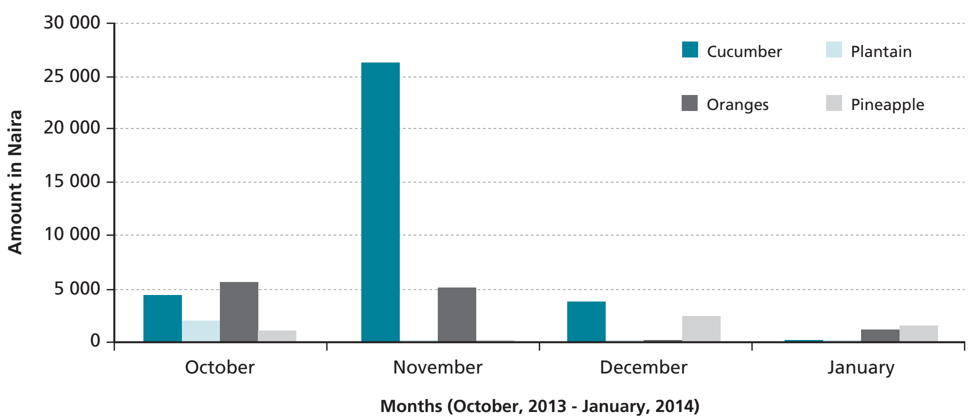
Source: authors' elaboration based on COBFAS data.

The operation of the organic produce kiosk is a novel idea in Nigeria and enabled COBFAS to track consumer reaction to produce quality, willingness to pay, consumer preferences and profitability of each commodity. This information is being used to learn more about consumer demand for sustainable food in the country. From 2007 to date, the level of awareness of clients (staff and students) on the health and nutritional benefits of organic produce has built up over the years through advocacy and the testimonies of people who buy organic produce. Demand has been met by the production of vegetables (amaranthus, *telfairia*, tomatoes and pepper) and fruit (plantain, citrus, pawpaw, cucumber and pineapple) from the organic skills plot. Organic maize and soybean have also been produced and used in the formulation of poultry feed. Data on revenue trends are shown in Figure 4.3.

It is clear that when trainees harvest their produce, the clients first in line are the host communities. Market opportunities on campus have not been optimized through lack of communication between sustainable producers and consumers in the study area. This is mainly because of weak market linkages, inconsistent supplies of organic produce and misconception that organic products are expensive and thus should be targeted for export. This aptly reflects the national situation. For a long time, organic producers in Nigeria focused on searching for export opportunities rather than developing domestic markets by seeking the patronage of 173 million Nigerians. Understandably, the lack of appropriate market policy, infrastructure and support to link emerging sustainable (organic) agricultural practices with local consumers has made this difficult. Yet local markets are a real alternative to sustainable global agro-industrial markets.

Based on the modest progress made in promoting organic agriculture in Nigeria, OAPTIN is working towards replicating the innovative local organic kiosk in West Africa to enhance the visibility of organic produce. This is helping to promote the organic farmer training programme concept.

FIGURE 4.4
Sales of different commodities by Work, Earn, Learn Programme interns in Nigeria



Source: authors' elaboration based on COBFAS data.

4.4 RESULTS

COBFAS benefits vary according to the actors concerned, and are described in the following sections.

Farmers

Increased awareness has been created among farmers now that agriculture has been shown to be profitable through sustainable innovations/technologies, adoption of best agricultural practices and proper management of the production system. Awareness and adoption of organic production has increased. Through the activities and presence of the university and interns in the communities, local farmers have increased the areas cultivated, diversified their production and improved farm productivity.

Several technologies for organic agriculture have been developed and directly benefit farmers who have been part of the development process. For instance, 5 tonnes/compost/ha/year have been considered optimal for vegetable production and as compost for soil fertility maintenance; and hot water or ethanol extracts of lemon grass (*Cymbogon citrullus*) plus neem (*Azadirachta indica*) plus *Jatropha* spp. have shown some promise in control of grasshoppers and larvae of Lepidoptera. The potency of French marigold in controlling soil nematodes in organic cropping systems is under investigation.

FUNAAB has initiated the Graduate Agricultural Employment Scheme whereby the university provides land, inputs and funding support for ex-students to start farming on campus after graduation. The implication is that those who attended WELP and COBFAS' organic training programmes can be gainfully employed after graduation. Currently, one trainee already operates his own farm outside the university, sponsoring all his own farming activities. Other trainees are finalizing plans to start their own farms in the not too distant future.

Host communities

The programme has impacted positively on host communities by providing direct university job opportunities for members of the various collaborating communities. Two young people from each location (eight in total) work as field overseers of the scheme as tenured staff of the university (COBFAS, 2012). Furthermore, some of the trainees have purchased local goods, providing steady income for members of the communities and boosting rural economies. Fresh vegetables have been made available to local communities (Photo 4.2) by trainees even during the dry season – a practice that was hitherto not possible because of underdeveloped local water resources. In order to achieve this, FUNAAB sunk nine boreholes in each community for irrigation and domestic use. This represents a major institutional investment (Figure 4.1). Furthermore, there have been improvements in social amenities (such as electricity) in the communities, through the provision of communication technology infrastructure by the private sector, and mentorship of community youth by visiting COBFAS interns who provide voluntary counselling services, academic coaching and also look out for sport talent.

Finally, youth of the host communities now have access to university education. In 2011/2012, eight qualified prospective candidates seeking admission to FUNAAB from host communities were admitted to its various undergraduate degree programmes. The number increased by 100 percent to 16 in the 2012/2013 session.

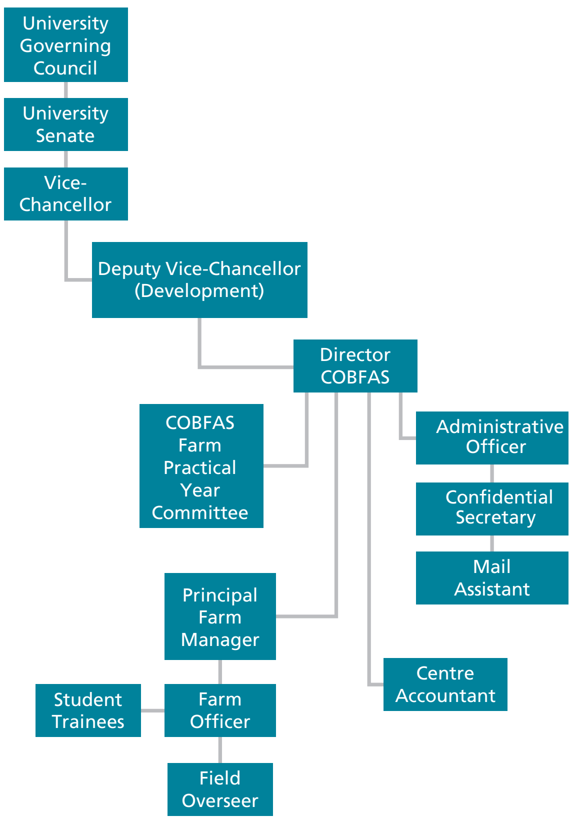
This is an approach by FUNAAB to institutionalize programmes. These candidates pay their own fees for the duration of the degree programme. Since FUNAAB is a Federal Government University, its fee of about US$100 per session is reasonably low and affordable by candidates. As FUNAAB students, they can compete for their respective state governments' bursary allowances to assist them further.

Consumers

Demand for organic agriculture is gradually increasing and strategies for meeting the demand are being reviewed. Through COBFAS, organic farming has been formally introduced to the various communities, thereby guaranteeing production of adequate and healthy food in years to come. Consumers' supply of sustainable produce has increased (Photo 4.1). Organic produce is sold at the farmgate, house to house, or at local community markets at five-day intervals.

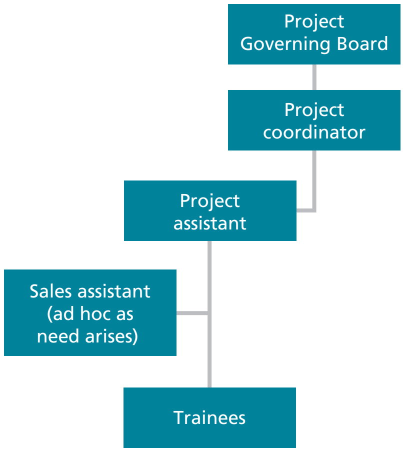
FIGURE 4.5

Organizational structure of the Centre for Community-Based Farming Scheme, Federal University of Agriculture, Abeokuta, Nigeria



Source: authors' elaboration based on COBFAS data.

FIGURE 4.6
Organizational structure of organic produce kiosk, Federal University of Agriculture, Abeokuta, Nigeria



Source: authors' elaboration based on COBFAS data.

Innovators

Through the establishment and implementation of COBFAS, FUNAAB has improved its impact and enhanced its prospects for local and international partnerships and collaboration in rural development (Photo 4.1). Since the inception of COBFAS, 1 500 students have been trained in best agricultural practices and the projection is that at least 5 000 will have been trained by the year 2015. It is predicted that 2–5 percent of trainees will adopt farming willingly as a career after graduating from university (Atungwu *et al.*, 2013). This means that 100–250 students will have become agricultural entrepreneurs by 2015 as modern farmers who will drive the rural agricultural transformation agenda (ATA) to improve rural economies in the country.

Many of the trainees have already begun to acquire farmland in the various host communities. Feedback from COBFAS alumni will help track this progress. As of 2015, the programme was just four years old and the first set of students had graduated only recently, after which they had to spend one year in the mandatory National Youth Service before returning to look for a job and establish a business. Many students and non-students have shown an interest in being trained in organic agriculture. Twenty-three university lecturers, farmers and graduates have been trained in advanced organic modules at the International Summer School on Organic Agriculture, a collaborative effort of FUNAAB, OAPTIN, WANOART and Coventry University, United Kingdom.

During the 2012/2013 academic year, investment in infrastructural development, equipment acquisition and more practical coverage was increased. More land was opened up across the locations and a total land area of 33 ha (83 percent increase) was cultivated by students. These have grown in number from the 712 per academic year in 2010/2011 at inception, to a total of 1 024 (44 percent) in 2012/2013. More permanent livestock structures are emerging. Three hundred and fifty capacity broiler production facilities (Photo 4.2), including housing, stocking, vaccinations, feeding and routine maintenance, have been provided in addition to the existing temporary facilities for sheep, goat, pigs and rabbits for the training of students. In doing this, the operators also generate income. COBFAS monthly income shown in Figure 4.2 reveals that income generated peaked in December 2012 (COBFAS, 2012).

Interactions and making innovation a common practice

OAPTIN uses its conferences, workshops and free advisory services to disseminate up-to-date information and conduct advocacy on organic agriculture. Based on experiences generated from the WELP pilot scheme on organic agriculture, COBFAS has adopted a scaled-up version of organic agriculture as one of the training modules during the fourth year of study. This has enabled more students to become involved and a higher volume of organic produce to be generated to meet increasing demand. Through the multilocational activities of COFBAS, organic agriculture has become better known among farmers, varying organic produce (Table 4.2) has been sold in rural communities, and farmers are at the stage of verifying organic agriculture as a prelude to adoption.

4.5 CONCLUSIONS

The COBFAS initiative under FUNAAB is innovative in that students are trained on rural farms in real-life situations and supported with inputs, advisory services and skills acquisition in entrepreneurship. The initiative has promoted sustainable agricultural production through organic agriculture and verification of indigenous knowledge in farming. Linking trainees' farm produce to viable and high premium markets will improve rural economies and farmers' socio-economic conditions as well as boosting organic businesses and entrepreneurial development in rural communities. The impact on other countries has been an unintended beneficial effect of the initiative. To clarify, one part of neighbouring Iwoye-Ketu is in Nigeria while the other is in Benin. This means that COBFAS interns in that community spread knowledge and contributed (slightly) to the economies of both Nigeria and Benin. Thus, internationalization of these schemes through collaboration with similar initiatives in other countries and/or universities, if exploited, has great potential. In the particular case of Nigeria, farmer training at the Songhai Centre in Benin has now been replicated in six Nigerian states (Enugu, Lagos, Cross River, Delta, Rivers and Katsina). COBFAS interns could be seconded for short courses and gain work experience in waste recycling farming systems that would further increase their chances of spreading the sustainable practices and high-value market linkages efforts of FUNAAB.

Given the success of COBFAS in sustainable production and marketing of organic produce, FUNAAB is working towards scaling up the project by encouraging and assisting rural farmers who are already practising organic agriculture to adopt organic farming. Moreover, other universities in Nigeria and Benin have seen the significant impact of COBFAS and may be willing to institutionalize its innovations.

Major challenges facing the current initiative are the low levels of awareness, low prices and paucity of modern technologies and funding/support. This will affect the availability of appropriate modern tools/equipment and road infrastructures that currently threaten efforts for scaling up the initiative. Seminars, workshops, advocacy, private and public partnerships would provide opportunities for innovations to be spread more widely.

4.6 RECOMMENDATIONS

In view of the success, prospects and challenges seen in the innovative way of training the future farmers of Nigeria and the possibility of linking sustainable products from rural host communities, the following recommendations would help to scale up the community-based farming scheme.

1. Support of initiatives by private organizations and spirited individuals in and outside Nigeria should be vigorously pursued by innovators.
2. Strategic follow-up of COBFAS alumni would encourage those who might opt for a farming career, and raise hopes of revitalizing farming and its traditional methods.

Acknowledgements

This paper was funded by the Food and Agriculture Organization of the United Nations and this is gratefully appreciated by the authors. They sincerely thank Dr Allison Loconto and her team for their critical comments and reviews. They also appreciate with thanks FUNAAB, COBFAS and the host communities of the scheme reported in this paper.

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Chapter 5
Familia de la Tierra participatory guarantee system in Colombia: Business innovation as a tool for social and productive change

Oscar Nieto

5.1 INTRODUCTION

In Colombia, about 300 000 ha are used for organic farming, representing 7 percent of the country's total agricultural land (DANE, 2012a). In parallel, agriculture caters to a total population of some 46 million Colombians and demographic trends show that, by 2020, the population will have risen to around 51 million, yet the agricultural production index for 2007 was just 99 percent of average production between 1999 and 2001 (DANE, 2012b; CEPAL, 2012). Bogotá is Colombia's largest city, with a current population of 7.5 million, and accounts for 25 percent of Colombia's gross domestic product (GDP). According to statistics (DANE, 2012a), Bogotá's population is set to increase to around 9 million in the coming years and it will be a major logistical and environmental challenge to meet its food and energy needs. In addition, patented varieties of Bolivia's major crops are now entering the market, forcing farmers to buy proprietary maize, coffee, potato, sugar cane and soybean seed, which is expensive and creates direct dependence on global seed companies.

Trade in products from agro-ecological and family farms has been increasing in recent years, accompanied by some of the usual problems that arise in the early development stages of such markets. Although there is a Ministry of Agriculture certification mark, it is granted only to producers with third-party certification. As the state does not yet have a policy for systematically promoting sustainable agriculture, it has instead been developed by local policy initiatives, which have included the protection of seeds and the agro-ecological and sustainable traditional native system of subsistence farming in the Amazon *(chagra)*.

To take into account this complexity and the organizational processes involved in the *Familia de la Tierra* network, through practical experience and opportunities for discussion at meetings, rallies, fairs and markets, the network set out to build a production and partnership model that would lead to a profitable business dynamic and a comprehensive, environmentally and socially sustainable production process. The model consists of spaces for production and community work on producing and saving native and traditional farmers' *(criollo)* seed; composting; agro-ecological food production; processing and adding value; and marketing. It is explained in greater depth later in this chapter.

The present study describes the organization's strategy for addressing the market complexity involved in ensuring that smallholders appropriate the food cycle, so that the organizational model can be used across all economic spaces and can create natural synergies in the cycle as a whole. This strategy includes a number of activities in each component of the food cycle, which are contextualized and described below. The chapter further defines the innovative tool that allowed the *Familia de la Tierra* network to link sustainable farming practices with local markets and so generate sustainability for farming families and the system as a whole. This tool is the participatory guarantee system (PGS), which is a quality assurance methodology containing 14 criteria that are assessed by agro-ecological farmers, professionals and consumers at large. Last, a series of lessons learned by the *Familia de la Tierra* network is shared as a process that can be replicated in a variety of local contexts, together with a number of proposals to strengthen the movement for the sustainable production of agro-ecological food and for the families that are turning this movement into a living organization.

5.2 INSTITUTIONAL ENVIRONMENT

For agro-ecological farming to be strengthened successfully through partnerships between producers and consumers, an enabling environment needs to emerge to ensure that such initiatives flourish and exceed the threshold of economic and social sustainability. This social environment of neighbourhood and village producers is complemented by the public and private sectors. Only the simultaneous emergence of green initiatives in all three sectors will lead to the comprehensive strengthening of the agro-ecological food production system and the diversification of farmer-owned native and traditional local seeds.

As the *Familia de la Tierra* network was created and developed in an institutional environment where ecology was not on the agenda, the network's proposals were greeted with some scepticism at first. In 2009, the network concluded the first partnership agreement with Bogotá's Economic Development Secretariat to conduct market research for launching an alternative channel to market products from the indigenous and peasant economy in Bogotá. This objective for the city was proposed by civil society organizations (CSOs), which saw it as a priority requirement and obligation of Bogotá city council, the city's collegiate body for administrative decision-making.

As a result of coordinated work between agro-ecological farmers' CSOs, public institutions and local political leaders, this objective was formalized in a district development plan by the mayor's office of Bogotá. It led to technical and organizational strengthening of the *Familia de la Tierra* network within an institutional environment that provided small grants to CSOs with an ecological and innovative approach.

Once CSOs had succeeded in convincing the city to set an objective that would benefit its rural and indigenous population by creating custom-made economic spaces, *Familia de la Tierra* set out to consolidate the marketing channel for products from the indigenous economy. Its aim was to continue encouraging the debate in the public administration concerning agro-ecological production as a rural development policy for Bogotá and the region.

In Bogotá's 2012 mayoral elections, people voted for a progressive development policy for regional integration, called "Humane Bogotá" *(Bogotá Humana)*. The policy proposed guidelines for making the city sustainable through land-use planning under a scenario of climate change, taking into account the city's waterbodies and safeguarding local biodiversity. The objectives set by the district government for its term in office include the ecological recovery of the moorland corridor, implementation of agro-ecological farming as a model for Bogotá's rural development, and protecting the city against the entry of genetically modified seed into urban kitchen gardens. These policies have been key to strengthening farmers' organizations and connecting them with local ecosystems, while mitigating climate change and creating a social and economic fabric.

Under a partnership agreement to support *Familia de la Tierra*, the network carries out the certification processes for its PGS, which has had a positive impact on agro-ecological production systems and on the ability of city dwellers to access agro-ecological food. These institutional support processes are critical in providing the necessary momentum to the economic systems of rural and indigenous people and small agro-ecological farmers in general. This CSO economic leverage is the investment that governments must make to promote economic sectors of benefit for large sections of the population.

The private sector has been another key player in the positioning of such initiatives because it is the main consumer of agro-ecological products. Restaurant chains have been evolving in response to consumer demand for healthy, locally produced food, by seeking new sourcing strategies and preparing for the transition from an unsustainable to a green economy. Although this has been a slow process, there is now a trend that will make agro-ecological products a cheaper option than oil-dependent industrially produced food in the near future.

The social environment has shifted markedly in recent years because of the positive impacts of agro-ecological farming on the production systems of smallholders and their associations. Public spaces for discussion, consensus-building fora, town meetings, organic farmers' markets *(ferias)* and citizen dialogue have led to the establishment of farmers' organizations with local, regional, national and international influence. Public dialogue and networking, as in the Latin American and the Caribbean Agro-ecology Movement (MAELA), International Federation of Organic Agriculture Movements (IFOAM) and Slow Food movement, have provided opportunities for action and debate on national and global agro-ecological farming issues. Even though the institutional environment has been increasingly receptive to such alternatives to agro-industrial development, there is still a long way to go to achieve public policies that can strengthen CSOs and build on the network's achievements to date.

Despite the existence of land-use planning and a public policy to reduce the ecological impact of the economy and politics, the civil servants in charge of executing budgets fall short of implementing the plans and projects, with the result that it takes a long time for citizens to appropriate the policy and no impacts can be seen in the short term.

A unified system of institutional agro-ecological food procurement for nursery schools, soup kitchens and district schools to tie local agro-ecological production into food supplies for children and young people in Bogotá city requires political will. It also requires legislation to establish a unified fund for institutional procurement in the form of a collective food contract to meet the demand of the institutions. This should be put out to competitive tender to ensure that the demand is met by local producers, thereby encouraging teamwork between public institutions and smallholders. For this policy to become a reality, a number of evaluation criteria are needed, including maximum food distances; ability to change what is grown to meet public food policy requirements; size and sustainability of production systems; and product quality, rather than just the lowest price, as is the case today. A public policy of institutional procurement needs to be complemented by a programme of school visits to sustainable production systems to create a synergy that gives young people access to learning from nature and agro-ecological production systems. This will nurture PGS models and encourage the creativity of children and youth during their schooling, to ensure that future generations are educated by and for nature.

A vital issue for the future of agro-ecological production systems and their linkage with local, national and global markets is the production of seed. A public policy is needed that encourages the decentralized and diversified local production of native and traditional seeds, to ensure that producers have access to and control over quality seed. The production scenarios to encourage this policy must include legislation to keep seed as a common good. This calls for a policy that considers native seed as a common heritage of humanity, protected in practice through smallholder agriculture and excluded from all international trade and intellectual property agreements.

5.3 INSTITUTIONAL INNOVATION: A NETWORK OF FAMILIES

Background and organizational structure

In the past, *Familia de la Tierra* members would either not sell their agro-ecological products at all or would sell them at the same price and in the same marketing channels as conventional products. When *Familia de la Tierra* began trading in Bogotá in 2009, it met with stiff resistance from organic shops, restaurants and consumers in general. One of the most common constraints it faced was doubt that the products were agro-ecological. Another was the lack of a production and consumption system with the specific characteristics needed to enable smallholders to demonstrate their sustainable livelihoods and so gain access to niche markets. In turn, this would boost a local economy that incentivizes the scaling-up of agro-ecological production of native and traditional foods.

The model needed to be rethought. Advances in information technology, ecology, thermodynamics,[5] ecological economics, biopolitics and biology enabled *Familia de la Tierra* members to devise an alternative model that would allow them to make a decent livelihood from their land. It differs from the neoliberal model in that it hinges on networking small agro-ecological farmers in horizontal networks where wealth is distributed across the network, unlike the model that seeks to turn all farmers working for a large multinational into underpaid farmworkers.

The first aspect of the model to be overhauled was its linearity, expressed in the concept of a food chain composed of separate links, which have been hijacked by

[5] Knowledge of thermodynamics enables producers to determine the energy flows into and out of the production system, allowing them to establish energy-efficient sustainable cycles and processes and so reduce the overall costs of the process.

processors and traders. This linear concept needed to be turned into a cycle. Reflecting nature's self-organizing processes, the network needed to go beyond the linear rationale and did so based on a new, complex and integrated cyclical paradigm.

The second aspect to be overhauled was the fragmentation and reductionism inherent in the Western epistemological paradigm. This has led to a way of seeing, thinking and doing that is embedded in all economic processes, and hence in food production, with processes seen as separate fragments, rather than components of a cyclical system.

Next, *Familia de la Tierra* members had to integrate all the steps in the process into a unit that could be appropriated by small-scale agro-ecological farmers, and this meant that the process needed to be viewed from a different angle. These basic concepts for rethinking the food production process, based on a different paradigm, were those of cycle, loop, feedback loop, diversity, networks, thermodynamics and complexity. The food cycle begins with the soil and continues with the seeds planted in it, which then grow into products that can be processed, marketed and consumed. The question was: how to turn this process into a feedback loop?

The first task for *Familia de la Tierra* members was to nourish the soil with micro-organisms and natural enzymes; the second was to produce their own seed; the third was to become the owners and producers of their inputs; and the fourth was to learn to process food, design its packaging and market it, all as one collaborative, simultaneous and complementary unit. In fact, members had to appropriate the entire food cycle, and this meant addressing the complex task of implementing collectively all the activities involved at each stage until products reach the final consumer.

To close the cycle, not only did organic waste need to be returned to the soil, but the final consumer had to be reconnected with the land, seeds and food. *Familia de la Tierra* members did this with a tool that allowed them to develop a different kind of trading relationship with consumers and created an empathy that cemented ties with responsible consumers. This tool – PGS – allowed them, as part of the strategy of appropriating the food cycle, to instigate the food loop and close the cycle with the return of the responsible consumer to the land.

PGS are programmes where consumers and producers independently guarantee the agro-ecological origin, fair trade practices and sustainable use of local natural resources. PGS programmes are based on a fundamentally agro-ecological approach to agriculture and the social processes underlying it. Participatory certification differs from third-party certification mainly in its approach, which aims to involve consumers in production systems in order to build trust and reciprocity in an ongoing relationship between consumers and local producers.

The certification process conducted in the farms of the *Familia de la Tierra* network includes collection of socio-economic and environmental information about the farms, diagnosis by soil chromatography, visits by consumers and delivery of certificates to the farms.

The PGS certification process in the *Familia de la Tierra* network was modelled on IFOAM's PGS guidelines, while taking into account local production characteristics. The first change was to include native seed as one of the indicators to be checked before certification is granted. The network also included the use of soil chromatography as a qualitative method of soil analysis that allows independent decisions to be taken for improving production.

Sustainable practices

As *Familia de la Tierra* is a nationwide network, production is highly diverse and includes grains, such as two quinoa varieties, two wheat varieties and 18 maize varieties, together with 39 haricot bean varieties, amaranth and brown rice. As regards vegetables, network members produce ten leafy vegetable varieties and tomato varieties, which they are disseminating to obtain healthy and agro-ecological local seed. They are also developing products such as dried *yacón* root and coca noodles, providing agro-ecological farmers across the country with a more diverse product range to enable them to process and add more value to their products.

Familia de la Tierra believes that these processes are sustainable because they follow the closed-loop production approach, which minimizes and recovers all waste. For instance, some farmers in the network feed rabbits on the trimmings from the vegetables they grow and, in turn, the rabbit manure helps to restart the vegetable growing cycle by providing nutrients. Another example of a cycle in the Andean agro-ecological economy is the quinoa/trout cycle: chaff is a crop residue of quinoa that is used to produce organic feed for trout, which in turn produce a nutritious sludge in the pond that is used to cultivate quinoa. *Familia de la Tierra* believes that whenever production is treated in terms of feedback loops, it makes the network more efficient and competitive.

While the network needed to access a stable local market, it also needed to define a set of criteria that would validate its entire production process – a way to communicate with consumers. Smallholders needed to access niche markets that would provide an economic flow to their production system, and the innovative tool that *Familia de la Tierra* developed was a trust-building system that would enable a niche market to view it as an ally in supplying food. For this, the network designed a set of criteria to assure consumers that the process used for producing their food is a sustainable and ecological one. It defined the sustainability criteria shown in Table 5.1.

TABLE 5.1
Sustainability criteria in food production

1. Use of traditional local seeds	2. Biodiversity management
3. Soil and air conservation	4. Local resource management, use and conservation
5. Environmental care	6. Water care
7. No use of agrochemicals	8. Animal protection
9. Forest conservation	10. No use of genetically modified organisms
11. Respect and care for human beings	12. Respect for traditional knowledge
13. Management of traditional production systems	14. Food sovereignty
15. Gender equality	16. Fair trade
17. Solidarity	

Source: authors' elaboration.

The following four-stage process is used for on-farm assessment of the criteria.

- *Initial contacts and preliminary analysis of the production system*. During this stage of the process, the technical team conducts visits and completes questionnaires in order to obtain initial information on each farm with respect to the above-mentioned criteria. This process results in a database of information about the farms.

  The questionnaire developed for this purpose is completed during a visit with the farmer to view the sites designated and integrated into the production system. In this case, it includes a visit to such sites as: garden, composting centre, seed storage area, store for inputs, waterbodies and marketing facility. Data are gathered during the interview, including: main type of crop; minor crops; non-agricultural uses; soil preparation methods; pest control methods; composting and compost production methods; seed saving; crop planning; planting design; water and irrigation sources; wildlife restoration; farm management records; and destination of the harvest.
- *Boosting agro-ecological conversion and soil analysis using round filter paper chromatography*. Soil chromatography is a method for separating mixtures that allows smallholders to conduct a qualitative soil analysis on their own. This method was included in the *Familia de la Tierra* system to obtain information about soil health and to aid decision-making for improving production. This type of analysis shows the interaction between the soil's mineral components and micro-organisms, with distinctive patterns showing its state of health. After analysing each farm's results, a fertilization model and soil preparation mechanisms are established to help maintain a healthy, living soil.
- *Consumer visits*. This stage of the process entails farm validation visits by consumers. The pattern of the visits is as follows. *Familia de la Tierra* invites consumers to visit, members then tour the farms with them to verify the various aspects and criteria described above, and afterwards everyone enjoys a garden-fresh lunch together on one of the farms in the network. Consumer visits last around four hours, although they generate such a lot of discussion and enthusiasm for learning that, in practice, they tend to continue all day long. To date, eight verification visits have been made by a total of 117 people (including students from a prestigious cooking school, chefs from a well-known restaurant chain, organic shopkeepers and consumers), which have led to the certification of more than 35 farms.
- *Delivery of certification to farms*. To date, a total of 36 farms averaging 1 ha have been certified under the *Familia de la Tierra* PGS, enabling farmers to access markets managed by *Familia de la Tierra* in Bogotá, which include 18 restaurants, seven eco-shops and a responsible consumption network. The plan is to build on this experience to expand the initiative and use communication tools to integrate it into the concept of a distributed local organization. Each node must contain an internal control system (ICS), which can be sampled in order to assess the economic and social viability of the model as a whole. The aim is to multiply the number of processes certified using the innovative PGS tool.

Familia de la Tierra's goal as an organization was to establish a local certification system that would build trust between consumers and producers to allow relationships to develop and endure. To achieve this goal, it teamed up with district public institutions in Bogotá under partnership agreements, developing schemes and processes that turned this certification process into a consistent and ecological system.

Markets for sustainable products and services

To secure a market for *Familia de la Tierra*'s products, the network conducted a series of preliminary investigations to analyse the economic space it would be targeting. At local level, the investigations included visits to 37 sales outlets for agro-ecological and alternative products located in Bogotá city, 15 of which were specialist shops, 17 large retail stores and five private sales distributors.

A visit to a sample of these outlets revealed that the selling price of agro-ecological products was between 20 and 400 percent higher than for conventional products. The biggest differential was found between products such as carrots, *pastusa* potatoes, lettuce and green beans. The products with the least price differential between the agro-ecological and conventional markets were unrefined whole cane sugar *(panela)* and honey.

With respect to consumers, research determined the profile of agro-ecological food buyers as belonging to the higher socio-economic groups in the city. Most of these consumers live in the neighbourhoods of Usaquén, Chapinero and Teusaquillo, which is where the majority of agro-ecological food outlets are located and where middle- and upper middle-class residents live. An investigation revealed that the products most commonly sold in these outlets are lettuce, tomatoes, rocket, leeks, carrots, chard and cherry tomatoes. The processed agro-ecological products most commonly sold in eco-shops and large retail stores were found to be organic coffee, dried herbs, quinoa, granulated *panela*, block *panela* and preserved vegetables. These products are definitely the most sought after by regular consumers of organic products. However, overall demand for organic products in Colombia remains small, with no statistics available for the organic production sector, although, in the experience of the *Familia de la Tierra* network, demand is increasing.

As research showed, there is high demand for fresh fruit in the agro-ecological food market, which should be met by a planting schedule and logistical coordination between producers and the marketing channel.

The trading experience of the producers' network has also revealed a market trend towards gastronomic innovation with native foods such as quinoa, amaranth, *maca* root, *yacón* root and native potatoes. This is confirmed by a growing interest among chefs in acquiring these foods locally from agro-ecological sources. Such agreements, culminating in a PGS, are helping to diversify gardens and restaurant menus in the city.

To encourage the city's hospitality industry to consume more local agro-ecological food, *Familia de la Tierra* conducted outreach activities with students from a prestigious cooking school in Bogotá to acquaint young students with Colombia's food diversity and enable them to reflect it in their culinary creations, generating opinion among diners and creating a sustainable market for smallholder networks.

5.4 RESULTS AND BENEFITS

Familia de la Tierra believes emphatically that the systemic approach of its model ensures that the results and benefits have a spillover effect and cover the social, ecological and economic dimensions.

This strategy has had a positive impact on the diversity, quantity and quality of the native and traditional foods produced, because of the economic incentives from accessing local niche markets, with fair prices and a low entropy, low energy consumption organizational model. At present, *Familia de la Tierra* members are growing 14 tomato varieties in Inzá (Cauca department), two quinoa varieties in rural areas of Bogotá, and ten leafy vegetable varieties and three broad bean varieties, also in Bogotá. In addition, they grow 39 haricot bean varieties. All these species and varieties are for household consumption, seed saving and, increasingly, for a niche market looking for varied, healthy, natural food that is produced ecologically.

In 2013, the *Familia de la Tierra* PGS enabled small-scale agro-ecological farmers to make sales of around 140 million pesos, boosting the production of native and traditional local seed, increasing sales to restaurants and specialist organic shops and providing consumers with fresh, healthy, fairtrade food. Approximately 80 percent of these sales went to restaurants and the remaining 20 percent to shops. The price differential between *Familia de la Tierra*'s products and conventional ones is no more than 30 percent.

By integrating the links in the agrifood process, new qualities, opportunities and synergies begin to emerge. When farming is based on living soil, organic native seed and networked CSOs, output increases and costs fall, along with fuel consumption and greenhouse gas emissions, as international studies by the Intergovernmental Panel on Climate Change (IPCC) and Worldwatch Institute have shown. Another benefit of this food-centred model of social organization is that it can mitigate climate change impacts.

In addition, the system of ongoing communication with consumers makes it possible to plan planting schedules collectively, reducing the risk inherent in agricultural production by spreading it between producers and consumers. This collective planning provides smallholders with a guaranteed cash flow that can stimulate the local economy. A further benefit of this type of innovation is the opportunity for consumers to improve their health and well-being by buying healthy, locally produced food and by eating nutritious and healthy food in their trusted restaurants. The belief is that healthy food makes healthy people, and healthy people make a healthy society.

5.5 CONCLUSIONS AND RECOMMENDATIONS

Although a great deal of progress has been made, many challenges lie ahead for this type of business dynamic linking agro-ecological farming practices with markets for sustainably produced products. The *Familia de la Tierra* network has overcome some of the barriers to access specific niche markets. It has realized that linking sustainable practices to its supply systems strengthens its businesses, while also strengthening the collaborative production systems of the network.

The network has succeeded in establishing a PGS enabling smallholders to demonstrate that their production methods and livelihoods are part of a sustainable process. It strives to ensure that this model continues to open sustainable, long-term economic spaces for agro-ecological farming and for CSOs that appropriate it to build resilience and knowledge, in so doing guaranteeing sustainable rural livelihoods.

It is safe to predict that small-scale, diversified, agro-ecological family farming, linked with specific market niches, will be a widespread production model in rural areas, with its low costs, low greenhouse gas emissions, low energy consumption and long-term sustainability. This model of organization around production and consumption, which takes lessons from nature, is based on an agro-ecological paradigm consisting of energy loops in dynamic equilibrium that evolve continually to meet the many challenges posed by the current environment.

One of the challenges facing the *Familia de la Tierra* network is the scaling-up and diversification of crops to include promising varieties for the market niches it serves. This scaling-up should be done tentatively, to avoid rushing into as yet underdeveloped economic niches, and in a way that enables the economy around agro-ecological farming to grow sustainably and flourish in diversity and quality. This scaling-up is a response to both local and global dynamics, with *Familia de la Tierra* having started by addressing the local market, while hoping to branch out into the international fairtrade market in the future.

To strengthen the agro-ecological sector and small-scale family farming, a network of community shops should be established to distribute products locally, which will enhance local food sovereignty. These shops should be financed by the public sector but managed by local organizations, implementing local exchange mechanisms such as regional currencies, which create a diverse economic fabric for the exchange of goods and services within an agro-ecological production context. Such financing will impact directly on health policies and the public health system as a result of the qualitative and quantitative improvements that the agro-ecological production model brings.

It is still hard for CSOs to obtain the necessary funding to implement such innovative models for linking sustainable practices with markets. The *Familia de la Tierra* network believes that public resources should be directed towards strengthening smallholders' appropriation of the food cycle, extending from soil and seed to product marketing, without which the entire system is unsustainable. To achieve this goal, CSOs must play a leading role in developing local public investment policies and ensuring that the impacts of such policies are relevant to local residents.

The *Familia de la Tierra* network also considers it vital to build an international network of organizations that are innovating in such areas, in order to ensure continuous feedback among CSOs from every corner of the world. This network would serve as a space for discussion and for exerting enough local political pressure to influence public policy and strengthen CSOs and agro-ecological production.

The key challenges facing food-producing CSOs both nationally and globally are sustainability, market connectivity, seed diversity, networking and interaction with the public and private institutions that will consolidate the space where sustainable modes of production become the norm. As the network's challenges are not insulated from politics, *Familia de la Tierra* regards itself as a social and biopolitical movement seeking to use production and economic organization to transform reality.

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Chapter 6
Strengthening local healthy food systems: An experiment in Ecuador's central highlands

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6.1 INTRODUCTION

This chapter describes an experiment in alternative markets for products from small farmers in the province of Chimborazo[6] in Ecuador's central highlands.

In 2010, as part of an action research initiative, the rural development organization EkoRural[7] and the urban development organization *Fundación Utopía*, together with *Canasta Comunitaria Utopía*,[8] a consumer group from Riobamba city, agreed to start trading directly with the smallholder members of *Asociación Nueva Generación* from the community of Tzimbuto.[9] The aim was to create a space for trading products directly, enhance economic opportunities and establish a partnership that was more than purely monetary. The initiative breaks away from the predominant rationale of market access for agricultural products and the role of producers and consumers in conventional markets.

The initiative, which in principle reflects the desire of farmers to engage in a different form of trading, reflects farmers' deep dissatisfaction with the way in which the conventional market works. It gives them limited bargaining power over prices and

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6 Chimborazo province represents the core of Andean agriculture in terms of biodiversity, culture and landscape. Its communities are an important source of daily food for rural and urban dwellers. Its traditional farming methods overlap important elements of agro-ecological science, in particular limited use of agrochemicals. As many crops are grown using natural inputs, they are regarded as "healthy" for producers, consumers and the environment alike.

7 http://ekorural.org

8 Ecuador's box scheme (*Canastas Comunitiarias*) emerged in 1987, in the middle of a widespread food price crisis, as a grassroots movement under the auspices of the Catholic Church (Kirwan, 2008; Garcés and Kirwan, 2009). What started as a collective purchasing mechanism to save box scheme participants money went on to become a consumer movement, under which participants began to question where their foodstuffs came from and how they were produced: "What is the use of saving money if we are eating food produced with chemical inputs?" This encouraged them to approach farmers in search of answers and closer ties, showing the box scheme's potential to impact the relationship between production and consumption (Bekkering, 2010; Soto, 2010).

9 Tzimbuto-Quincahuán is a small rural indigenous community of Quechua speakers situated in the province of Chimborazo, to the south of Riobamba city, at an altitude of 2 900 to 3 100 m above sea level. The community land features a mosaic of diversity, with mixed cropping on a host of plots, including medicinal plants, fruit trees and other crops. The community is home to around 250 inhabitants, including a large floating population that migrates intermittently to Ecuador's major cities.

allows intermediaries to control transactions, leading to unjust treatment of farmers. They therefore aspire to stable prices and respectful and transparent relationships (Soto, 2010).

The growing influence of urban markets for agricultural products has profoundly influenced the decision-making and focus of farm systems. An array of intermediaries, rules, symbols and negotiation mechanisms have transferred an ever increasing share of profits to traders. Product prices are speculative and vary dramatically, while for smallholders, particularly indigenous ones, trading relationships are characterized by inequalities, discrimination and disempowerment. Marketing proposals, consortia, chains and other factors have largely excluded farming communities from benefits while disregarding or undervaluing their products.

Furthermore, the desire for change in food systems reflects in part consumer dissatisfaction with the recurring crises relating to food quality, prices, supply volatility and other matters that typify the current situation. As a result, consumers and citizens are pressing for new food policies that foster closer ties between urban and rural areas and this has resulted in what is now recognized by law as the social and solidarity economy and in the organization of alternative marketing channels (CIALCO). In many ways, this resembles the food counter-movements taking place in Canada, the United States of America and Europe, which seek direct linkages between consumers and producers while fostering consumption of local foods (Feenstra, 2002; Seyfang, 2006; Feagan, 2007; Goodman, 2003).

In Ecuador, a number of direct market access initiatives – dubbed short value chains – have been put forward in recent years as a reaction to the prevailing global agro-industrial food system. They have the power to redefine traditional market access relationships (Otters, 2011). They include agro-ecological farmers' markets *(ferias)*, farm shops, food circles, public procurement and box schemes (Chauveau and Taipe, 2010). This has led to the growing prominence of the innovative concept of "alternative local agrifood networks", which promotes a range of relationships between producers and consumers.

This innovation stems from areas of shared ground and the convergence of multiple interests, providing a unique institutional learning opportunity about the potential for redefining relations between local producers and consumers. The linkage between producers from Tzimbuto and consumers from *Canasta Comunitaria Utopía* puts these expectations to the test, while providing an opportunity to ascertain the feasibility and prospects for direct trading and gain experience in it.

While this initiative to link producers with consumers received no direct funding, it did enjoy institutional protection in the form of an enabling environment between these groups of actors to allow relations to grow and strengthen, based on mutual learning and knowledge. This formed part of the routine activities of the facilitating organizations.

Background

In modern-day Ecuador, the debate on culture and agricultural development centres on two key trends: (i) developing the agro-industrial process linked mainly to agro-export and commodity chains; and (ii) building on the agro-ecological model based primarily on family farming and the traditional Andean form of highly biodiverse, small-scale, low external input agriculture dispersed over the landscape, which largely explains the diversity of products offered for domestic consumption. This dichotomy is expressed most clearly in the complex process of building a legal framework and in the debate on food sovereignty and the laws enshrining it, including those on biodiversity and seeds, water and land.

Production patterns in the Ecuadorian Andes underwent far-reaching change (Barsky, 1988; Ploeg, 2006; Arce and Uzeda, 2000) as a result of agrarian reform and strong pressure from "agricultural modernization". The environment and local culture ceased to be the main determinants of production systems in the field, with the eating habits and demands of unknown consumers now informing farmers what crops to grow and when and how to grow them. In Ecuador, significant diet and lifestyle changes have occurred, which have been attributed to "modernization of the food system" (Arce and Long, 2000a). Consumers buy more and more of their food in supermarkets, including processed foods, and lifestyles are becoming more sedentary, leading to obesity and health problems (Bekkering, 2011).

Such undesirable outcomes have prompted a number of initiatives that press for a change of direction in the food system by promoting local markets and the nutritional quality of fresh and native products. These have emerged within a political context of formal support. The Ecuadorian Constitution of 2008 and the Food Sovereignty Act[10] proclaim access to healthy food and a healthy environment as a universal right.

In Ecuador, Andean smallholder agriculture, which contributes over 50 percent of food for domestic consumption (Chiriboga, 2004, 2012; CAN, 2011), is going through a critical period. Mass consumer markets for fresh farm produce, such as potatoes, carrots and onions, are characterized by a plethora of intermediaries, price volatility and a complete lack of regulation.[11] This contrasts starkly with the situation for export crops such as rice, coffee, banana and cocoa, where an agro-export chain approach, niche markets or the influence of strong trade associations are dominant features. This makes it difficult, if not impossible, for small farmers to enter the global market and, if they do manage to do so, it is under unfavourable conditions, in spite of their major contribution to food supply.

Data collection methodology

The authors used an action research approach with stakeholders (producers, consumers, intermediaries, organizations and individuals providing information, etc.) because it leads to a process of collective learning among them. The experiment was subject to monitoring and ongoing support for changes in practices and discourse in organizations, as well as for periodic transactions and innovations at each event.

[10] As defined in Ecuador's Constitution, Article 481,the purpose of the Food Sovereignty Act is to establish the mechanisms by which the state shall meet its obligation and strategic objective of ensuring that individuals, communities and peoples are self-sufficient in healthy, nutritious and culturally appropriate foods on a permanent basis. It specifies that the state is responsible for promoting redistribution policies that provide farmers with access to land, water and other production resources; the conservation and recovery of Ecuador's agricultural biodiversity; the establishment of fair and equitable food distribution and marketing systems; and the prevention of monopolistic practices and any kind of speculation on food products. To ensure compliance with the regulatory framework of the Food Sovereignty Act, several laws are currently under discussion concerning such issues as use and access to water and land, access to credit, subsidies, agricultural biodiversity, seeds and agro-industry.

[11] See, for example, Herrera, Carpio and Chávez (1999).

All commitments, city-country mutual visits and evaluations by the parties were documented. In these various instances, the authors used a mix of quantitative and qualitative methods, including participant observation; interviews with producers, consumers and key network players; documentation of city-country meetings; and document analysis. The authors also established records concerning participants (supplier organizations, individual suppliers, number of consumers participating in each event, costs and product prices, collection of official statistics, etc.). They conducted ethnographies with a group of families, followed by surveys to estimate participants' degree of satisfaction with the initiative. Information was gathered from producers as part of the action learning activities for planning and calculating production costs.

The ensuing chapter is divided into three parts. The first part gives a general background on the history of the initiative, locations, the actors and the ways in which their own rules of negotiation have been established, as well as the overall official framework governing the operation of such initiatives. The second part details the finer aspects of the process of building linkages between producers and consumers. The third part concludes with lessons learned, potential opportunities and strategies for strengthening and expanding direct market access mechanisms for small farmers.

6.2 INSTITUTIONAL LANDSCAPE

In response to pressure from various sides to clarify the role of the consumer and the potential of food as a lever of change for small economies, Ecuador's 2008 Constitution created a legal framework providing for and facilitating the development and support of initiatives to develop local systems for food and agricultural products. The state currently makes a number of policy opportunities available through its decentralized autonomous governments (GADs). A host of local and international development organizations are becoming involved in the issue by creating potential for partnerships and coordination, ensuring the necessary legitimacy and representativeness for the entry of smallholders into local direct-sales markets.

The Government has established institutional spaces to put into effect the Food Sovereignty Act, including the Plurinational and Intercultural Conference on Food Security and Sovereignty (COPISA), National System for Food and Nutrition Security (SISAN) and Trade Networks Coordination Office (CGRC),[12] under which solidarity economy initiatives, such as farmers' markets, farm shops, public procurement and box schemes, are organized. These institutions face the challenge of building bridges of change and modernization in linkages between producers and consumers, to ensure greater equity and benefits for both sides of the food system (EkoRural, 2010). Recently, CGRC was made responsible for coordinating the supply of public policies of the central government and decentralized autonomous governments by promoting local associative trade networks of family farmers for the sustainable provision of healthy food.[13]

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[12] http://www.agricultura.gob.ec/coordinacion-de-redes-comerciales

[13] The Trade Networks Coordination Office seeks to institutionalize alternative marketing channels via two policies: (i) facilitating and promoting market access for peasant farmers by strengthening fair trading relationships; (ii) identifying local and regional market opportunities and organizing and coordinating marketing by rural agricultural economies with institutional markets.

A National Consumer Commission[14] was established under the aegis of COPISA. A large number of actors representing the various social agencies have been involved in the discussion and development of two bills: one on agrobiodiversity, seeds and promotion of agro-ecology (submitted to the National Assembly in March 2012) and the other on responsible consumption for food sovereignty (submitted in March 2013). Both are under discussion.

In the process, food movements have become a national force known as *Colectivo Agroecológico* (a group promoting agro-ecology and food sovereignty in Ecuador), whose members have united around a national campaign, "Qué Rico Es!"[15] designed to educate consumers about the benefits of healthy, locally sourced foods, to show them their power of change in response to the food crisis and to inspire them to become involved in existing alternative initiatives (Sherwood, Paredes and Ordóñez, 2014).

6.3 INSTITUTIONAL INNOVATION: LINKING PRODUCERS WITH CONSUMER GROUPS

Background and organizational structure

Forming linkages between consumer and smallholder groups has been a totally new experience in the area and a major source of learning as to how these groups behave in fairtrade and reciprocal markets and impacts on economic, social and ecological sustainability, capacity building and the development of innovation capacity.

This case study focuses on two key players: the *Asociación Nueva Generación* smallholder association in the Tzimbuto community, and the box scheme consumer group *Canasta Comunitaria Utopía*.

1. *Asociación Nueva Generación* comprises 52 families from the Tzimbuto community and is led mainly by women. It was established in 2005 with the aim of supporting its members' economic, productive, social and organizational initiatives.
2. *Canasta Comunitaria Utopía* has a membership of more than 100 families. It was founded over 20 years ago by urban consumers from Riobamba city in response to steep food price increases and the economic crisis in the late 1990s. *Fundación Utopía* is a foundation established in 2000 to facilitate the proper representation and dissemination of urban consumer interests by promoting the benefits of group buying. Subsequently, this means of buying food was thrown into question by new consumer concerns about the quality of foodstuffs, in particular the use of chemicals in vegetables and the origins of such foods.[16]

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[14] http://www.soberaniaalimentaria.gob.ec The commission is seen as a body for linking the state with civil society and for overseeing public institutions. Representatives from such organizations as the Humanist Movement; Latin American School of Social Sciences (FLACSO); University of Texas; Slow Food; Social and Solidarity Economy Movement of Ecuador (MESSE); Ecuadorian Ecological Foundation (FUDEC); alternative marketing channels of the Ministry of Agriculture, Livestock, Aquaculture and Fisheries (MAGAP-CIALCO); Ecuadorian Corporation of Organic Farmers (PROBIO); Vredeseilanden Office (VECO); and *Red Nacional Mar*, *Tierra y Canasta* have been involved in setting up the commission.

[15] www.quericoes.wordpress.com

[16] Initially, box scheme members were attracted to the 30–50 percent savings to be made by buying foodstuffs wholesale. However, over time, groups such as *Fundación Utopía* and the community of Tzimbuto diversified their agendas to include such issues as food quality, environmental sustainability and social equity (Borja *et al*., 2013).

EkoRural, which helps to build the capacity of rural community organizations, became involved in facilitating various relationships between producers and consumers as a result of recurring concerns by producers. Thus, in 2010, it used an action research and learning approach to facilitate an active linkage between *Asociación Nueva Generación* and *Canasta Comunitaria Utopía*.

Three or four years later, about 150 farmers have delivered their products to the box scheme, at different frequencies (with 50 farmers doing so on a regular basis), and direct negotiations have become a self-sustaining mechanism. In time, other producer organizations and individual producers have joined the initiative. The number of consumers varies from 60 to 180, depending on the time of year, with a typical average of 100.

What is more, *Canasta Comunitaria Utopía* has been instrumental in consolidating *Red Nacional Mar, Tierra y Canasta*, a network that groups together similar initiatives in Ecuador's coastal, highland and Amazon regions. Box schemes have expanded to more than 50 neighbourhoods nationwide, involving around 1 500 families (Kirwan, 2008; Chauveau and Taipe, 2012).

Agreements between the two actors, mediated by facilitating organizations, have given rise to a number of formal arrangements that currently govern negotiations and business opportunities. These institutional arrangements for market access are therefore seen as highly innovative and workable.

Sustainable practices: establishing linkages and creating a level playing field

Although stronger linkages between producers and consumers provide many advantages for both, it is not always easy to build these linkages. In the early months, difficulties arose owing to cultural differences between urban and rural families, limited experience of agro-ecological production and direct marketing in alternative markets, as well as problems with the coordination and organization of product collection, quality control and delivery. This made it essential to find common ground where relationships could be realigned in order to achieve a win-win situation in terms of profitability, equity and autonomy.

At the outset in 2010, the farmers' organization documented its supply, and planned and promoted initial field meetings with *Canasta Comunitaria Utopía* members to ascertain the reality of their demand. An analysis of expectations led to the establishment of agreements and the first deliveries. To understand more about the operation of *Canasta Comunitaria Utopía*, working meetings were held and farmers took part in the organization and distribution of boxes, which facilitated their interaction with the scheme's participants. This activity clarified the structure of the solidarity work underpinning the box scheme for those involved and demonstrated the strong political commitment of its founders.

In the early stages, the partnership proved fragile and, as analysed below, for various reasons it underwent a series of crises. Early on, consumers pointed to problems with the quality of the products delivered. Therefore, in discussions and meetings, *Asociación Nueva Generación* emphasized the importance of delivering quality foodstuffs of the agreed quantity and variety, as well as the need for close cooperation within the farmers' organization. A fundamental change rapidly occurred in the field, leading to farm planning and improved delivery and quality control mechanisms. The agro-ecological production proposal was deepened and strengthened[17] by diversifying management options as part of the agro-ecological organization of smallholdings. Emphasis was placed on such practices as the introduction of new species and varieties, staggered planting, crop rotation and composting, as well as on the recovery and reintroduction of native varieties of potato and other Andean tubers, thereby increasing the production system's genetic diversity and resilience. Farmer-to-farmer meetings enabled producers to understand the agro-ecological process and interactions fostered by these innovations. A process of strengthening Andean agriculture from an agro-ecological perspective was clearly evident.

Access to new plant species for consumption by farming families was considered a significant impact. Successive studies by Soto (2010), Marsh (2011) and Bekkering (2011) showed the effects and outcomes of farm diversification on the use, knowledge and consumption of new plant species among farming families. This has been accompanied by the normal redevelopment of traditional Andean crop species, based on personal accounts.

Innovations in horticultural production were particularly challenging because of their implications for knowledge, autonomy, organization and management. To ensure sustainable access to quality inputs, *Asociación Nueva Generación* members conceptualized – and in 2012 established – a community seed bank, which was a major innovation for sustainable biodiversity management.

Women have remained active in *Asociación Nueva Generación*, participate in *mingas* (traditional communal work to benefit the entire community) and strive to enhance their knowledge of agro-ecology, to improve their health and that of their families and to empower themselves (A. Cuenca, pers. comm., 21 March 2011; E. Tenelema, pers. comm., 2 April 2011). Their participation is a challenge to the patriarchal structure that still exists in Tzimbuto. Nevertheless, clear progress has been made, with these women now being able to express their views and gain their family's support (V. Parra, pers. comm., 2010; S. Zambrano field notes, 11 January–31 March 2011).

A survey in 2013 formally asked 30 farming families what changes had occurred since they began delivering their produce to the box scheme. More than 90 percent said that changes had occurred in their production methods. They reported having increased the number of crops planted and having introduced vegetables into their smallholdings. A group of participants (35 percent) said that farmers now plan better, cropping is more mixed, they eat more of the foodstuffs they produce, they use fewer agrochemicals and, to some extent, they are independent from market price fluctuations. ("Now I no longer care whether products are expensive or cheap because I plant only for the box scheme."). See Figure 6.1.

[17] In order to document knowledge and application of agro-ecological practices, visits to smallholdings, direct talks with farmers and technicians and community workshops were held. In addition, a semi-structured survey was carried out along with formal and informal interviews, and ethnographies were conducted to obtain in-depth knowledge of the level of implementation of the agro-ecological proposal in Tzimbuto. The following practices were documented: crop rotation and mixed cropping (100 percent); green manuring (80 percent); soil conservation (100 percent); agroforestry systems and windbreaks (50 percent); farm diversification (80 percent); production of organic manure (100 percent) and organic liquid fertilizer (50 percent). Clearly, a process of transition from Andean farming to an agro-ecological model is under way (based on field research by Marsh [2011], Soto [2010] and Bekkering [2011], and community workshops).

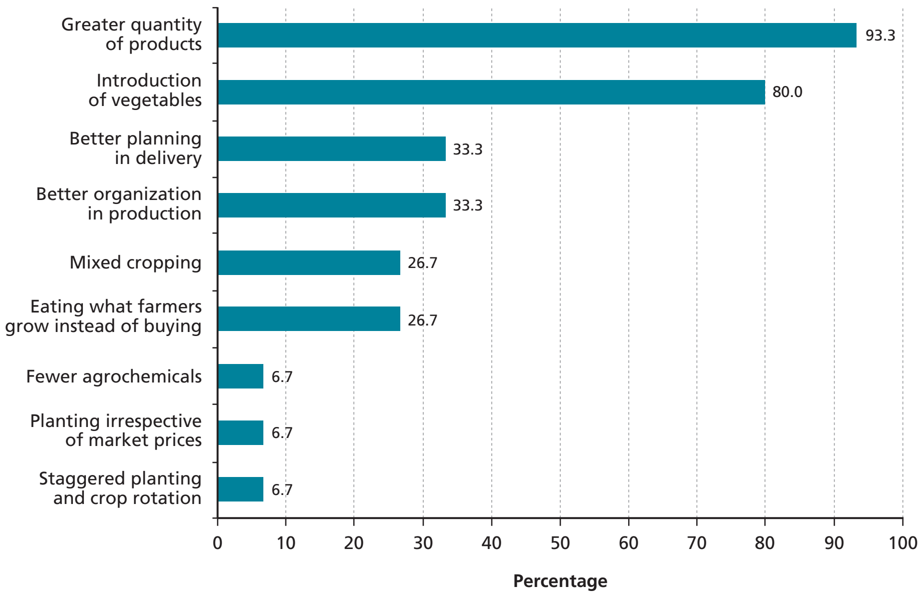
One community worker reported: "Tzimbuto has been able to diversity its production system to include crop rotation, crop diversification (especially with the inclusion of new varieties and vegetables) and organic fertilization, all of which have helped to diversify crops and diets" (F. Lema, pers. comm., 2009; Marsh, 2011). Home consumption of farmers' own foodstuffs helps to promote a closed-loop system of production and consumption which, coupled with the large amounts of organic manure produced from their own livestock, also helps to increase their autonomy (Marsh, 2011).

Economic relations

Pricing became one of the most sensitive issues for *Canasta Comunitaria Utopía*. For both the producers and consumers involved in the box scheme, foodstuffs had always been priced on the basis of the wholesale market reference price. In the region, organic and agro-ecological foodstuffs do not fetch a higher price. However, in this relationship, a huge question mark still hung over the issue of what is (or is not) a fair price for producer and consumer.

In a highly speculative market such as food, prices tend to reflect the perceptions of both buyers and sellers. The economics and rationale of small-scale farming are not governed by management or cost criteria and consumers have no access to knowledge on how food costs are formulated. This is true nearly everywhere in the world.

FIGURE 6.1
Production system changes seen by producers as a result of participation in the box scheme (percentage of respondents)



Note: percentages do not total 100 percent because questions were multiple choice, i.e. respondents were able to choose more than one option (July 2013).
Source: information from the field. Data: Mariana Alem.

At each fortnightly delivery to the box scheme, records are kept of the number and identity of participants, types of product, transacted amounts and producer prices. Records were also kept of official wholesale market prices for the same products and the prices quoted by the Ecuador Community Radio Schools run by the Ministry of Agriculture, Livestock, Aquaculture and Fisheries (ERPE/MAGAP), an organization that provides farmgate reference prices in Riobamba. In addition, since the second half of 2011, consumer prices have also been recorded in at least three retail outlets and, since 2012, prices received by farmers on the wholesale market have been recorded directly.

At a series of action learning workshops, *Asociación Nueva Generación* members discussed data on production and marketing costs for the main foodstuffs included in the boxes. They agreed on reference charges in each area for the use of such items as land, irrigation water, farmer-produced organic manure, own seed and family labour.

The information not only formed the basis of negotiations between farmers and *Canasta Comunitaria Utopía* representatives but also served as an indicator for farmers of whether they were financial winners or losers in the negotiations. The information was just as useful to consumers. Pricing information and its use from multiple perspectives is a major innovation in the context of market access for smallholders.

Markets for sustainable products and services: negotiations and changes in box schemes

Until late 2009, most of the fresh vegetables and other produce in *Canasta Comunitaria Utopía* boxes were sourced from the wholesale market, although the box scheme was also in regular contact with three farmers' groups from which it obtained some products directly.[18] In fact, some 60 percent or more came from the wholesale market. However, a serious discussion was already under way on the significance of food to the economy, nutrition, health and the environment and the need to diversify sources of fresh, healthy food.

A box usually contains a variety of 20–30 fresh agricultural products from the area and the coastal region, including tropical fruit, dried beans and flour. It always includes staples such as potatoes and onions, as well as commonly used foodstuffs such as carrots and tomatoes. Until the first half of 2012, the average unit price was US$10–12. The boxes are made up every two weeks.

Between 2009 and 2012, the number of organizations and individuals supplying the box scheme increased and their respective shares of overall purchases were realigned. An analysis of the sources of *Canasta Comunitaria Utopía* purchases over the 2009–2012 period (Table 6.1) shows that, immediately before the scheme began to purchase from Tzimbuto in 2009, more than 50 percent of horticultural products were bought wholesale. By 2010, a large percentage (20 percent) of the scheme's horticultural products was sourced from Tzimbuto and this increased to

[18] One of these groups is a cooperative of banana and plantain producers in the province of Los Ríos that usually travels to Riobamba every Saturday and makes regular deliveries to the box schemes. The second is a farmers' cooperative, ACT, whose members produce different types of flour. The third is a group of four farmers from Guamote, a city one hour away from Riobamba, who sell at a farmers' market in Riobamba and deliver some fresh vegetables to the box schemes, depending on availability.

TABLE 6.1
***Canasta Comunitaria Utopía* suppliers, 2009–2012**

Suppliers	2009	2010	2011	2012
Asociación Nueva Generación farmers' association (Tzimbuto)	0.30	20.1	29.5	25.0
Wholesale market	52.6	30.3	27.2	32.9
Individual farmers	17.8	25.3	24.9	17.0
Farmers' economic organizations (OEC)	22.0	16.4	18.4	9.4

Source: authors' elaboration.

25 percent or more over the subsequent two years. Indeed, this increase is reflected in a decline in wholesale purchases. Curiously, even though the number of supplier organizations increased, their share undoubtedly shrank over the period. Purchases from individual farmers rose from 2010 to 2011, before falling in 2012.

Over the period, *Asociación Nueva Generación* made 68 deliveries, providing around 20 different species of vegetables, roots and tubers, which they sold for approximately US$16 000. Given the difference in products delivered by men and women farmers, even though the number of units delivered by the women outstripped those of the men, the women producers received around one-third less for their products than men. It was more common for men to deliver products such as potatoes and carrots, while women were more likely to deliver products such as herbs or coriander (Table 6.2). A point of note is that *Asociación Nueva Generación* attended all the events organized and that the total numbers of men and women producers who participated were similar.

Much as in the case of producers, a sample of box scheme consumers (n=30) were asked about their various reasons for participation, especially about the quality of products in boxes compared with other suppliers.[19] Most agreed that products purchased elsewhere were of lesser quality, and they were satisfied with the box scheme's offering (n=21). It matters very much to consumers how foodstuffs are produced, i.e. whether they are grown by agro-ecological or by conventional methods, and whether they are produced locally. "They are organic/agro-ecological products" was given as the main reason for satisfaction, followed by "variety/quantity" and "quality". In fact, the majority (n=28) would even be willing to pay extra for organic or agro-ecological products. All the consumers highly valued the involvement of organized farmers' groups as suppliers of plants and agricultural products.

In contrast to the top-down approach used in systems with multiple intermediaries, the intermediary in this case did not promote external control mechanisms (certification, traceability, guarantee systems, etc.). Instead, consumers who visit the production plots in Tzimbuto quite frequently had the opportunity to take part in such activities as *mingas*, planting or harvesting. Such events are important

[19] They were interviewed by persons unrelated to the initiative during home visits outside box scheme events.

TABLE 6.2
Statistics on the participation, number of deliveries, income and number of products delivered to *Canasta Comunitaria Utopía* by men and women producers from *Asociación Nueva Generación* in Tzimbuto between 2010 and 2012

Item	Year	Women	Men	Total	
Farmers (participating)	2010	41	30	71	
	2011	32	22	54	
	2012	22	19	41	**94 total**
Deliveries (made)	2010	19	19	19	
	2011	22	24	24	
	2012	24	23	25	**68 total**
Income from boxes (in US dollars)	2010	1 710.2	2 285.9	3 996.1	
	2011	2 121.1	3 486.9	5 608.0	
	2012	2 968.9	3 468.5	6 437.4	
		6 800.2	**9 241.3**	**16 041.5**	**Total**
Types of product (species)	2010	16	15	17	
	2011	20	16	21	
	2012	10	10	12	**20 total**

Source: on-site records cross-referenced with data from *Fundación Utopía*.

in enabling consumers to verify the overall quality of the process and in motivating them to learn more about rural reality and the importance of eating and supporting locally sourced foodstuffs. This constitutes an emerging participatory guarantee system.

The system has allowed box scheme members to reflect more on the hidden costs of seemingly cheap modern foods and their detrimental impact on family nutrition, local economies, the environment and, ultimately, people's welfare. They have gained an appreciation for the day-to-day work of farmers and their way of sharing knowledge. City-country visits are a powerful and critical factor in building trust in the purchase and consumption of agro-ecological products, in addressing important issues and in compliance with agreements.

Consumers from Riobamba and producers from Tzimbuto have ever fewer opportunities to interact with those who produce their food and to understand their overlapping interests. Such meetings ensure traceability as a matter of course. Obviously, as these initiatives grow and become more complex, further standards and verification mechanisms will be developed locally.

The point is that consumers and producers rarely have the opportunity to meet face to face, get to know one another and talk over their realities. This specific case refers to urban consumers from *Canasta Comunitaria Utopía* living in Riobamba city and producers from the community of Tzimbuto, about 40 minutes away from Riobamba. One of the first trust-building activities to be carried out was a visit by consumers to the producers' farms to see for themselves how farmers produce food and how they live.

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6.4 RESULTS AND BENEFITS

Selling to box schemes rather than the wholesale market: analysis of marginal price benefits

An analysis of data on sales to *Canasta Comunitaria Utopía* over the period 2010–2012 reveals that producers achieved a significantly higher return from selling to the box scheme than from selling the same product on the wholesale market. Figure 6.2 shows that the two highly favourable periods for producers selling to the box scheme were January to March and October to December.

Price stability in box schemes

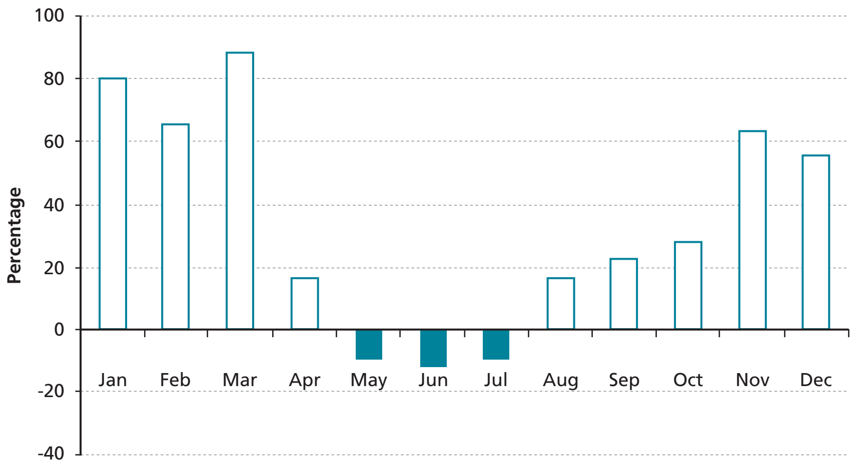
In an environment of highly volatile agricultural prices, box scheme suppliers were able to obtain more stable selling prices and, in the case of vegetables, prices were generally higher than in the wholesale and other markets. Figures 6.3 and 6.4 confirm this with the prices of two common consumer products: tree tomatoes and lettuce. Box scheme deliveries smooth seasonal cycles and associated variability.

Figure 6.3 is just an illustration of the price variations that can occur. The point is that selling to a box scheme provides a degree of stability compared with selling to other markets.

Even though price fluctuations tend to affect farmers' profits, they encourage a speculative approach in the expectation of higher prices. This is illustrated in the case of potatoes.[20] Figure 6.5, for 2010–2011, shows that price behaviour differs from one year to the next and that it is seasonal and highly variable. A peak of US$20–25 per quintal (100 kg) in the last quarter of 2011 tempered enthusiasm for fixed prices.

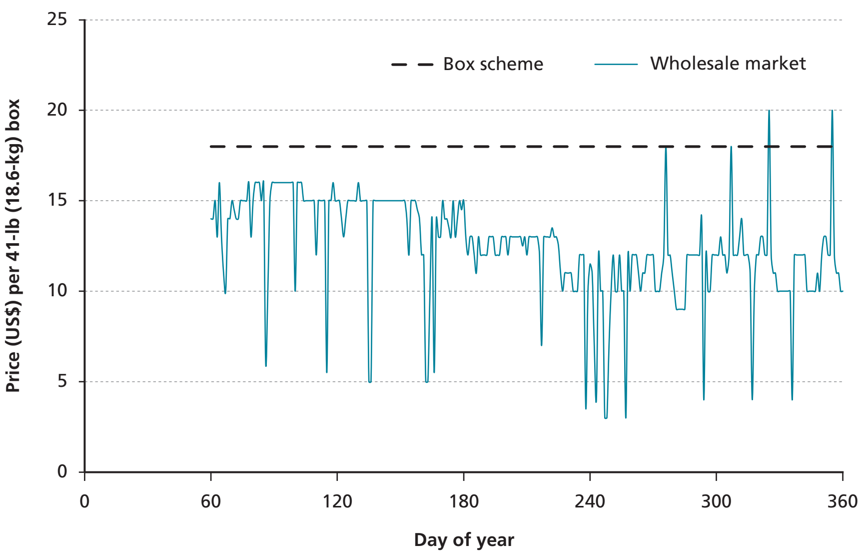
[20] Potatoes undergo the largest price fluctuations over the year.

FIGURE 6.2
Net difference, in 2012, between monthly percentage marginal benefits obtained from selling to box schemes and benefits that would have been obtained if products had been traded in the wholesale market



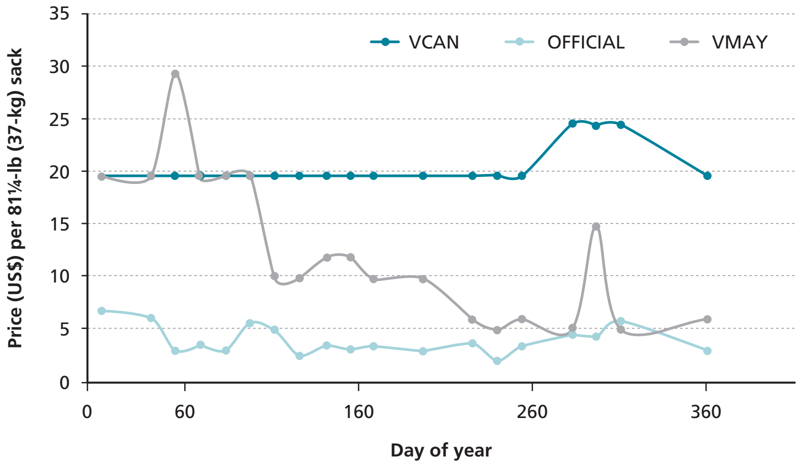
Note: the zero line represents a situation where, monetarily speaking, it makes no difference for the producer to sell to either market.
Source: authors' elaboration.

FIGURE 6.3
Tree tomato selling prices on the wholesale market and in the box scheme, 2010



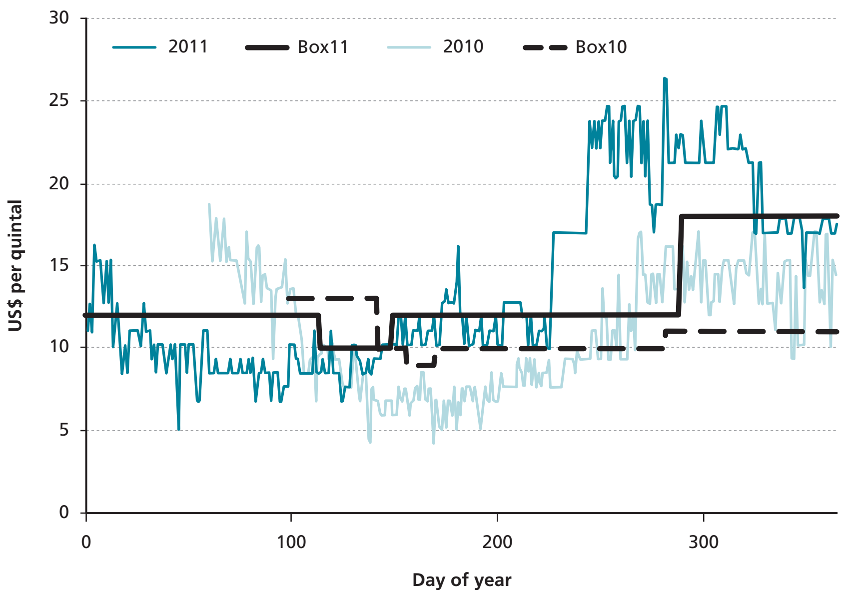
Source: authors' elaboration.

FIGURE 6.4
Lettuce selling prices per 81¼-lb (37-kg) sack, according to three* different sources of information, 2010



* Cash amount received by producers for selling their products to the box scheme (VCAN); official sources (Official); and price at which wholesaler sells products on that day (VMAY).
Source: authors' elaboration.

FIGURE 6.5
Price dynamics per quintal of the *Fripotato* potato variety, 2010–2011



Source: data from MAGAP's agricultural price information system for wholesale markets in Riobamba and prices paid under box schemes.

TABLE 6.3
US dollar values for different aspects of production and marketing with *Asociación Nueva Generación* for selected products, 2012

Crop	Vcprod US$	VPrMay US$	VCAN US$	VMAY US$	VMIN US$
Peas	34.70	52.90	52.50	63.00	82.80
Broccoli	nd	26.00	50.00	35.00	nd
Cabbage	53.00	65.90	341.00	199.30	155.70
Coriander	34.90	39.40	132.30	53.00	67.50
Broad beans	nd	653.20	875.00	769.30	nd
Lettuce	15.50	19.80	191.90	25.20	92.90
Turnips	44.60	30.60	141.50	36.90	63.90
Potatoes	2 228.70	3 7171.00	4 298.00	4 446.00	5 841.00
Squash	nd	8.50	30.00	13.10	nd
Carrots	277.30	290.40	310.20	371.40	568.60
Total	**2 688.70**	**4 903.70**	**6 422.40**	**6 012.20**	**6 872.40**

Note: Vcprod = cost of production and marketing undertaken by producer; VPrMay = price the producer would receive by selling wholesale; VCAN = cash amount received by producers for selling their products to the box scheme (also what the customer paid); VMAY = price at which wholesaler sells product on that day; VMIN = amount retailer would have charged for product delivered to the box scheme; nd = not determined.
Source: authors' elaboration.

Farmer participation in box schemes compared with other markets

Until 2012, producers achieved a stable share of around 25 percent of *Canasta Comunitaria Utopía* purchases, representing 50 percent of their vegetable sales. They made a profit[21] of about 80 percent when selling to the box scheme, compared with 40 percent had the same product been sold wholesale.

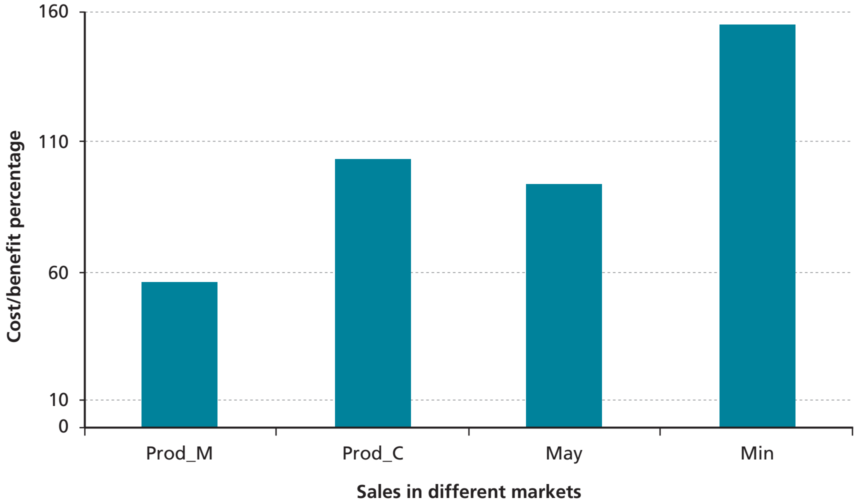
For box consumers, there was no significant cost differential between buying from wholesalers or from groups of agro-ecological producers. However, they benefited greatly from being able to obtain healthy, high-quality foodstuffs and save time on group buying from wholesalers, as well as on logistics and transportation to the box scheme premises, which are now undertaken by the producers.

An important consideration is that rates of return differ from product to product (see Table 6.3) and that, as each delivery is composed of an array of products provided by different *Canasta Comunitaria Utopía* members, not everyone benefits equally from every sale to the box scheme. In other words, an overall positive balance in a transaction does not necessarily apply to all participants.

It is common for urban consumers to buy some of their foodstuffs from retailers.[22] In taking stock of what such retail outlets offer to consumers and to some

[21] Returns after adjusting for production and marketing costs.
[22] Such as warehouses, stores and other retail outlets, for which data on prices for box scheme products were recorded at various outlets in the city.

FIGURE 6.6
Price relationship of products sold by *Asociación Nueva Generación* in different markets: wholesale, box schemes or sale to the consumer via wholesaler and retailer



Note: Prod_M = percentage return on capital invested in production and marketing when selling wholesale; Prod_C = return when selling to a box scheme; May = wholesaler's average markup when selling products; Min: retailer's average markup when retailing products.
Source: authors' elaboration.

extent inform producers of their options, Figure 6.6 shows that producers would achieve a rate of return of about 57 percent by selling wholesale and approximately 100 percent by delivering to box schemes. Consumers paid an average of 10 percent more for their foodstuffs under the box scheme than they would have paid wholesale. However, if these consumers had bought the same foodstuffs from a retailer, they would have paid just over 60 percent more than they paid to the box scheme. Nevertheless, box schemes come with the personalized attention that reflects the social aspect of market spaces such as these.

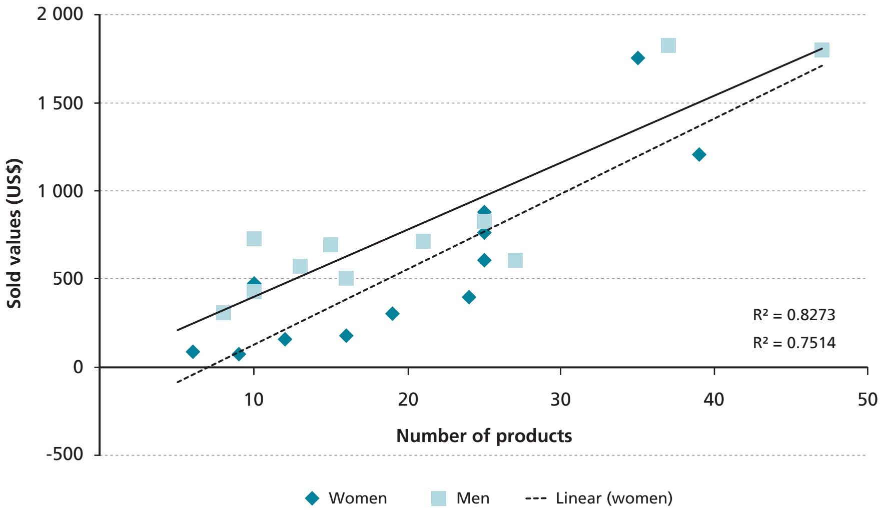
Profit margin made by men and women

Although an equal number of men and women participated in box scheme deliveries, women producers delivered slightly more foodstuffs than men. However, as Figure 6.7 shows, they did not make the same profit. Male producers made almost a 33 percent higher return than female producers.

Men sell products such as carrots or potatoes, which are more prized and of higher value. This is a gender issue. Some of the women delivering to the box scheme have never sold on the market. Even if the women did deliver a larger quantity of products, the price is higher for potatoes than for products such as herbs. For example, a single consignment of potatoes fetches a much higher price than a larger quantity of the horticultural products delivered by women.

While it makes no difference to earnings, the distinction is clear between the volumes and types of product sold.

FIGURE 6.7
Ratio between number of products sold by men and women and selling price received, from 2010 to 2012



Source: authors' elaboration.

Benefits perceived by box scheme consumers

Although, as mentioned earlier, the authors collected consumer perceptions routinely, they conducted a small survey in 2013 to examine in more depth consumer perceptions and reasons for participating in a scheme. The sample was broken down into two groups of consumers: one making a relatively smaller share of purchases and another that purchased more than a one-third share of box scheme products over the three-year period from 2010–2012.

In response to the survey, more than two-thirds of the most active consumers considered the box scheme to be useful first and foremost as a social space in which to build relationships, while also valuing the flavour and nutritional quality of the products on offer. Half ranked cost savings in third place. According to Bekkering (2011), one of the greatest benefits of a box scheme is to create opportunities for women to meet, interact and pursue new projects with other members. The *Canasta Comunitaria Utopía* box scheme provides an enabling environment for an ongoing exchange of information on different issues (Table 6.4). Health and nutrition benefits and saving money on food purchases were common reasons for the less active group to participate.

Diet. Most participants (73 percent of the less active group and 87 percent of the more active group) admitted having changed their family's diet in the hope of a positive health impact. They mentioned having changed their way of eating vegetables (n=24) and having learned new ways of consuming food.

Quality and freshness. Freshness is another benefit acknowledged by consumers. They also appreciate the variety of foodstuffs delivered, especially new or unfamiliar varieties or products. Most respondents ranked organic or agro-ecological production methods as either very important or important.

TABLE 6.4
Reasons why consumers participated in the box scheme, 2013

Reasons for participating	Group 1 (more active participation)	Group 2 (less active participation)
1	Social capital	Nutrition/health
2	Nutrition/health: fresh produce	Cost savings
3	Cost savings	Social capital

Source: authors' elaboration.

6.5 DISCUSSION AND CONCLUSIONS

The authors' work over the past three to four years in helping to develop and strengthen direct city-country linkages, which includes various other forms of market access, would suggest that, although many challenges remain, box schemes have the potential to influence local healthy food systems in favour of farmers and consumers, as indicated by recent studies on solidarity economy mechanisms (MAGAP/AVSF, 2014).

They learned that consumers play an important role in initiating or supporting these initiatives; a major challenge is to explore urban demand further; and responsible consumption can foster alternative visions. Redefining new spaces for smallholder food production may make it possible to restructure the network of social, economic, political and ecological relationships and connections that the conventional food system has undermined. Because the linkage between farmers' organizations and urban consumer organizations is complex, more time and the provision of protected spaces seem to be needed for it to stabilize.

The desire of farmers to engage in direct trading reflected their deep dissatisfaction with the way in which the conventional market worked. Nevertheless, both groups experienced a real sense of frustration in spite of their mutual motivation. Dialogue clarified what it meant to be a producer or consumer. It was therefore interesting to see how quickly the discourse moved beyond the concept of *solidarity*, used in the sphere of food policy, to one of *reciprocity*, which led to a host of win-win situations but which, in turn, was constantly put to the test.

The concurrence of multiple institutions and organizations, especially on the supply side, and the multiple linkages it establishes means that the box scheme can be classified as a special type of alternative agrifood network (AAFN). AAFNs are an interesting policy space and a key innovation for strengthening social and solidarity economy processes. They help the rural sector to work on the consumer-citizen concept, as well as to work with local governments on linking economic empowerment with nutrition, health and agriculture. AAFNs give concrete form to people's aspirations and learning in that they promote change.

Systematic analysis of economic data and expectations conducted over the period provides a good indication of general satisfaction on both sides and a great deal of commitment to and expectations from continuation of the experiment. Benefits include more personal forms of trade that help both parties exercise greater control over what is produced and consumed. For farmers' organizations, it has represented a learning-by-doing approach to training and an opportunity to showcase their creativity. Not only has it has led to a redefinition of roles and leadership (with women assuming new responsibilities in such areas as organizing deliveries, attending public events to report on experiences, supporting debates and discussions on various platforms and giving radio interviews), but it has also added value to the concept of agro-ecological farming.

These qualitative changes were documented through personal accounts over the three-year period, as part of an action learning process showing, for example, that new people (especially the young) are negotiating, that new communities are becoming involved in proposals and are initiating processes and that consumers feel immensely proud after watching and taking part in community activities. The current network of actors who communicate with the communities is wider and has a higher profile than at the start of the initiative.

The experiment revealed that the relationship between farmers and consumers is subject to tensions that require constant negotiations and arrangements. However, in their everyday activities, the actors enriched their learning and engaged in an ongoing exploration of opportunities to build new partnerships.

Challenges

For smallholders, collective sales of multiple products present unique challenges, including inequitable price dynamics, costs, the ability to deliver on time and differences in product quality, with the result that not everyone derives the same benefit or satisfaction. For a farmer selling a set of products, the overall balance may be the most important criterion, but not when a delivery necessitates dividing the profits among producers and by product, as in a box scheme. This is illustrated by a clear disparity in returns between women and men and by differing market opportunities for different products.

Clearly, the concept of a fair price and a price for organic or agro-ecological products is a matter still to be resolved. The issues of quality in the current food supply and lack of recognition given to communities for delivering healthy foodstuffs are yet to be consolidated. While box scheme members showed interest and a positive attitude to the subject, messages and meanings were different when it came to clinching a business deal.

Despite an enabling legal environment for short value chains and food-related innovation, some mechanisms, including local box schemes, have remained relatively limited. When taken over by government agencies, they are coopted (with a switch to products high in oils, fats, processed flours, etc.), thus impairing their ability to enhance local production systems that generate positive impacts on diets and health.

6.6 RECOMMENDATIONS

Local food systems in Ecuador require a protected institutional environment in which to grow. This makes it important to revitalize institutional platforms such as Ecuador’s consumer platform (TECU) and COPISA, promoting the role of smallholder production in local initiatives. To boost local food systems and their mechanisms, there needs to be continual monitoring of innovations in urban-rural relationships; growing urbanization of the countryside; and the emergence of urban and peri-urban agriculture. The challenge for decentralized autonomous governments is to secure recognition for the proposal, support for its expansion and some form of institutionalization.

The possibility of farmers' or CSOs initiating innovations to enhance producer-consumer linkages, in the form of retail outlets, producer-consumer cooperatives or some other type of linkage such as farmers' markets-contract sales, direct sales or box schemes should be promoted judiciously in line with the skills developed by stakeholders at both ends of the food chain.

Finally, it is imperative to strengthen local food systems as part of an urban-rural multistakeholder process, based on ongoing experiences, with a view to influencing local government policy. The authors see it as essential to intensify work in the urban consumer arena by creating a value base that promotes the empowerment, responsibility and civic-mindedness needed for social change.

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Chapter 7
Participatory guarantee systems: The case of smallholders in Indian markets

Ashish Gupta

7.1 INTRODUCTION

India has the potential to have one of the largest "organic by default" or non-certified organic agricultural lands in the world. This includes rainfed, tribal and mountain areas of the total land under agriculture in India. In northeastern India alone, around 18 million ha of such potential land exists (Charyula and Subho, 2010), where most agriculture is rainfed and little is certified. This excludes pastures and forests; hence, the overall area of cultivable land under sustainable agriculture is probably the largest in the world. Operational landholding by tribals in India is 16.9 million ha, including forest land and forest villages, and the use of chemicals on these lands is negligible since a large part of the land belongs to collectors of non-timber forest products (NTFPs) (Ministry of Tribal Affairs, 2010). It is worth noting that over 275 million people in India are dependent on forests, specifically for NTFPs. To date, there is no uniform policy or standard in India for collection and marketing of NTFPs (Planning Commission, 2011), which is a potential case for participatory guarantee systems (PGS) and work is already in progress.

India currently has 0.5 million organic producers (FiBL/IFOAM, 2013), indicating that the country is one of the largest in the world for organic and wild produce. Land under certified organic agriculture is 1.1 million ha (FiBL/IFOAM, 2013). More important, non-agricultural organic areas in India are the third largest worldwide, at 4.5 million ha (FiBL/IFOAM, 2013). These default organic swathes of land exist where a large number of producers have not used chemicals for decades but have received no certification. Given that over half the Indian population is directly or indirectly linked to agriculture, this leads to the largest organic farming or sustainable agricultural community in the world, under both certified and non-certified agriculture.

The use of chemicals under the Green Revolution regime over the last 70 years of Indian agriculture has led to serious issues in terms of ecology, economics and health. Continued leaching of chemicals and poisons into the soil and groundwater, and depletion of biodiversity because of large monocropping systems have led to serious ecological challenges. In addition, food economy, complex pricing mechanisms and supply chains have led to a crisis that has manifested itself in the suicides of large numbers of farmers. Never has the world witnessed a crisis of such dimensions – over 200 000 farmers committed suicide between 1997 and 2010

(Sainath, 2010). The maximum residue limits (MRLs) of pesticides and chemicals in fresh food have soared in urban markets. As of 2012, food safety in India has no defined regime for theoretical maximum daily intake and average daily intake of residue for a large number of pesticides used in the country (Centre for Science and Environment, 2013). Hence, there is strong demand from consumers for safe and organic food.

This situation at national level provides an enabling context for the promotion of organic agriculture and its assurance through PGS in India. PGS is a trust-based peer review mechanism that facilitates primary producers' participation in markets. India has been leading the promotion of creating and sustaining a short supply chain based on a PGS certified market. The need for ecologically sustainable agricultural practices was understood by most farmers in India even before the 1950s and the introduction of destructive chemicals, when all farming was what is deemed today to be organic. However, systematic changes in the market economy, global trade, large industries, knowledge bases such as universities and government departments departing from improving traditional farming methods, have left the farmers involved in sustainable agriculture in a lurch. All farmers understand the need for lowering farm input costs and maximizing market value by quality improvements in yields or value addition. The former is addressed by methods of ecological agriculture and the latter by ensuring community-based and equitable access to markets.

Organic agricultural production in India consists of certified organic agriculture, non-certified or default organic agriculture and wild produce. The latter two cases are appropriate for PGS certification systems, since most producers or wild collectors are smallholders and cannot afford expensive and complex certification systems. The PGS Organic Council (PGSOC) thus plays a primary role in the inclusion of small producers who are organic by practice but not by certification. In addition, the idea of community and social structure is built in PGS with the essence of bringing "culture" back into "agriculture". All organizations, as part of PGSOC, are working to help farmers understand the principle of social justice, fairness and community-based activities and marketing. All this should be built into a system that works for marginal farmers. These factors are naturally the primary driving forces behind the need for and evolution of PGS. Given the large agricultural sector in India, it is not possible for governments alone to perform these activities in intent and scale. Private initiatives are needed that can bridge the gap between organic production practices and markets for organic products. As an amalgam of Non-governmental Organizations (NGOs) and Voluntary Organizations (VOs), PGSOC tries to fill this gap as best it can. It has been assisting farmers in the country with PGS and markets since 2006.

The need for PGS primarily arose in India because of the complex and expensive third-party certification systems for organic produce. Certification systems originally excluded domestic markets as being viable for organic produce, which is commonly understood as meaning that they provided expensive produce for consumers. The third-party system, while catering to the export market, is not well suited to the domestic market since most small and marginal farmers cannot afford the exorbitant costs, nor can they manage the complex documentation or understand the technical systems in a language that is foreign to them. PGSOC has introduced documentation in most major Indian languages including Hindi, Telugu, Tamil, Marathi and Kannada. In addition, with more groups from the state of Jammu, Kashmir and Ladakh and the northeastern states, more languages are being added to the literature and documentation process (PGS Organic Council, 2010). This chapter illustrates how a private or NGO/VO-run PGS, suited to local requirements, has facilitated the adoption of organic agricultural practices.

The chapter is organized as follows: first, the institutional landscape is described. PGSOC is introduced as the institutional innovation. The sustainable practices that it promotes and the market linkages are described. In the results section, the activities of three of the Facilitation Councils (FCs) in PGSOC are presented. The study relies on data from 2010 to 2013 to present the cumulative growth statistics for all FCs that are part of PGSOC. Finally, the challenges and the strategies put forward by each of the relevant actors in the PGSOC are discussed. Conclusions on the innovativeness of this approach and recommendations for overcoming outstanding challenges are presented.

7.2 INSTITUTIONAL LANDSCAPE

The National Programme for Organic Production (NPOP) governs the public standard in India for organic food production systems. Surprisingly, standardization and accreditation for organic food production systems in a country as vast as India are regulated not by the Ministry of Agriculture, but by the Ministry of Commerce and Industry. This can be explained by the history of the development of organic production in India, which was not meant for domestic consumption but for exports to other countries, and is thus considered an issue of trade and industrial systems and not of agriculture (Ministry of Commerce and Industry, 2005). While standards for organic production are geared towards the specificities of India, e.g. the use of *Ayurveda* and *Unani* medicine systems in agriculture, they have since been implemented through the third-party system of certification. In this system, the Agricultural and Processed Food Products Export Development Authority (APEDA), as a body under the Ministry of Commerce and Industry, accredits third-party certifiers. These certifiers perform farm audits for compliance with NPOP and certify the production and supply chain systems as organic. However, this service is complicated and expensive so that most small and marginal farmers cannot afford the costs.

PGS, as an alternative, was introduced to India with the help of the Food and Agriculture Organization of the United Nations (FAO) and the International Federation of Organic Agriculture Movements (IFOAM). In 2006, a discussion on an organic PGS for India was introduced in public debate (Khosla, 2006). The meeting was organized by the Organic Farming Association of India (OFAI) and was attended by representatives of various organizations and the Indian Government.

PGS does not certify the farmer as an individual but as a group. This grouping tends to lend itself naturally to being a collective on the marketing side of organic practices. Thus, once the system of PGS had been put in place, the marketing mechanism was developed. PGS was set up as a system of participatory certification to create collectives of farmers as local groups. These groups were strengthened through mechanisms such as producer companies, cooperatives and self-help groups that gave farmers a community for participating in markets. The innovation in terms of mobilizing the PGS as a cooperative structure has lowered the marketing risks per farmer family and has enhanced the value of produce through the transparent ownership mechanism where participating farmers hold a certain degree of equity. The last seven years of inclusive operations has indicated that PGS works for the benefit of smallholder farmers and the environment. It is implemented independently in India by PGSOC. There is also a public PGS, which is run independently, so that farmers are free to choose either body.

As of 2011, the Government of India authorized a national PGS programme along the lines of the one run by PGSOC, implemented by the National Centre for Organic Farming (NCOF), a body under the Ministry of Agriculture (NCOF, 2011). NCOF participated in the original meeting on PGS in 2006, which was organized by OFAI, as a certification system was recognized as a viable option for Indian markets and production systems. Although this recognition at national level was important in opening up policy space and national possibilities for operating PGS, there was no formal association between the PGS run by the Indian Government and PGSOC at the time this case study was written.

7.3 INSTITUTIONAL INNOVATION: PGSOC AND FACILITATION COUNCILS

Background and organizational structure

PGSOC is a formal society consisting of 12 NGOs/VOs working in various states of India. It is a democratically run organization with council members electing the executive council and managing committee. Each of these organizations works in various parts of India with small and marginal farmers, mostly in rainfed conditions. As shown in Table 7.1, a total of 587 small farmer groups across India with 5 925 farming families were directly involved in certification and marketing under PGS.

FIGURE 7.1
PGS organic produce marketing logo

Apart from working with small landholding farmer families, forest dwellers are also assisted in the sustainable collection of wild produce, quality assurance and marketing. The marketing structure is formed through organizations in which the producers hold equity in a direct manner or indirectly through association with the NGO/VO. Thus, local markets created by the groups own the collective brand identity of the PGS logo, as shown in Figure 7.1, and approach markets on the basis of the strength of their peer review systems.

By the end of 2008, the membership base numbered 184 groups. This has slowly risen to its current base of 587 – an increase of nearly 319 percent over the last five years (PGS Organic Council, 2009, 2013). As of September 2013, the number of farming families was 5 925 – an increase of nearly 238 percent over the last five years, as shown in Figure 7.2.

Since 2010, land area has also grown from 12 to 15 percent per year. The land bank is expected to grow over 20 percent in the next two years, with an increasing number of organizations across India expressing interest and confidence in PGS. Many farmers are small and marginal, with an average landholding of about 5 acres (2 ha) or less, in addition to being in dryland farming conditions with rainfed agricultural systems. This situation is shown in Figure 7.3.

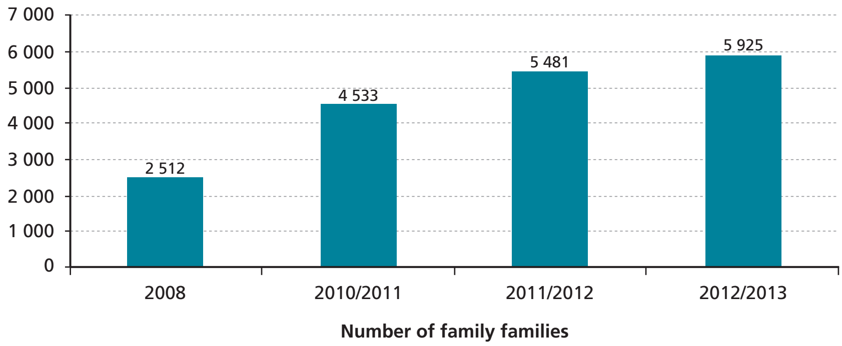
TABLE 7.1
PGSOC Facilitation Councils and farmer groups, September 2013

Name of Facilitation Council (FC) Organization	State of operation	Farmer local groups	Number of farming families
Organic Farming Association of India (OFAI)	Uttar Pradesh, Kerala, West Bengal, Karnataka, Himachai Pradesh	14	100
Keystone Foundation	Tamil Nadu	14	118
Convenant Center for Development (CCD)	Orissa, Tamil Nadu, Andaman and Nicobar, Maharashtra	28	407
Green Foundation	Tamil Nadu, Karnataka	112	736
Institute of Integrated Rural Development (IIRD)	Maharashtra, West Bengal, Tamil Nadu, Karnataka	153	2 161
Timbuktu Collective	Andhra Pradesh	51	797
Deccan Development Society (DDS)	Andhra Pradesh	37	185
Chetna Vikas	Maharashtra	20	117
Pan Himalayan Grassroots Foundation	Uttarakhand	40	485
Institute for Cultural Research and Action (ICRA)	Karnataka	68	496
Maharashtra Organic Farmers Federation (MOFF)	Maharashtra	44	318
TEDE Trust	Tamil Nadu	6	5
TOTAL		**587**	**5 925**

Source: authors' elaboration.

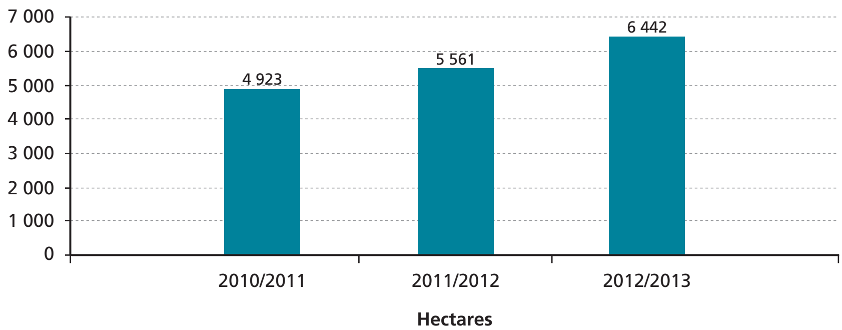
The operational structure describes the flow of certification and usage of the PGS organic mark and logo by local groups (Figure 7.4). The actual marketing lies with the farmers themselves. PGS helps them organize this by providing their group structure with vernacular or local language-based certification systems, which help the community understand the value of certification better. The NGOs/VOs are the back-end organizations working with training farmers in sustainable agricultural practices and mobilized community-based marketing, while the front-end organizations are farmer owned or oriented, such as the Mahagreen initiative in Aurangabad city where farmers are underwritten by the producer company and assisted in direct marketing of produce (Indian Institute for Rural Development, 2011). Thus, a variety of marketing models exists through PGSOC, which has been a natural progression since not all markets are equal or work on the same structure. These various marketing models are detailed in subsequent sections.

FIGURE 7.2
Family farmers with PGSOC



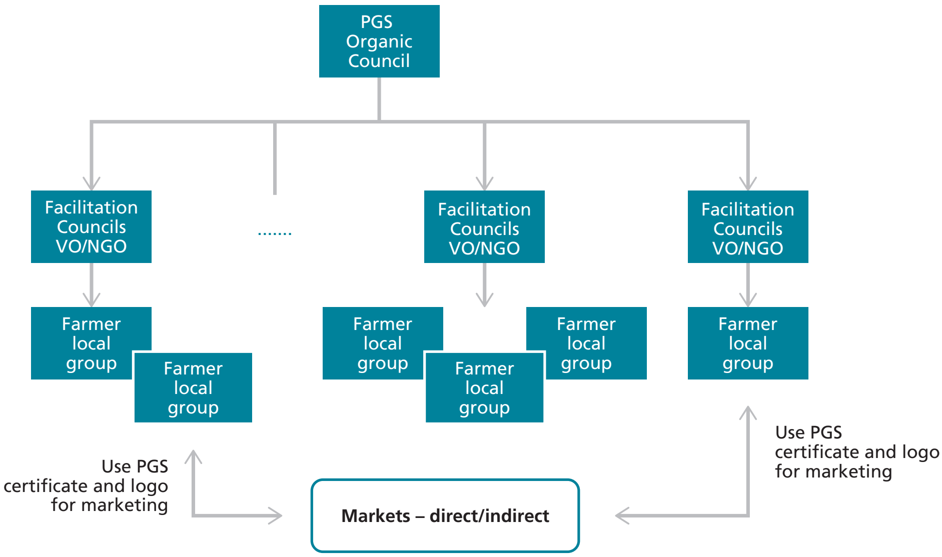
Source: authors' elaboration.

FIGURE 7.3
Land under PGS



Source: authors' elaboration.

FIGURE 7.4
PGS Organic Council operational structure



Source: authors' elaboration.

Costs for running PGSOC from 2006 to 2013 were funded by the FCs themselves, as part of running the formal organization structure as a society. In 2013, PGSOC received funding for its activities over the coming three years from an external funding body. No support is received from the Indian Government. In addition, the back-end organizations play a key role in PGS certification and management. This model is different from the third-party system since it has greater linkages with grassroots farmers, assisting in all aspects of sustainable agriculture. In this model, all back-end NGOs/VOs are FCs of PGSOC.

Most FCs work with small and marginal farmholders in rainfed areas. In other research, it has been indicated that small farmholders constitute up to 80 percent of food supplies in Asian countries (FAO, 2012). It has been recommended that small farmholders are best suited to form community-based systems to help absorb market and climate change pressures (Altieri and Parveez, 2008). These small farmholders are most susceptible to market shocks but contribute most in terms of food diversity to their countries. Almost all small farmholders are farming families, who do not have the resources to connect directly with external markets on their own and focus exclusively on small footprint markets in their vicinity. The smallest unit in PGS is not only an individual farmer but can also be a complete farming family and others dependent on the farm unit, including farm labourers. This is in keeping with the social goals of poverty alleviation and environmental sustainability.

TABLE 7.2

An example of peer review data collection

No.	Farmer's name	Father/ husband's name	Age	M/F	Total land (acre)	Organic cultiv.	Irrigation	Type of land	Land preparation	Crops
1	S. Thangaraju	KM Sandra Gounder	45	M	15	All	Well, river, drip irrigation	Red soil, clayey soil	Multiseed sowing, drainage, mulching, mixed crops, ash and lime application	Banana, papaya, turmeric, coconut, paddy, pineapple, groundnut, toor dal, drumstick, vegetables, elephant yam, millet, flowers, castor
2	V.S. Arunachalam	V.K. Sengottiyan	32	M	10.75	All	Well/ borewell and river	Sandy loam and red soil	Multiseed sowing, lime, ash, mixed crop and drainage	Paddy, banana, sugar cane, turmeric, coconut, vegetables, pepper, oranges, guava, papaya, musambi, lemons, elephant yam, black gram, castor, vegetables
3	MP Senthilkumar	M.R. Ponusamy	52	M	13	All	Well/river	Clayey loam	Multiseed sowing, mulching, mixed crop, drainage, ash and lime	Sugar cane, turmeric, banana, lemons, papaya, oranges, chilli, mango, paddy, elephant yam, castor, coconut, guava, vegetables, ginger, toor dal, millets, drumstick and groundnuts
4	K. Arunagiri	s/o Kaliannan Gounder	49	M	14.5	All	Well	Gravelly red soil	Mixing, multiseed sowing, multicrop, ash and lime	Coconut, areca nut, banana, pepper, mango, guava, gooseberry, drumstick, vegetables, flowers, lemons, oranges, papaya, turmeric, pineapple, chilli, toor dal, ginger, maize, millets, elephant yam, castor, groundnuts, thippili
5	S. Annamalai	s/o KM Sandra Gounder	39	M	8.5	All	River and borewell	Clayey loam	Multiseed sowing, mulching, mixed crop, ash, lime	Banana, turmeric, ginger, pepper, vegetables, lemons, musambi, paddy, pulses, coconut, castor, papaya
6	K.R. Maheshwaran	s/o KP Ravindran	43	M	12	All	Open well and borewell	Sandy loam, alkaline, saline	Multiseed sowing, mulching, mixed crop, ash, lime	Banana, coconut, lemons, pepper, papaya, areca nut, drumstick, vegetables

Seed treatment	Pest control	Animal details	Labour	After harvest	Storage	Crop	Witness	Date of inspection	Name of team (inspection)
Panchakavya, amrithajel, mixed with ash	Herbal pest repellent	Cow, buffalo, goat, hens and chicks	Own and hired labour	Dry jute bag, mixed neem leaf	Jute bag	NA	V.S. Arunachalam	29.12.2013	1. V.S. Arunachalam 2. Muthukumar 3. M.P. Senthilkumar
Dry, mixed with ash, cow dung, urine, panchakavya, amrithajel	Herbal pest repellent	Goats 4, cow, hens	Own and hired labour	Dry jute bag, mixed neem leaf	Lime, bamboo, hibiscus	NA	M.P. Senthilkumar	30.12.2013	1. Annamalai 2. Muthukumar 3. Mahesh
Panchakavya, amrithajel	Herbal pest repellent, intercrop ash	Cows, goats, hens and chicks	Own and hired labour	Lime and chilli powder	GoDown and jute bag, bamboo baskets	NA	V.S. Arunachalam	30.12.2013	1. Arunagiri 2. Annamalai 3. Muthukumar
Panchakavya, amrithajel	Intercrop ash, herbal pest repellent	Cow, hens and goats	Own and hired labour	Vasambu, lime, chilli	Jute bag and GoDown	NA	V.S. Arunachalam	29.12.2013	1. Thangaraj 2. Muthukumar 3. Mahesh
Panchakavya, amrithajel	Herbal pest repellent, intercrop, ash	Cow and hens	Own and hired labour	Jute bag, lime, chilli, neem leaves	GoDown	NA	V.S. Arunachalam	29.12.2013	1. V.S. Arunachalam 2. Senthilkumar 3. Arunagiri
Panchakavya, amrithajel	Herbal pest repellent, inter crop, ash	Cow, goat and hens	Own and hired labour	Jute bag, lime, chilli, neem leaves	GoDown	NA	V.S. Arunachalam	30.12.2013	1. V.S. Arunachalam 2. Muthukumar 3.Thangaraj

TABLE 7.2
(continued)

No.	Farmer's name	Father/ husband's name	Age	M/F	Total land (acre)	Organic cultiv.	Irrigation	Type of land	Land preparation	Crops
7	V.T. Valluvan	M. Thangavel	45	M	13.82	All	Well, borewell and drip irrigation	Red soil, clayey soil	Pit treatment, live mulching, channel drainage, green manure cropping, mixed cropping, ash, lime and compost application	Coconut, banana, lemons, oranges, mosambi, pineapple, nutmeg, wood value trees, vegetables, pepper
8	S. Premlatha	V.T. Valluvan	44	F	7.39	All	Well, borewell and drip irrigation	Red soil	Pit treatment, live mulching, channel drainage, green manure cropping, mixed cropping, ash, lime and compost application	Coconut, banana, lemons, oranges, mosambi, pineapple, nutmeg, wood value trees, vegetables, pepper
9	V. Arthanari Babu	s/o Visvanathan	45	M	7	All	Well, borewell and drip irrigation	Gravel	Multiseed sowing, drainage, mulching, mixed crop, ash	Banana, turmeric, coconut, paddy, pineapple, toor dal, vegetables, castor, pepper, thippili, curry leaves, lemons, oranges, mosambi, guava, mango, mathulai (pomegranate), wood value trees
10	T.R. Rajkumar	s/o T.R. Rathnam	35	M	36	All	Well, borewell and drip irrigation	Red soil and oodai sand	Multiseed sowing, mulching, mixed crop, drainage, ash	Banana, coconut, lemons, mosambi, oranges, toor dal, castor, mango, mathulai, bablimaas, naarthai, seetha (custard apple), wood value trees
11	R. Sivakumar	s/o K. Ramasami Gounder	56	M	4	All	Well, borewell and drip irrigation	Clayey loam	Multiseed sowing, mulching, mixed crop, drainage, sweet potato	Banana, coconut, lemons, mosambi, oranges, toor dal, castor, amla, wood value trees, thippili, pineapple
12	T.R. Rathnam	s/o K. Raja Gounder	65	M	6	All	Well, borewell and drip irrigation	Sandy	Multiseed sowing, mulching, mixed crop, drainage	Banana, papaya, paddy, vegetables, pineapple, lemons, mosambi, oranges, coconut, thippili, curry leaves, amla, seetha

Source: Linga Bhairavi Organic Farmers' Group.

Seed treatment	Pest control	Animal details	Labour	After harvest	Storage	Crop	Witness	Date of inspection	Name of team (inspection)
Panchakavya, amrithajel	Herbal pest repellent, neem liquid, intercrop ash	Cows 4, hens 25, geese 8	Own and hired labour	Nil	Field	NA	V.S. Arunachalam	28.12.2013	1. M.P. Senthilkumar 2. Muthukumar 3. V.S. Arunachalam
Panchakavya, amrithajel	Herbal pest repellent, neem liquid, intercrop ash	Cows 3	Own and hired labour	Nil	Field	NA	V.S. Arunachalam	28.12.2013	1. Annamalai 2. Muthukumar 3. V.S. Arunachalam
Panchakavya, amrithajel, mixed with ash	Herbal pest repellent	Cow	Own and hired labour	Dry jute bag, mixed neem leaf, nocchi, vacha and paccha	Jute bag, GoDown	NA	V.S. Arunachalam	27.12.2013	1. Muthukumar 2. V.S. Arunachalam
Panchakavya, amrithajel	Herbal pest repellent, intercrop ash	Cow	Own and hired labour	Dry jute bag	GoDown and jute bag	NA	V.S. Arunachalam	23.12.2013	1. Muthukumar 2. V.S. Arunachalam
Panchakavya, amrithajel	Herbal pest repellent, intercrop ash	Nil	Own and hired labour	Jute bag	GoDown and jute bag	NA	V.S. Arunachalam	24.12.2013	1. Muthukumar 2. V.S. Arunachalam
Panchakavya, amrithajel	Herbal pest repellent, intercrop ash	Cow	Own and hired labour	Jute bag	Jute bag	NA	V.S. Arunachalam	23.10.2013	1. Muthukumar 2. V.S. Arunachalam

Sustainable practices

PGSOC publishes a manual in various languages for the implementation processes, which also contains a section on sustainable practices. The minimum requirement is published as a basic organic standard, which is a summation of the IFOAM 2005 standards and NSOP, the public standard in India (Ministry of Commerce and Industry, 2005). Across India, farmers use various sustainable organic practices that vary by region. For example, farmers have easy access in the plains to *Azadirachta indica* or neem kernel. The oil extract from the kernel has insect-repellent properties. *A. indica* is however not easily available in the higher altitudes of the Himalayan regions where organic farmers prefer to use *Lantana camara* extracts. Similarly, in the southern part of India, leaf or kernel extracts and oils from *pongamia* or *karanj* are used, which are not easily available in the northern part of the country. Consequently, specific methods of sustainable agriculture production systems are left to the farmer groups so long as they adhere to the basic PGSOC standards, which are harmonized with IFOAM 2005 standards and NSOP.

The basic PGS process is actually quite simple. A farmers' group reviews farms and constitutes peer organic farmers within the group. Groups are created with a farmer in the same village or co-located villages. Central to PGS is a farmer's pledge, which each member of the local group must take. For example, if there is a local group of five farmers, a minimum of three farmers will follow the PGS peer review process and certify the remaining farmers. Farmers who own the farms cannot certify their own farm. As part of the process, they have to answer simple questions in the local vernacular, many of which have a "yes" or "no" answer. If farmers are not literate, FCs can facilitate the review process by digital (audio or video) means.

PGS local groups publish their sustainable production practices and land management systems. These will vary across India, depending on the terrain, availability of *in situ* inputs, etc. As an example, farmers in the southern state of Tamil Nadu practise techniques such as seed treatment with ash and *panchagavya*, which is essentially, a decoction made of five cow products – milk, butter (clarified), cow urine, fresh cow dung and curd (Dhama *et al*., 2005).

Yields of organic farms as compared with chemical production systems have been researched in India. The outcome indicates that in a number of crops such as soybean and cotton, yields are comparable (Forster *et al*., 2013). It has been demonstrated even in the case of paddy that organic farming systems are comparable in profitability – yields are more nutritious and more profitable if premiums are provided for better quality (Singh, 2012). By overall reduced input costs, especially in the case of cotton and sugar cane (Charyulu and Biswas, 2010), organic farming is more profitable in mixed cropping systems (Shiva and Pandey, 2006). It is also well known that nutrition yields per acre are exponentially high in organic farms as compared with chemical farming systems (Shiva and Singh, 2011). Even in multicropping systems with a marginal drop in yield of an average of 9.2 percent, the overall profitability of organic farms is shown to be higher because of lower input costs (Ramesh *et al*., 2010).

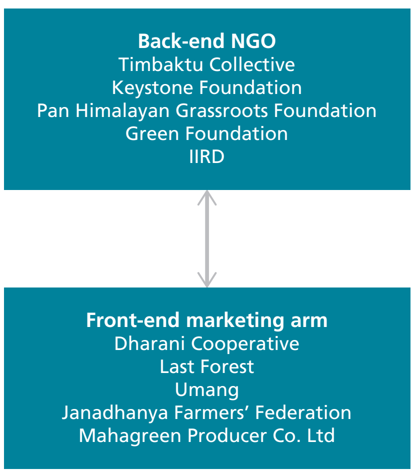
The PGS peer review mechanism strengthens the community bond and enables farmers to learn from each other about organic processes and techniques. Ruling out parallel production systems ensures the complete application of sustainable agricultural systems. PGSOC certification aims to certify the entire land owned by individual farmers as organic. Let us consider a farmer who owns multiple and sparsely located tracts of farm land. The farmer may choose to have a parallel production system of organic and chemical farming on different plots. However, for PGS, the farmer's land has to be considered organic, so that full certification can only be granted after all plots are cultivated organically. Hence, a new farmer inducted under PGS is given time until conversion to ascertain that sustainable agricultural systems work to achieve the sustainability goals of ecology and economy.

Markets for sustainable products

Farmers market their produce through the following channels.

- *Direct sales by farmers to end consumers.* Advantages are that markets are local and informal, there is little need for PGS, and the market is within easy reach at village level. Most customers are farmers themselves. In this method, most produce is sold with minimum processing and value addition. Market niches also exist, for example the local groups of the FC Green Foundation use PGS certification to produce open pollinated seeds for other farmers and organizations. This is done through the Janadhanya cooperative. Other examples are organizations such as the Institute for Cultural Research and Action (ICRA), which assists a farmers' federation to organize periodic fairs where farmers interact directly with consumers from the nearby village or town.
- *Organization-assisted sales.* These are formal sales channels with organizational hand holding and fair pricing, as shown in Figure 7.5. Here, the organization plays a significant role in assisting farmers to reach markets, ensuring fair price access and underwriting market sales. Distance to markets

FIGURE 7.5
Organization-assisted sales model



Source: authors' elaboration.

may even be across an entire state. This kind of marketing is undertaken by the Alexander Mahagreen Producer Company Ltd (Indian Institute for Rural Development, 2011). The customer profile is families and households who demand safe food for self-consumption. Products such as compost are also sold through similar markets. In this case, farmers participate directly in sales at the weekly markets. Packaged and branded produce is also sold through this kind of sales system.

- *Sales to retailers as intermediaries.* In this marketing model, there is farmer-owned brand identity and direct marketing with value addition to the products. The model covers the greatest distance in marketing and is capable of absorbing the maximum surplus. Farmers group themselves together as a self-help group or as a group of entrepreneur farmers who form a direct branding and marketing system. Here, farmers or groups are free to perform all manner of marketing, albeit on a small scale. Since most farmer groups are constricted by availability of funds, most of these initiatives are of necessity small scale. An example of this type of marketing is given by local groups of FC OFAI, which brand and package and then market directly under their own brand. As shown in Figure 7.6, a group of farmers under FC OFAI in the state of Himachal Pradesh market their produce, such as walnuts, lentils and ghee, under their brand name of Himachal Se!

As shown in Figure 7.7, overall sales in '000 rupees (INR) per combined FCs have increased with such varied models of marketing over 130 percent since 2010. This shows that there is considerable interest in PGS produce not just by markets but also by small farmers who have few options of market access. Consumers of PGS produce are direct end consumers, intermediate markets and retailers or farmers themselves. The following sections discuss three such cases concerning producers, market mechanisms and PGS.

FIGURE 7.6
Co-branded farmers' logo with PGS

Himachal Se!

North Harvest Organic SHG
Promoted by: Karsog Valley Farmers' Group
V&PO Churag, Tehsil Karsog, Distt. Mandi
(HP)

Email: northharvestorganics@gmail.com
Tel.: 09418455027

PARTICIPATORY GUARANTEE SYSTEMS
PGS
ORGANIC PRODUCE

PGS NO – HP A01 00_

Source: authors' elaboration.

7.4 RESULTS: CASE STUDIES OF FCs IN PGSOC

Three case studies are described in this section as part of the results of PGSOC work in implementing community-based certification and marketing systems in 2006.

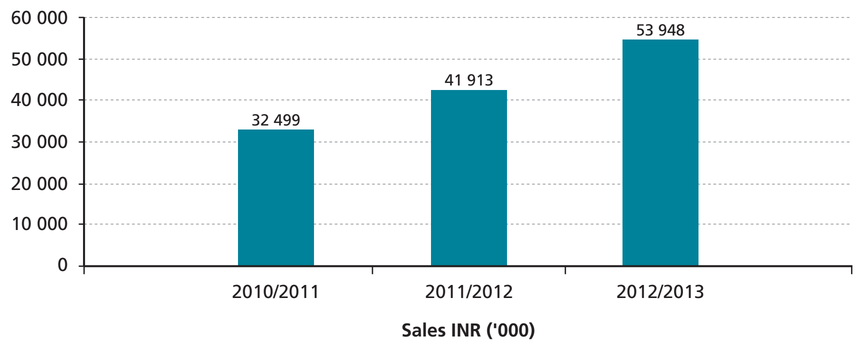
In order to explain how the results achieved by each PGS are unique to the way in which the system is organized locally, we describe three cases of the farmer-to-consumer model of marketing promoted by PGSOC. These cases demonstrate the range of PGS applications to sustainable systems. They are the FC Green Foundation in the state of Karnataka; FC Institute for Cultural Research and Action (ICRA) of Karnataka; and FC Timbaktu Collective in Andhra Pradesh.

FC Green Foundation

Green Foundation works in the southern Indian states of Karnataka and Tamil Nadu on seed conservation, rights of women in agriculture and biodiversity. The foundation assists farmers of a federation known as Janadhanya to produce open pollinated seeds for distribution to other farmers. The federation plays a pivotal role in procuring quality organically produced seeds with buy-back guarantees from farmers under PGS. It also assists in providing quality premiums for farmers. Each local group working with the Green Foundation undergoes effective training for managing PGS and necessary documentation in the Kannada or Tamil local language. Figure 7.9 shows the volume sales in kg of produce sold through the federation (C. Sivakumar and R. Satish, Green Foundation, pers. comm. by e-mail, 2013).

Figure 7.8 shows the relative growth in the number of farming families, land under PGS (converted and in conversion) and local groups associated directly with the Green Foundation. In rural areas, most seed produce ends up at community seed banks and thence to the farmers' federation that brands and packages the produce for sale. Seeds are sold back to the farmers at wholesale, and other produce such as oilseeds and pulses are sold as consumables in urban and rural markets. For consumables, urban markets represent urban cooperative bazaars and retail stores in addition to enabling individual customer purchase from the federations.

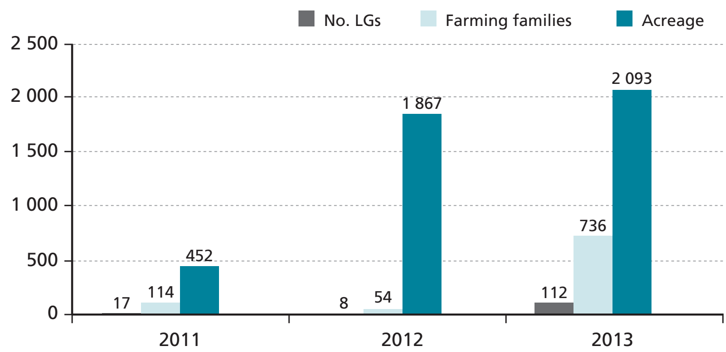
FIGURE 7.7
Sales in '000 rupees (INR) per combined Facilitation Councils



Source: authors' elaboration.

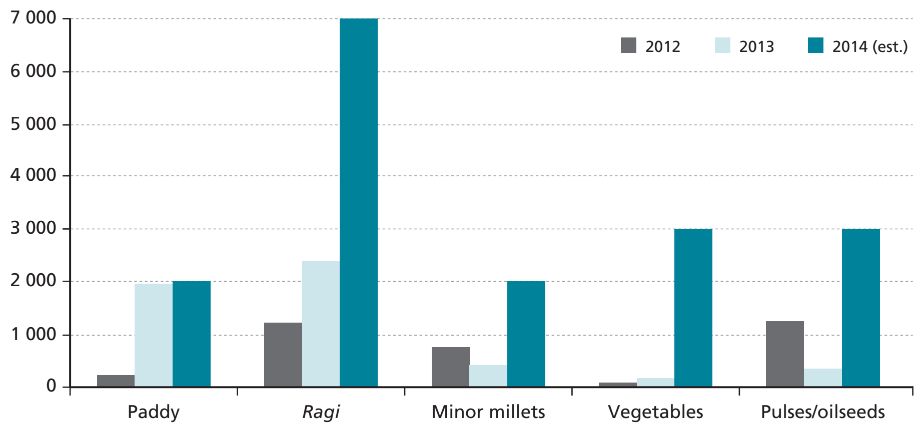
Over time, the PGS brand and the commitment of Green Foundation have led customers to trust the produce coming from the system. In addition, customers receive transparent information in terms of farmers and source of produce. Hence, they benefit from clean safe food at reasonable prices and farmers benefit from near zero cost of certification, a fair price for their produce, elimination of unnecessary intermediaries and growth of the collective.

FIGURE 7.8
Farming families, land and local groups (LGs) – FC Green Foundation



Source: authors' elaboration.

FIGURE 7.9
Volume sales of produce (kg) under PGS 2012–2014 for Green Foundation



Source: authors' elaboration.

Institute for Cultural Research and Action

ICRA has been promoting sustainable agriculture in dryland areas of northern Karnataka since 2003. Small and marginal farmers in rainfed areas are assisted with the adoption of sustainable agricultural practices. ICRA has seen considerable success in crop management and yields, rivalling those of high-input farming systems over the past seven years. Although it became an FC only in 2012, the work done by ICRA over the last decade in the area is phenomenal. Of the approximately 2 000 farming families (not all under PGS), over 50 percent of farmers in two major areas of operation have converted to organic farming (P. Babu, pers. comm. by e-mail, 2013). Initially the conversion to organic practices was not market oriented but focused on input cost reduction, hence farmers would not demand a premium for organic production. However, with stabilization of yields, certification is being demanded from markets, which are at a considerable distance from the farm sources. A number of farmers were familiar with third-party certification systems but, given the complex administration and costs, they decided to go with PGS.

A total of 496 farming families as 68 local groups are under PGSOC PGS with ICRA as FC. A total of 1 086 acres (440 ha) are managed by these groups with ICRA. To ensure that farmers have equity in the marketing arm, two formal farmers' federations have been created for marketing. These are *Chamrajanagara Jilla Susthira Savaya Krushikara Okkuta*, based in Mysore and *Bhoomi Mitra Savaya Raitha Okkutta*, based in Bellary and run by the farmers. Most markets for farmers exist within the same or neighbouring districts. However, local retailers in cities such as Bengaluru have recently started to buy PGS-certified produce from the farmers' federation. A number of organizations make wholesale purchases of PGS produce from the federation and repackage it under a different label. However, the labelling provides the consumer with details about the source of each product and the farmer. In addition, farmers participate in direct markets that they organize, such as farmers' markets or fairs. These types of market are periodically held in a village or groups of villages (*taluka*), in a nearby town or at district level. Such meetings provide a place for consumers and farmers to discuss and exchange ICRA literature on health- and nutrition-related issues.

Customers have a greater possibility of knowing the source of the produce right back to the farmer and this consequently ensures greater consumer participation.

TABLE 7.3
Produce and price availability under PGS to November 2013

Produce	Quantities available (tonnes, rounded)	Farmgate price points (INR/kg)
Gram, pulses and lentils (Bengal gram, horse gram, cowpea, pigeon pea, black gram)	26	15–65
Sorghum, millet and minor millets (finger, pearl, foxtail)	22	15–25
Miscellaneous seeds (coriander, groundnut, castor, mustard, wheat)	47	40–85
Others (red chilli, local onion, garlic, tamarind)	102	na

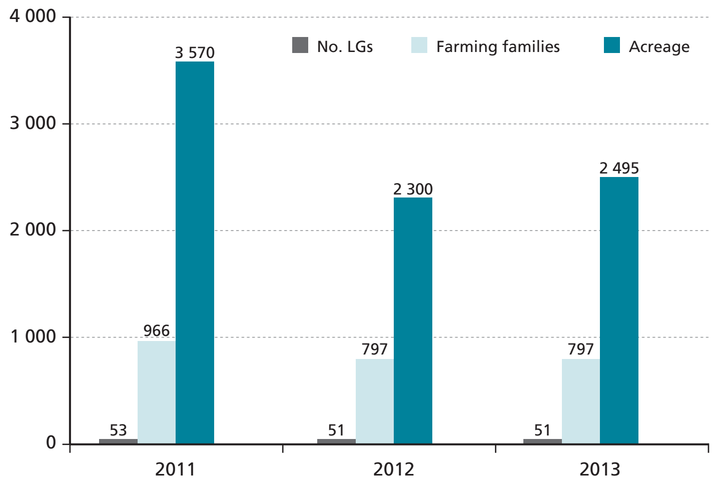
Source: authors' elaboration.

Table 7.3 shows the quantities of produce available under PGS for the ongoing 2013 marketing season. The federation also assists farmers in processing, value addition and packaging in retail packs. The sale of PGS produce for the 2013 season was expected to generate a cumulative income of 14 million rupees (approximately US$230 000 at the time of writing this paper). There are plans in the pipeline to scale up the farmers' federation into fully running producer companies (Ministry of Agriculture, Department of Agriculture and Cooperation, 2013; Singh, 2008).

FC Timbaktu Collective

The Timbaktu Collective is an initiative to empower people in rural areas of Anantapur, Andhra Pradesh. It focuses on empowering landless labourers, marginalized farmers, women, children, youth, people with disabilities and *Dalits*[23] who are most affected by situations such as chronic drought, unproductive land, unemployment and poor infrastructural facilities. It also provides education for rural disadvantaged children and youth, and creates awareness on local self-governance, such as the establishment of self-administered *sanghas* or village groups, and networks with organizations at district, state and national levels. Timbaktu Collective is also one of the founding FCs of PGSOC (Timbaktu Collective, 2006). As a principle of this PGS, *sangha* farmers first provide for themselves, their relatives and other village members and then give to the cooperative. Hence, surpluses are traded subsequently.

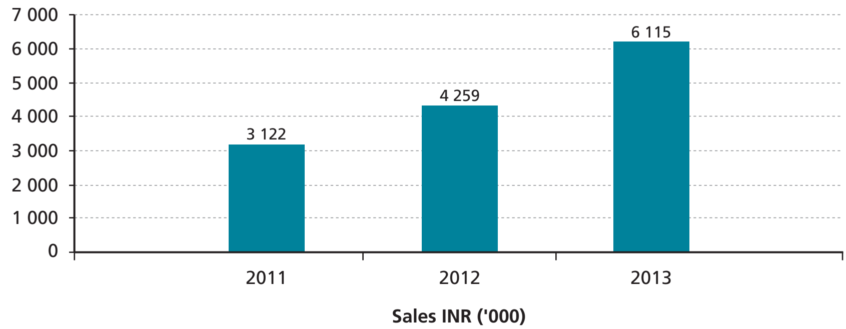
FIGURE 7.10
Farming families, land and local groups (LGs) – FC Timbaktu Collective



Source: authors' elaboration.

[23] Dalits are a caste or social group of people in India who have historically been economically and politically neglected. They were once considered untouchables and existed on the economic fringes of social hierarchies.

FIGURE 7.11
Volume sales of produce (kg) from 2011 to 2013 for Timbaktu Organic Dharani



Source: authors' elaboration.

To allow better equity in marketing access to farmer groups, a cooperative called Dharani FaM CooP (Timbaktu Organic, 2008) was formed, whereby a total of 797 farming families benefit from smaller PGS groupings. Each group or *sangha* member has approximately 15 farming families (Figure 7.10). The cooperative assists with the processing, value addition, branding and marketing of produce and ensures that, apart from existing as a collective of PGS farmers, farmers also own equity in the marketing branch of the cooperative. Dharani started as a project of Timbaktu Collective and became a separate independent cooperative when it reached larger proportions. At the time of purchase, Dharani offered quality premiums to *sangha* farmers and a yearly bonus amount was also credited to farmers as a dividend of the profits earned by the cooperative. Apart from retail customers in the cities, who buy from various "green" shops, bulk consumers purchase produce such as groundnuts for processing (e.g. peanut butter).

Dharani markets PGS produce ranging from millet (little, foxtail, finger and pearl), sorghum, pulses, rice and groundnuts among other value-added products. From 2011 to 2013, produce sales went up by about 40 percent as shown in Figure 7.11.

7.5 CONCLUSIONS

PGSOC comprises NGOS and VOs that work directly with farmers and groups in various villages across India. As non-profit organizations, the idea of social justice for farmers is ingrained in all their activities. This is visible at the front-end marketing sector, which has various mechanisms to ensure that farmers own equity in the businesses assisting in the marketing of their produce. The efficacy of this model can be seen by the growth of land under organic production, farmer family inclusion and overall sales of produce that have been increasing by more than 100 percent per year. Moreover, for a system introduced only over the last decade, it has gained growing acceptance. It not only connects farmers to markets in a systematic manner but also helps to create communities at a manageable level by the farmers themselves.

Nevertheless, there are challenges to face regarding economies of scale. Despite limited resources and finances, a strong movement of participatory and fair market systems has been growing over the last seven or so years. The case study of three organizations as part of FCs is testimonial to this fact. Data from existing FCs have been collected to present the cumulative statistics on land under cultivation, farmer family base and overall sales. In addition, these three cases show how local groups function sustainably.

PGS works with informal market systems, identifying them as such and offering to collectivize them for markets. Although PGS offers certification to communities, this is then owned by them. There has been multiplicative growth in the PGS farmer group/family base as well as in the markets.

PGSOC took the initiative to institutionalize PGS and combine it with smallholder farming systems and markets. This institutional structure assists in the creation of farmer communities, where the collective owns the market supply chain system and certification mechanism. This system did not previously exist in markets and is thus an institutional innovation.

The challenge is to address the growing distance to markets and the associated requirements of transparency and fairness. Using appropriate technological interventions will mitigate these challenges. Moreover, PGS will be popularized across the country to assist more farmers to access better markets while keeping the informal structure intact. Challenges of scale have to be addressed without resorting to corporatization; the option of community enterprise systems has been proposed (Charyula and Subho, 2010). On an immediate basis, PGSOC needs to expand its functioning capacity in order to make PGS more easily available to producers and consumers. It is anticipated that in the next five years or so, there should be multiplicative growth in PGS FCs, local groups and markets.

An important study in this aspect has indicated that informal markets exist in large numbers and have been working for centuries. They currently contribute to over 75 percent of the world food market (Vorley, 2013). There is a need is to bridge the knowledge gap, understand that informality works and identify ways of upgrading it. PGS takes this informality into consideration and provides for a system of collectivizing and conditional formality without the associated contemporary costs. As a mechanism binding farming families to communities, it assists with the process of marketing both at local level and when the distance to markets is greater.

PGS attempts to create communities of small farmholders with greater access to and control of marketing systems. The creation of such an innovative system ensures better transparency for consumers, whereby they have more information available about the sources. This process starts with granting codes to local groups for collective or individual marketing of produce. Let us consider a case where farmers in a local group decide to market their produce directly to retailers. Grading, packaging and labelling are done at group level in the village. PGSOC thus grants a unique code to each local group to use for tracking of produce back to the group. (This is shown in Figure 7.6 as code HP A01 xx – where xx is a two-digit code to identify a local group.) This code appears in all the group's packaged products. Therefore, a consumer can track a pack all the way back to the local group and even the farm source where the product was procured. This level of end-to-end transparency is typically unavailable in conventional markets, where third-party companies procure, rebrand and sell to consumers. PGSOC publishes the codes of all local groups online on its Web site.

It is crucial that markets further away also be targeted because of the collective surplus of produce from local markets. Front-end marketing ensures that groups of farming families have these distant markets. Economies of scale result in challenges in scope and operation of PGSOC, FCs and local groups, which are discussed in the following section.

7.6 CHALLENGES AND RECOMMENDATIONS

In examining the PGSOC system, there are a number of challenges for PGSOC in particular, and PGS as an institutional innovation in general. These challenges and possible solutions are summarized below.

Peer appraisal upkeep and NGO involvement

- *Challenge.* At present, NGOs feel that the cost savings achieved by farmers in PGS are borne partly by the NGOs, since their field staff and documentation efforts have increased. Hence, there is scope for further savings even though net savings are more, compared with third-party certification costs.
- *Solution*. NGOs' preliminary hand holding should include training farmer groups to undertake the PGS exercise and documentation themselves. Since PGSOC works with farmers in the vernacular, this should not be too difficult a task. Once farmers take to doing this, costs to NGOs can be eliminated altogether.

Comparison with third-party systems

- *Challenge.* Third-party systems introduced prior to PGS existed predominantly in the markets, as well as being an acceptable means of trade systems for import and export. However, the third-party system is implemented in India by a body under the Ministry of Commerce and Industry rather than under the Ministry of Agriculture. Moreover, the need for PGS arose from shortcomings observed with third-party systems as applicable to small and marginal farmers. However, the acceptability of PGS is still in question by some farmers and markets.
- *Solution.* Farmer and consumer interaction continues to demonstrate the workability of PGS. PGS need not be against third-party systems – there are innovative ways to supplement one system with the other. Parity of the processes gives farmers from PGS systems automatic recognition in third-party systems, which may be required when markets cross national boundaries. It is also possible to envisage PGS being acceptable as an internal control system (ICS), as required by third-party certification systems. Thus, over time, PGS will find its market acceptability increasing, even though this may take longer than we have hoped for, given the resources available.

Consumer-oriented transparency

- *Challenge.* At present, codes generated for PGS products are given to FCs and through them to local groups. The goods are branded and move on to markets. The only way for consumers to check sources through the codes is for them to go back along the supply chain, which may not always be easy to do with markets further away.

- *Solution.* Since groups are expected to maintain transparency in the supply chain right back to the farmers, this information needs to be digitized and put on the Internet. In this way, consumers will be able to view details about the source of PGS produce by using the marketing codes. Although the details of all codes and farmer groups have been put online as documents, a live search facility connected to the sales system is also being considered, but the operational technology still needs work.

Organizational strengthening and use of appropriate technology

- *Challenge.* PGSOC has worked well over the past seven or so years, but resources are limited. We need capacity for managing data from all FCs, a centralized online codification checking system and market mapping capabilities.
- *Solution.* Work with universities and other independent bodies to come up with an online marketing system, even though resources to manage the system are still pending. This will help with data collection.

Scaling up farmers' organizations

- *Challenge.* With growing markets, production surplus and larger farmer groups, the issue of scale needs to be addressed. However, in keeping with the informal structure, various options exist for farmers to continue, albeit at a higher scale of operation. In India, studies have indicated that farmers have the option of forming community enterprise systems (Nayak, 2012). These assume asymmetries of operation such as skills, competences and resources as in formalized market setups, as well as sustainability in terms of socio-economic outcomes such as trust and common property rights.
- *Solution.* These community enterprise systems will be farmer/producer organizations or producer companies (Singh, 2008), within the scope of the definition given by the Government of India (Ministry of Agriculture, Department of Agriculture and Cooperation, 2013). With suitable support from the Government, these organizations/companies can bridge the gap between formal, urban industrial setups and merge the idea of running businesses informally.

Market channels for selling produce

- *Challenge.* Compared with institutional and sales channels, the third channel – selling through a retailer – is the most interesting. A number of NGOs and individuals have opened small "green" shops across India in order to have PGS produce in the vicinity. However, there is an inevitable surplus, which means trading to different parts of the country. The challenge is to manage the supply chain between these networks of retailers in India.
- *Solution.* Over time, farmer groups have learned to process and package produce to make it easily transportable over long distances and the produce brand is owned by the farmers themselves or is co-branded with others. Surpluses are marketed only to the nearest state or further beyond, if necessary. This helps to keep the overall footprint of food miles to an efficient minimum. Collectivizing farmer groups as envisaged by PGS also tends towards fairness, with groups insisting on prices from the markets rather than being left at

their mercy. This trend in organic markets is seen even in fairtrade systems where over 70 percent of the produce is organic (Singh, 2004). PGS helps and empowers farmers to continue this trend.

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Chapter 8
Community-based organizations in sustainable production and marketing of agricultural products
Integrated Pest Management Group in the Islamic Republic of Iran

Hossein Heidari and *Alfredo Impiglia*

8.1 INTRODUCTION

The Islamic Republic of Iran's total land area is 162.85 million ha; it has 6.8 percent of forest and 11.93 percent of arable and permanent crops. In 2013, the total population was 76.41 million – 27.53 percent rural and 72.47 percent urban. The labour force in the agriculture sector was 6.54 million and the value of total agriculture and food production was US$26 881 and US$26 447 million, respectively, in 2011. Agriculture and food production per capita was 103 tonnes in 2011. The main commodities produced in the country are tomatoes, meat, chicken, milk, wheat, pistachios and grapes. Top imports are maize, soybean cake and oil, meat and palm oil. The top ten exports are pistachios, spices, pastries, raisins, dates, tomato paste, cucumbers, gherkins and apples. For fishery products, Iran import values were US$68 million and export values US$155 million in 2010 (FAO, 2011).

When the impacts of the green revolution were first felt on human health and the environment, the Iranian scientific community and agencies responsible for the agriculture sector began to investigate ways to reduce the negative effects associated with applied intensive agriculture technologies. Addressing the issue of the excessive use of chemical pesticides, they appealed to the concept of Integrated Pest Management (IPM), following the trend built up in North America and Europe, and supported by international organizations such as FAO. Since the First National Plant Protection Congress (1968), where one of the earliest references to IPM in Iran can be traced, the need to introduce IPM as a sustainable approach became a recurrent theme in almost all fora related to plant protection.

Unfortunately, these attempts did not lead to the introduction of sustainable and practical techniques to be used at farm level. Various research studies, pilot cases and even large-scale activities such as an ambitious national programme for the reduction of pesticide use failed to have a sustainable impact on Iranian agriculture. The national programme benefited from strong political support and sizeable funding for several years; a flagship activity under the programme was the production and distribution of biological agents. The programme released these agents on farmers' fields free of charge in the first few years, assuming that farmers would start paying part of the costs in later years. This assumption, however, did not come true, because the biophysical and socio-economic aspects of IPM were not approached in an integrated manner. The programme was started without any training of trainers, and farmers were not familiar with the new approach and technologies; natural enemies were delivered as "chemicals". Other activities focusing on research and extension of sustainable production and IPM also failed to reach farmers, partly because specific crops or pests were at the centre of attention, disregarding the central role played by farmers and the rare research findings based on farmers' needs and ecological conditions in Iran. Most research studies are duplications of what has already been done in other more advanced countries, trying to adapt the findings to conditions in Iran.

The Government frequently asks about research findings and their role in the production system. Consequently, a group of researchers from the Ministry of Agriculture and Non-governmental Organizations (NGOs), who were familiar with the IPM Farmer Field School (FFS) approach from FAO's earlier programmes in East Asia, promoted this innovative approach as the solution to the socio-technical and institutional shortcomings of conventional approaches in Iran. During IPM implementation in various projects, farmers were gradually made aware of the advantages of this method for their products. The IPM Group was created after ten years of implementing IPM activities throughout the country. The group itself has activated international safe food standards through an internal inspection system, since to date there is no monitoring and certification system concerning safe food in agricultural crops in Iran. This system could slowly promote the issue of safe food all over the country in the future.

Data used in this chapter come directly from the experiences of those who have participated directly in the implementation of IPM projects in Iran and in the Middle East, as well as from information of three workshops on exchanging marketing experiences of IPM products. IPM project reports, especially the final annual reports, as well as the report of marketing studies, have been used in preparing this chapter. Reports on activities of farmers who are IPM organization members have been the most important information resources, both in writing or by interview. Reports from the Institute for Green Rural Advancement (IGRA) and IPM as the non-governmental executives of IPM projects, either in the form of writing or in dialogue with their authorities have also been used. Several short interviews with farmers and IPM product consumers have been a further source of information. As regards country information on a large scale, the FAO Web site and the Iran Ministry of Agriculture have been of great help. Rules and regulations concerning health, the Iranian Five-Year National Development Plan, the Institute of Standards and Industrial Research of Iran (ISIRI), and the Ministry of Public Health have all contributed to this chapter.

8.2 INSTITUTIONAL LANDSCAPE

Iran's agricultural sector development programmes have emphasized high-value products for food security and self-sufficiency. For this reason, agricultural sector policy has been based on the institutional axis and subsidies. Alongside the intensive development programme, the widespread destructive effects of the green revolution approach first became clear in academic and research societies. Hence, product programmes abandoned quantity and paid attention to quality. The role and importance of quality become more distinct in later regulations and are referred to more frequently in international circles. This is why Iran asked to become a member of the World Trade Organization (WTO) and is trying to comply with its requirements.

The first comprehensive food health and industrialization of food production law was ratified in 1977 and emphasized the residual index of chemical foods for the first time. Monitoring of this law was handed over to the Ministry of Public Health and obliged the Plant Protection Organization (PPO) to respect maximum residue levels (MRLs). The law for reduction in chemical fertilizer and poison subsidies was ratified in 1993. According to this law, an amount in the budget equal to 3 percent of credit from subsidies of fertilizers and pesticides (maximum US$1 152 000) was granted annually to the Ministry of Agriculture so that during the five-year development plan about 30 percent of pesticide use was reduced, approximately 38 000 tonnes. In 1998, ISIRI published regulations on the use of the hazard analysis and critical control point (HACCP) as National Standard 4557.

The Iranian Nutrition Society was established in 2002. This society works in close collaboration with three ministries – Agriculture, Industries and Public Health – and is responsible for compiling and regulating safety and hygienic regulations related to the production of food based on global standards. In 2008, CAC/GL-2007 was ratified as Standard 11000, via ISIRI, as a national standard (ISIRI, 2008). This was the first step towards organic production.

The last part of Article 3 on the health sector in the Fifth Law of Agriculture Development (2011–2014) implied that the Ministry of Public Health, in collaboration with the Ministry of Agriculture, should make clear the national MRL for agriculture products. These standards are prepared for 100 products and are given to ISIRI for implementation. According to this law, the Ministry of Agriculture should enable people to access healthy products, while informing them about reducing chemical fertilizers and pesticides in agriculture.

The IPM approach is strongly accepted by the Government and non-governmental sectors at national level. Paragraph D, Article 134, of the chapter on agriculture of the Fifth Five-Year National Development Plan (2010–2015) anticipates that: "The grounds should be prepared to gradually expand IPM, appropriate use of pesticides and fertilizers, biological agents, animal drugs, as well as biological control, organic farming, integrated production, and application of national standards on agricultural products quality control to at least 25 percent of the total area of production by the end of the Plan".

According to Part 1, Article 3 of the law on reforming laws and rules by ISIRI, ratified in 1991, ISIRI is the formal authority of the country that is responsible for determining, compiling and publishing Iranian national standards, yet in spite of rules on agricultural products and health, the underlying problem has remained unresolved. Surveys indicate that there are several main reasons for this.

- Little monitoring has been done on pesticide residues.
- The implementation and research sectors of the Ministry of Agriculture have not been developed in tune with product management based on chemical methods.
- Programmes have followed the top-down approach so that farmers' real requirements, especially in terms of knowledge about farm management, are not considered.

Approval for the law regarding the promotion of IPM has provided the necessary background for the development of safe food products and for discussing the topic with the relevant authorities. However, it might be helpful in the implementation of innovations to follow what has already been done by the Ministry of Agriculture, FAO and the Global Environmental Facility (GEF) Small Grants Programme (SGP) at the United Nations Development Programme (UNDP). They have played a substantial role in the process of implementation of the IPM approach by creating an enabling environment to promote the IPM/FFS concept through support at government and parliament level for a national programme on pesticide reduction. They formed a High Council to supervise this development process.

The first IPM/FFS in Iran was set up in 1999 on pistachio orchards in Damghan. This activity demonstrated the merits of IPM/FFS as a conceptually well-defined, feasible and socially adaptable approach to empowering farmer communities to acquire the required decision-making skills for individual and group action towards sustainable production.

Between 1999 and 2004, projects involving the IPM/FFS approach were at small-scale pilot level; they mainly tried to adapt this innovative approach to the socio-economic and agro-ecological conditions of the country in specific locations. In fact, the mainstreaming of IPM and FFS in Iranian agriculture began with the launch in 2004 of the FAO Regional Integrated Pest Management (RIPM) Programme in

PHOTO 8.1
FFS farmer in Damavand explains apple IPM techniques to a project manager

the Near East. The programme began with an Inception Workshop in June 2004. A National Steering Committee (SC) comprised of relevant stakeholders was set up to coordinate the activities of the project at national level, assisted by FAO experts.

At the beginning, the project focused on capacity development, training skilled people as IPM trainers and/or IPM FFS facilitators. The first work plan of the project in Iran was for 60 IPM FFS groups in Tehran and Qazvin provinces. However, with the development of institutional capacity, the project was extended to six other provinces.

By 2013, approximately 870 FFS (around 480 by FAO, 20 by UNDP and 400 by the Government) were organized regarding more than 60 crops and animal husbandry. About 7 000 farmers were empowered by FAO and UNDP to apply sustainable farming methods, but there is no clear information about the number of farmers under the governmental IPM/FFS programme.

A larger community of farmers also received indirect information through farmer-to-farmer contacts. On average, each participating farmer trained or advised two other farmers on IPM tactics. A large percentage of IPM/FFS farmers abandoned or reduced their use of synthetic pesticides and fertilizers. In economic terms, participating farmers achieved a significant decrease in production costs. A key to sustainability of the results was the introduction of viable marketing solutions.

The only IPM area in Iran is the one where farmers follow the FAO and UNDP IPM project. It is hoped that with stronger support from FAO, the Ministry of Agri-

PHOTO 8.2
Training of trainers' workshop, Tehran

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culture might really move more quickly and comply with the Five-Year National Development Plan. The national MRL is the only formal standard in the country, but there is no monitoring system of control.

8.3 INSTITUTIONAL INNOVATION: IRANIAN INTEGRATED PEST MANAGEMENT AND FARMER FIELD SCHOOLS

Background and organizational structure

IPM was first proposed in 1957, as a concept that promoted biological control, good agronomic practices and the use of other means to control pests besides chemical pesticides. IPM is location specific, based on local field ecology and socio-economic conditions. It is not a centrally defined "packaged technology" that must be taught to farmers. Farmers need skills to define a local optimum of management practices that result in the highest economic yield, without destroying the environment and health of the community. IPM in the Iranian programme meant more than just "pest control", since it was extended to the larger scope of sustainable farm management. IPM is based on four practical principles: (i) grow a healthy crop; (ii) conserve natural enemies; (iii) observe fields regularly; and (iv) farmers become experts.

An FFS is a season-long training programme conducted in the field. Activities follow the different developmental stages of the crop and its related management practices. There are different FFS models, but the process is always learner centred, participatory and relies on an experiential learning approach. Farmers grow one or more crops together with support from a field facilitator. They learn to observe and understand the functioning of their agro-ecosystem, design and implement field exercises and experiments to solve problems, and test and compare IPM with conventional practice plots.

The FFS model links the expertise of various sources (farmers, research, extension and other partners) on one platform: FFS. In FFS, all parties are equal partners in providing locally adapted crop management practices. Research and extension officers learn from farmers through FFS compared with the traditional extension model and, therefore, can help farmers better. For example, pest control specialists who are not experienced in irrigation, farming systems or soil management can increase their knowledge on these issues at FFS and integrate them into a more sustainable production system.

Implementation: from FFS to community IPM

In order for IPM to become sufficiently embedded in a community, activities should not stop after one season. All field schools normally have at least one follow-up season, the intensity of which will be determined by the motivation of participants, time constraints of the participants and facilitator and, to some extent, funding. Often farmers agree to a second cycle of FFS to verify findings, or to repeat the FFS process on a new crop. Studies may also be conducted to understand a specific crop problem in more detail, such as how to manage bacterial wilt disease in tomatoes. It is worth mentioning that some groups form associations, organizations or clubs that officially or unofficially carry out group activities. Facilitators usually become less central in the process, although they may continue to provide technical backstopping and stimulation for the group.

Training of trainers and facilitators

Training of trainers (TOT) is to improve the skills and practical experience of field facilitators. In the TOT programme, they become proficient in the principles of growing a healthy crop, applying suitable IPM techniques and learning how to assess and follow up IPM through the FFS model. TOT builds up a team of trainers and facilitators, who are crucial to the success of any IPM programme. TOT is a season-long training with regular (e.g. weekly) meetings for about 25 potential facilitators. As in FFS, the learning approach is non-formal and is based on experiential learning. After two months of basic training, TOT participants form subgroups of about five people and they organize and implement FFS at specific locations. Planning and running FFS are prepared and evaluated in TOT with the master trainer.

Training is carried out at a small vegetable farm of 500–1 000 m^2, from land preparation to harvest, and includes theoretical subjects, herbivores and carnivores, health exercises, IPM technology, seed preparation, composting, preparing insect zoos, preparing research farms, sampling, documentation and other necessary information. There is a main FFS group for TOT workshops. One of the most important problems at the beginning of FFS was the means of communication with farmers. To resolve this issue, the first three days of TOT are conducted at community level with a group of farmers. The facilitator starts work with the farmers'

PHOTO 8.3
Apple FFS where women study insect life cycles, Kerend, Kermanshah, 2010

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group while new facilitators sit around and take notes, and learn participatory rural appraisal (PRA) practical methods, selecting study farms, seeds and so on. Training for 25 facilitators usually takes about eight days of conceptual workshops and eight weekly meetings over two months.

After this training course, facilitators can run about three FFS per week. It may be useful for both farmers and facilitators to visit other FFS. There many good reasons for exchange visits – a different FFS organization, a different facilitation style, innovative ideas on pest management, interesting discussions with colleagues and farmers, or simply noting that an FFS is part of a large regional network for IPM.

During FFS, farmers become aware of the importance of their knowledge. They are not usually informed that what they are doing is valuable for improving their knowledge and helping them to produce better food. During sessions with farmers, facilitators gather valuable indigenous knowledge about, for example, underground canal irrigation systems (*ganat*); the history of farming for feeding the people; pruning techniques; and women's preservation of seed quality. Here there is no Ministry of Agriculture or university. Farmers help each other by exchanging experiences. Valuable techniques and information come to the fore – using cow milk against powdery mildew on cucumber; marketing certain products among farmers; buying damaged apples from apple farmers to produce vinegar; learning to produce compost and vermin compost; networking and sharing issues; visiting and exploring

PHOTO 8.4
Facilitators carry out practical farm training, Varamin, Tehran

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new places; and learning different/new irrigation methods.During IPM implementation in the form of various projects, farmers gradually became aware of the advantages of this method for their products and made efforts to find suitable markets for them. The projects welcomed farmers' decisions and defined their activities by giving them educational, technical and logistical support. In this way, farmers sold their products directly to consumers. At the beginning, consumers bought directly from the farms and this activity was developed both by producers and consumers. However, farmers were anxious about how they could continue these projects. This issue was the foundation stone for the establishment of a farmers' IPM group.

Creation of the IPM Group

The IPM Group was organized in 2009 as an informal group with the initial aim of supplying IPM products directly to clients. The idea was first discussed among participants at the marketing and networking workshops organized by the FAO IPM project. These workshops were not intended to form specific groups, nor set down any specific solution to IPM marketing problems. Rather, they provided a forum for IPM/FFS veteran farmers and facilitators to confer on how the supply and demand chain for IPM products could be established in a sustainable and effective manner. At these workshops, a common complaint of the farmers was that existing marketing channels did not recognize the value added of IPM products, so that they often

PHOTO 8.5
Farmer selling his crop to consumer, Damavand, Tehran

were bulked with conventionally produced items for marketing. Indeed, the existing agricultural marketing system did not include any specific incentives in favour of IPM or even organic products.

In the absence of any formal or informal IPM marketing channel, the idea of networking gained momentum among the more active participants of the marketing workshops and meetings. The network created had a very simple structure. In a meeting of interested people, a volunteer was selected to collect the cell phone numbers of producers/consumers and disseminate information about available products. Two or three other volunteers were selected to help in distribution or organizing direct market days based on the information provided by the person responsible for supply and demand information. The costs of the networking were covered by a small admission fee of 1 000 000 rials (US$35) for all members in the first year, then reduced to US$10. It is planned to make the membership fee voluntary. The network was informal, self-motivated, and without a written institutional structure. Financial matters were dealt with by mutual trust.

Members of the IPM Group

As a result of IPM/FFS projects implemented across the country, a growing number of farmers are applying IPM methods at different levels. The IPM Group has 15 farmer members who provide IPM crops to group consumers and are covered by a group inspection plan. Some members may represent a group of other IPM farmers from a nearby village or region. About 7 000 farmers have been trained under IPM projects, on 200 000 ha and with 14 different crops. On the basis of various studies, several conditions have been tested for sustainability. Farmers need to:

- eliminate pesticides and chemical fertilizer from their farms;
- grow diverse crops;
- have easy access to markets.

About 20 farmers with 30 crops are working more or less with the IPM Group. However, there are other crops that are not covered by the IPM project, so the group is collaborating with communities in the mountain region where small farmers are living and producing natural crops such as beans, dried fruit, vinegar, medicinal plants, honey and eggs. The group set up funds in these communities, as in Kurdistan for women. They trained farmers particularly on the biological and physical aspects of safe food because no pesticides or fertilizers are used in these regions. Young women also buy certain commodities from the farmers, package them and send them to the IPM Group. The group has put about US$500 in the fund, which is used for paying crops in cash. Farmers set the price per kg. All training for local communities and for women is free of charge. The communities prepare about 85 natural crops. Eighty local producers prepare crops for the IPM Group, of whom 60 percent are female.

The IPM Group is working for consumers in Tehran province, but some farmers from other provinces have joined the group because of their interest. For example, there are no IPM pistachio farmers in Tehran, so a farmer from the FFS group in Semnan province prepares pistachios for consumers of the IPM Group.

Most members are consumers who are concerned about the safety of the food reaching their plates. About 90 percent have a university education, with a wide range of professional backgrounds, including physicians, teachers, journalists, business people, diplomats, executives and staff of international organizations.

At present, the IPM Group has about 600 members, of whom 75 percent are women, and comprises individuals, groups and companies. As the number of members grew, the network felt the need for a more organized management. A core team, comprising IPM/FFS veteran farmers and environmental volunteers, established the IPM Group in early 2010, capitalizing on the potential capacity of the emerging network. Its creation was assisted and encouraged by the FAO RIPM project.

Three possible frameworks available in the country were considered for registering the group, namely as a cooperative, an NGO or a corporate. After consultation with a wide range of stakeholders, the group decided to remain as an informal entity, not registered in any of these frameworks.

The reason was that each of the available systems had drawbacks that could lead the IPM Group to deviate from its basic values or otherwise affect its current smooth functioning. If registered as a cooperative, for example, the group would have to pay high monthly salaries to a manager, accountant and other compulsory staff. Registration as an NGO was difficult, if not impossible, under the current rules and regulations of the country. Likewise, registration as a corporate under the Corporations Registration Act would push the group into being a profit organization. Therefore, it decided to continue its activities as it was. An SC was established to lead the group.

Steering Committee (SC) of the IPM Group

The activities of the group are led by an SC, comprising ten members, who were initially involved in creating the network. Four of them are farmers. They are members because they have extensive knowledge of markets, farmers' interests and farming systems and *not* only to sell their crops. The SC is responsible for the group and its decisions are based on consensus. Nevertheless, it is extremely flexible, and there is a continuous flow of members. However, five members have been permanent since the establishment of the group. They expect the group to register in the future.

The SC convenes regularly with a good participation of members attending each weekly meeting (latterly fortnightly). SC members also act as an informal Board of Directors of the IPM Group, to ensure that adequate management experience is built up in the group should the membership decide to register it formally. The informal Board of Directors has a President, Managing Director and Inspector elected by members of the IPM Group. Rules and procedures, including chairpersons, agenda, voting, reporting and other arrangements for holding SC meetings have been established.

The organizational values of the group are that:

- market development in the context of the IPM Group be based on health consciousness and not on profit making;
- farmers be trained, consumers made aware and the whole process of production inspected by the Persian Organic Certification Institute (POCI).

The group follows a participatory approach, starting with local farmer-managed quality assurance systems, reinforced by PGS and an internal control system (ICS), to be later accredited by third-party certification (if needed for entering impersonal mass markets).

Monitoring and inspection methods are internal and are only for members. All members are kept informed about the whole system via workshops. Standards and good agricultural practices (GAPs) come from PGS. The group tries to use the best possible standards and would like to work on safe food for all and *not* on organic products for specific groups. It aims to:

- grow slowly but steadily, based on awareness, mutual trust and direct producer-consumer relations;
- be always transparent and cautious about the traceability of all produce, distribution and financial activities, with the direct involvement of producers, consumers and other stakeholders in monitoring and evaluation;
- move towards integrated and balanced development by creating synergy between healthy food production, sustainable farming, fair trade and community development.

Pricing should always be based on cost accounting, not on trade margins, commission-based systems or financial manipulations. In Iran, fruit and vegetable prices are controlled at municipal level by government and fixed daily, but not for retailers. The IPM Group's price indicators are that:

- cost of crops must be paid within a maximum of one week to the farmers or community;
- depending on crops, prices are usually higher than market prices (5–100 percent) so farmers may benefit and are encouraged to produce safe crops;
- the community chooses/suggests the price of products, *not* the IPM Group – for IPM farmers, daily prices at large markets are pricing indicators;
- consumers pay market prices for IPM and natural food.

The protocol of the IPM Group is that:

- farmers benefit because they are producing safe food (at a better price);
- consumers benefit because they have access to safe food;
- nobody works under stress;
- consumers maintain their health by paying an inspection group (POCI).

The group strictly observes these values. In one case, the SC refused a partnership proposal from a cooperative store because the proposal contradicted the approved organizational values, which do not allow conventional products or IPM products to be offered that are not covered by the group's inspection plan.

Accounting and auditing of the IPM Group

Initially, the group had no specific arrangements for accounting and auditing. As the organizational structure of the group became more secure, an economic subgroup was created to audit the economic activities facilitated by the group. This subgroup regularly reviews activities related to product orders and pricing, supervises product distribution and ensures the transfer of sales income to the bank account of the IPM Group.

A member of the SC is responsible for accounting and bookkeeping. Farmers and producers are paid within 24 hours, up to a maximum of one week. In exceptional cases, which occur mostly in products sold in large quantities, such as rice, farmers are paid 30 days after the supply date. The group's bank account can be accessed in the name of three members of the SC.

Sustainable practices

There are several definitions and terms regarding sustainable agriculture, organic, IPM and so on. However, the following concepts form the basis of this study.

- The concepts of sustainable agriculture are to maintain better environmental health, economic profitability, and social and economic equity.
- Healthy produce means that farmers produce according to specific standards – whether MRLs, organic, GAPs or natural.
- The sustainability concept has prompted major adjustments in conventional agriculture to make it more environmentally, socially and economically viable.
- Organic agriculture, as defined by the Codex Alimentarius Commission, "is a holistic production management system that avoids use of synthetic fertilizers, pesticides and genetically modified organisms, minimizes pollution of air, soil and water, and optimizes the health and productivity of interdependent communities of plants, animals and people" (El-Hage Scialabba, 2013).

The IPM group uses a combination of organic, MRL and GAP standards for safe food. These products may come from IPM projects or be natural crops from family farmers in the less accessible regions of the country. All farmers under the IPM project receive rigorous training on pesticide hazards and if they have to spray a chemical, they are ashamed to tell the others. Most IPM farmers state that: "No spraying is an attitude!" Farmers are informed that chemical companies do not always tell the truth regarding pesticide efficacy – they need to sell their products. In some cases, a pesticide is considered suitable one year, and then may be banned the following year. Farmers are aware that they have to protect themselves, their families and the environment.

Many farmers are looking for alternatives to pesticides. Recently, a private company began to produce non-chemical pesticides for IPM farmers, such as garlic juice, pesticides based on soap and pepper, and kaolin clay. Farmers tested these and they seemed to be effective. Thus, IPM farmers were pioneers in applied research activities! PPO approved the import of 12 natural enemies from the Netherlands but only farmers trained by IPM projects were interested in using them. IPM farmers commonly produce compost from *azolla*, an introduced plant to Iran (which is aggressive to wetlands), from date-palm leaves (instead of burning them), and compost and vermicompost from cow manure. Harvesting weeds from apple orchards in Damavand to use as fodder is one important way to eliminate herbicide applications. The main differences between IPM farmers and conventional farmers depend upon the activities described more fully below.

Grow healthy crops

In most FFS in Iran, weekly meetings are held to select seeds and varieties to control soil-borne diseases, thereby increasing yields, ensuring a healthy crop, resistance to stress and better genetic resources. Farmers also discuss pest control at these meetings, since they cannot afford to let insects increase their population. Farmers only use chemicals when needed, in some cases as hotspot applications. Many farmers now use alternatives to conventional chemical pesticides such as those based on plant extracts, kaolin clay, *Bacillus thuringiensis* (Bt), plant oil, mechanical control, habitat management, pheromones, banker plants, cow milk, sulphur, sanitation, sodium bicarbonate, soil solarization, mulching, more efficient irrigation systems and fertilization programmes based on soil analysis.

Conserve natural enemies and diversity

- Use pesticides in hotspots.
- Eliminate pesticides in certain crops and release chickens into apple orchards
- Establish insect zoos in all FFS to raise awareness about herbivores and carnivores.
- Use banker plants as in apple orchards.
- Use non-chemical pesticides to help conserve natural enemies in all FFS, except in greenhouses.
- Eliminate herbicides in orchards – a main sustainable activity increasing natural enemies.

Observe fields regularly

All FFS conduct weekly meeting and agro-ecosystem analysis (AESA), so that farmers can monitor their own farms and make better decisions. More than 70 percent of farmers are active in AESA. Through their weekly meetings, farmers have increased their knowledge about ecosystem elements, their interactions and correlations. They have learned about different methods of sampling for analysis to be used on their farms.

PHOTO 8.6
Friday IPM market organized by farmers

Farmers become experts

Farmers in many FFS groups have understood that technology is not their first priority, as they thought before the IPM projects. They have found that aspects such as organization, communication, participatory decision-making and access to sustainable markets are more important than delivering inputs. Currently, as follow-up to the IPM FFS projects, there are about eight established community-based organizations (CBOs), some of which are members of the IPM Group. Many grow their crops based on sustainable agriculture principles and, in many cases, without using any chemical inputs. They also work on vermicompost and better farming practices learned through the project. They know what they need, what they want and what their real problems are. Working together after the IPM projects is the main basis for sustainability through sustainable marketing.

Certification and quality control

The market for IPM and organic products in Iran is just beginning to emerge. There are no clear safety standards, except for the MRL standards accepted in 1967 by the Government of Iran, modified by IRIPP's Pesticide Research Department and adopted by ISIRI in 2010; and occasional third-party certification for local organic production, which is limited and expensive, because of the lack of certification bodies (CBs) in the country.

In the IPM Group, inspection and quality control are carried out at random under a trust-based programme. They are supervised by an inspection subgroup in partnership with POCI, which is registered at the National Organization for Civil Registration (NOCR). POCI carries out monitoring and inspection services only for the IPM Group. Since there is no system in the country to monitor pesticide residues based on the MRL standard, consumers in the IPM Group set up a local inspection system to ensure clean produce by random analysis; this significantly increased the number of members and consumers. Some products such as honey, citrus fruit and pomegranates come from a clean region and were not under IPM projects. These regions and crops are usually introduced by members who know about safe food and IPM products. With the aim of supplying safe food for its members, the IPM Group orders a specific amount of each product and checks for residues of any pesticides or heavy metals. If the analyses show any residues, producers pay the cost of the test. If products are pesticide free, the group pays the cost and adds this to the price of the product. Members are fully aware of this process and accept it. These tests are done once a year on any product that the IPM Group has not been monitoring.

Markets for sustainable products and services: practical marketing options

The IPM Group was aware that it was in the early stages of market development and was not disappointed if one or more marketing channels failed or were not viable. The following section presents a brief summary of the different channels tried by the group, together with the key challenges and lessons learned.

Member-based sales and occasional markets

The first marketing attempt of the IPM Group was direct selling to members through occasional farmers' markets and "farm tours". Members were notified by SMS of the date and location of the market and IPM (member) producers sent their products to be sold on the designated day. Non-members were not invited to the market, except those who had some association with members or accompanied them to learn about the group. Moreover, not all members came to the markets – the participation rate was 20–25 members each time. This led to various challenges.

- *Small volume of product orders and high transportation costs.* Only a few boxes of each product were ordered (maximum 50 kg) for each Friday market, and these had to be transported by bus, taxi or train. Handling was, therefore, difficult and uneconomical for both farmers and organizers.
- *High rate of crop loss.* Many of the products were not sold because of the small number of member consumers.
- *Limited product variety***.** Because of the limited number of farms that could be visited, only certain products were available, thus making it unfeasible for consumers to travel long distances to buy only a few items.

Despite these drawbacks, the farmers' market experience helped IPM Group members to become aware of key marketing and organizational issues and to feel the need for a more committed and structured approach.

Many issues about pricing, safety and quality assurance, product handling, accounting and overall management of marketing and sales operations needed to be addressed before the group could adopt direct marketing schemes. For example, potato yields are reduced by half without chemical fertilizers. Consumers need to be aware about cases such as this, otherwise they may complain about the price and refuse to buy the crop, losing money for the farmer.

The IPM Group was able to sell to specific consumer groups that ordered a few days in advance because of the precise level of demand. These groups included the NGO that operated the Metro Friday markets, the Women's Association and the United Nations Office in Iran. Thus, small but continuous niche market opportuni-

FIGURE 8.1
IPM Group logo

ties were created. The IPM Group labelled products with the IPM logo after packaging, which is used only for members and increases public awareness about IPM.

Participation in the organic and safe food exhibition

One of the important marketing efforts of the IPM Group is participation in the organic and safe food exhibition under the aegis of Tehran's Fruit and Vegetable Markets Organization (FVMO). This exhibition helped the IPM Group to have a better understanding of the market and proved that participation in public exhibitions could be extremely profitable if IPM products were to be supplied in sufficient quantity and variety. The exhibition also helped to widen the group's linkages with other stakeholders, marketing channels and producer groups and provided the opportunity for a wide range of customers and producers to learn about the IPM Group and apply for membership.

Renting outlets in fruit and vegetable markets

Fruit and vegetable markets are by far the largest and most widely spread retail markets for fruit and vegetables in Iran. Regulated by FVMO, each of these markets is visited by thousands of customers every day. After the organic and safe food exhibition, the IPM Group held joint meetings with the officials of FVMO as to how the group could be presented in the market. As a result, a small (10-m^2) outlet was rented to the group at subsidized rates in Emamzadeh Gassem Market (EGM), which is one of the smallest and most remote markets in Tehran. The experience lasted for six months in 2011 and lessons learned were the following.

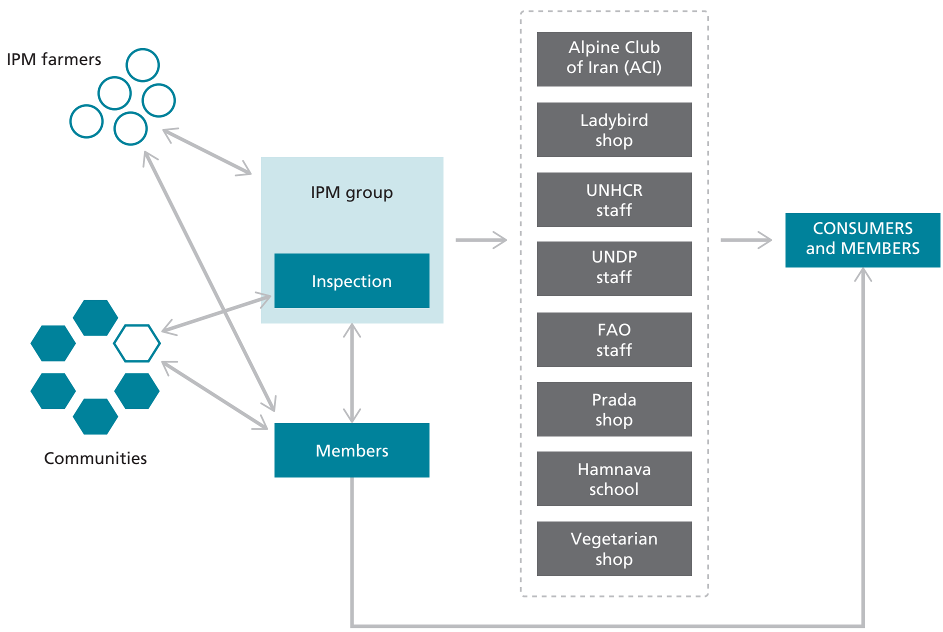
- *Price limitations of markets*. FVMO sets fixed prices for fruit and vegetables, which are updated on a weekly or fortnightly basis. Products with a certificate of safe production from the Ministry of Agriculture, ISIRI or private certification institutions are entitled to a 30 percent price premium. However, this premium is not enough to cover all costs of IPM production and distribution under the existing situation.
- *Difficult access*. EGM was not easily accessible because of the distance from urban public transport systems, leading to a low number of visitors, high transport costs and difficulty in finding full-time sales staff.
- The exercise was a good experience for the IPM Group to learn about the pros and cons of direct retail sales. It showed that direct involvement in retail offers a great opportunity for interaction with the general public and regular consumers. EGM was close to a municipal cultural centre, which hosted different classes and activities for the general public. Using this opportunity, IPM Group members visited the classes and talked to people about food safety issues. As a result, several new members joined the IPM Group.
- The exercise also proved that having a permanent outlet for the IPM Group is key to success in marketing. In spite of its small size, the outlet brought continuity and order to storage, sorting, packaging, labelling and handling of products.
- The conclusions were that the IPM Group should enter the public fruit and vegetable market only when the volume and variety of its products are large enough to compete with conventional products, and when the group has acquired adequate experience, membership and economic vigour to open a stand-alone permanent outlet for IPM products.

A stand in the IRIPP Consumer Cooperative store

Based on the EGM experience, the group started to set up an outlet of its own. The Iranian Research Institute of Plant Protection (IRIPP) Consumer Cooperative was found to be the immediate option at hand to test selling through a typical supermarket store. Since IRIPP is a major partner in the FAO Regional Integrated Pest Management (RIPM) Project, it gave its support for IPM products to be sold through the cooperative. Shelf space was thus provided for the IPM Group, where different products were sold. Customers of the cooperative are generally aware of food safety issues and the advantage of IPM products, although they are more familiar with organic than IPM, which is the reason why the two in some cases are mixed up. Even with a limited range of products, sales at the IRIPP store picked up relatively easily, enabling the IPM Group to have the largest share of its sales (about 50 percent) in the short seven-week trial period in 2011.

After the trial period, the IPM Group held evaluation sessions to decide on whether to continue with the IRIPP cooperative stand or consider other options. The SC considered that the stand was too small to operate on a sustainable basis. Accordingly, the group began negotiations with the IRIPP authorities on contracting the whole fruit and vegetable department of the cooperative. Later, however, the group withdrew its proposal because it was required to sell conventionally produced fruit and vegetables alongside IPM products, which the SC did not agree to, since it was against the basic

FIGURE 8.2
IPM Group marketing channels



Source: authors' elaboration.

values and principles of the IPM Group. Nevertheless, from the experience gained, the group formulated a concrete production and marketing plan, which was based on contract farming from the production side and was coupled with a strategy for setting up distribution centres and opening permanent marketing outlets.

Setting up permanent distribution centres

As part of this plan, the first distribution centre was established by the IPM Group in the summer of 2013. The centre was rented by the group to continue its marketing activities. The premises are a 110-m^2 building, which includes a packaging hall, meeting room, two offices and a kitchen. It is equipped with facilities to organize training courses and marketing campaigns. The main equipment includes simple packaging equipment, shelves, stationery, plastic boxes and containers, computers, printers, labelling equipment and scales. The full-time staff includes a manager/accountant and one technician. Packaging is mainly done by part-time staff.

8.4 RESULTS

With the establishment of the permanent distribution centre, most of the problems identified during different marketing experiences were resolved. The majority of the following obstacles were overcome.

- *Low economy of scale and instability of supply and sales* through lack of a permanent address.
- *Lack of product variety and shortage of supply*. With the establishment of the distribution centre, even the group occasionally faces a surplus of products from farmers, because the outlets of the group do not have the adequate capacity to handle large quantities or varieties. About 80 types of product (approximately 20 percent of total needs; 35 types are natural) are supplied by the IPM Group. Some of these crops are procured once for the needs of a whole year, others are procured monthly and fresh vegetables come in twice a week. There are still some limitations on fresh food. Dried fruit and vegetables are available all through the year.
- *Lack of assured markets*. Some of the member farmers supply only 5–10 percent of their produce to the group. The rest goes to conventional markets. Member farmers are able to grow several other IPM crops, which could easily solve the problem of variety, but they do not do so because their market is not assured under current circumstances.
- *Pricing issues*. The average sales margin of the IPM Group was about 20 percent, whereas the costs on top of product purchases were at least 23 percent. Therefore, pricing has to be calculated more carefully. However, municipality market price controls limited the amount of sales and the profit to be accrued through EGM and this was a loss. In the proposed outlet, this issue will be effectively resolved, since municipality officials have expressed their readiness to cooperate fully with the group in this stand-alone outlet.
- *Lack of handling facilities at the IRIPP store and packaging requirements*. Packaging requirements at the IRIPP store added to costs, while limiting the amount of sales. Sorting and packaging took a lot of time and labour, without allowing for the flexibility required for customers to pick/smell/test, selling small sizes mixed with larger ones and changing prices based on market feedback.

- *Product waste and underpricing of perishable products*. One of the main drawbacks of the previous channels of marketing was that cold storage facilities were not available for IPM products. As a result, large quantities of perishable products were often lost, leading to disadvantages of IPM products compared with conventional products. A small cold storage facility will solve the problem.
- *Retaining consumer interest in IPM products*. Overall, consumers are increasingly showing interest in IPM products, but the lack of a fixed venue affects their interest.

8.5 CONCLUSIONS

The market for safe and organic products in Iran is just beginning to emerge. Consumer and farmer awareness is low and there are no widely recognized standards and processes for food safety guarantees, nor does third-party certification for local organic production exist. After a decade of IPM implementation in Iran, IPM has been successful in providing a model of crop production and protection management in accordance with local socio-economic structures for smallholder crop production systems. From the social perspective, especially for small-scale farmers, IPM has improved living conditions by reducing production costs, reducing investment risks and increasing farmers' income by establishing niche markets for IPM products as safe food.

The IPM Group, initially organized by farmers who had successfully adopted IPM practices following training through the IPM/FFS initiatives of IPM projects in Iran, demonstrated that linking sustainable production to markets is difficult but feasible. Priority is given to supplying the needs of IPM Group members and at the same time increasing the number of members through awareness programmes on food safety. With the expansion of the area of farms under contract, consumer demands for new outlets are increasing. The IPM Group has itself activated international safe food standards through internal inspection systems, since there are currently no monitoring and certification systems concerning safe food in agricultural crops in Iran. This could slowly develop the safe food issue throughout the country.

Both large and small farmers are keen to work with the IPM Group and benefit economically. Large farm and greenhouse holders benefit from IPM tactics to eliminate herbicides, and reduce pesticides and production costs, while small farmers benefit from selling their crops at better prices and obtaining more income.

To date, there is no consensus concerning even the meaning of IPM. The structure of the PPO system in Iran is similar to many countries in that it is chemically oriented. IPM could be an environmental model for plant protection in the country even for strategic crops but there is some resistance. Researchers resist because they are not able to work at field level with farmers. The only IPM area in Iran is the one where farmers follow the FAO and UNDP IPM project.

The IPM project's support in conducting market research and participation in creating a market based on consumer awareness of healthy agricultural products has led to the formation of a new market model for certain products. Iran needs to expand this market model to other products and use it as a national model to achieve food security and safety, poverty eradication and increased income for small farmers. The IPM Group could be a model for similar initiatives in other regions of Iran and elsewhere.

8.6 RECOMMENDATIONS

IPM is a strategy in the agricultural sector that could substantially improve the yield and quality of different commodities in local Iranian ecosystems. Furthermore, IPM techniques can help small-scale farmers as well as improve the livelihoods of rural communities. Based on the experiences of the IPM Group, the following suggestions are made.

- The structure of PPO in Iran is similar to many countries and has a chemical-oriented approach. Therefore, it is necessary to restructure it, as well as universities, and research and implementing agencies.
- The establishment of a farmers' market is required for the sustainability of IPM activities and to improve communication and exchange of information and experience.
- Farmers should be helped to have better market opportunities, without intermediaries, through replicate IPM groups in other provinces.
- Farmers need to improve the production to consumption process for better food security and food safety in Iran.
- A national IPM market programme should be developed to accomplish 25-percent IPM land allocation as set out in the Five-Year National Development Plan.
- A sustainable national food security strategy needs to be developed to include IPM and FFS as integral and essential elements in the strategy.
- Government and international agencies such as FAO, supported by an IPM Group as a model, could help provide better welfare, reduce poverty, create income and increase food quality in local communities.
- Farmers need assistance in the application of more land allocated to IPM (as per the Five-Year Plan).

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Chapter 9
Quezon Participatory Guarantee System in the Philippines
Engaging smallholder farmers and other stakeholders in the development of sustainable agriculture

Carmen L. Cabling

9.1 INTRODUCTION

The Philippines is an agricultural country with a total of 9.2 million ha of land for agriculture – 9.1 million ha are cropland while 0.1 million ha are pastureland.[24] Its main crops are divided into two categories, namely: *temporary* crops that include rice, maize, sugar cane, tubers and fruit-bearing vegetables; and *permanent* crops that include *abaca*, bananas, coconuts, coffee, grapes, oranges, pineapples and strawberries. Of the total agricultural workforce, 68 percent are small farmers occupying 25 percent of agricultural landholdings.

Two farming systems exist in the country: conventional and non-conventional agriculture. Sustainable agriculture falls under non-conventional agriculture characterized by varied sustainable practices, e.g. biodynamic farming, natural farming systems, *Agnihotra* practices and organic agriculture. In fact, the latter can be a combination of all the above-mentioned practices, together with the use of vermiculture and a few traditional farming practices such as *igba*.[25]

Sustainable agriculture in the Philippines began to gain recognition in the early 1980s. Farmers and advocates, inspired by the Farmers' Assistance Board programme on organic agriculture and appropriate rural technology, started projects on organic agriculture throughout the country. In spite of the Organic Agriculture Act of 2010 and budget support from the Government for its implementation, sustainable agriculture is growing at a slow pace. This can be attributed to the following.

Sustainable agriculture technology. Uneven understanding of organic agriculture benefits and practices exists not only among farmers but also among implementers and

[24] Bureau of Agricultural Statistics, 2013.

[25] *Igba* is a traditional farming practice in Quezon. Before planting, farmers bury either coconut or betel nut in the cultivated land for a bountiful harvest.

policy-makers. Agricultural technicians at provincial and municipal levels are mostly agriculture graduates who were educated and trained using conventional agriculture technologies. Sustainable farming technologies still have to be learned and acquired, not through formal education in regular universities, but through workshops and training given by the Agriculture Training Institute of the Department of Agriculture, technical and skills training institutions, and seasoned organic practitioners. For instance, the National Organic Agriculture Board (NOAB), the policy-making body for organic agriculture, has only three farmers among its 14 members.

Lack of popular information, education and communication (IEC) materials. Although demand for organic produce is increasing, especially in key cities and urban centres, information regarding government programmes and incentives on organic agriculture, such as tax exemptions and subsidies, is minimal among smallholder farmers, at times even with implementers in the field. This slows down the development of sustainable agriculture in the farming sector which, given ample production support and incentives, could contribute to its development. This gap in IEC on organic farming also exists among consumers, particularly regarding certification and organic standards and, for that matter, even Republic Act 10068 (Organic Agriculture Act of 2010).

Incentives for agro-enterprises. The long government procedures and volume of requirements from different government agencies, from the smallest administrative units in the *barangay* (village/district) to the national arena, subject farmers to dealing with intermediaries in marketing their produce at urban markets, instead of setting up small-scale agricultural enterprises.

Lack of regulation on GMO crops. Increasing production of genetically modified organism (GMO) crops, specifically maize, is one of the major deterrents in the development of sustainable agriculture in the Philippines. The presence of GMO-testing field areas for golden rice, aubergines and other crops, with the concurrence of the Government, puts sustainable agriculture at risk. Although it is explicit in the Organic Agriculture Act of 2010 that no GMO seeds/varieties should be utilized for organic agriculture, GMO crop production cannot coexist with organic agriculture. Petitions have been filed by members of the academic world, church and international organizations to ban GMOs totally in order to protect the fragile biodiversity, which is one of the richest in the world. The Government has yet to respond.

Sustainable agriculture in the country is at its infant stage. At the National Organic Agriculture Congress held in November 2014, the National Program Management Officer for the National Organic Agriculture Program (NOAP) of the Department of Agriculture reported that 87 000 ha are cultivated using sustainable farming technologies, a total of 88 000 organic practitioners are recorded and the volume of organic products amounts to 27 000 tonnes. The market niche for organic products is estimated at 3.2 billion Philippine pesos and, as of 2013, there were 9 878 certified organic farms. There are no figures reflecting whether these farms are third, second or first party certified.[26] By 2016, NOAP will target at least 5 percent of the total agricultural area devoted to organic farming.

[26] The Philippine National Standards for Organic Agriculture define farmers and consumers as first and second party certifiers, respectively.

Given this reality, how can sustainable agriculture supply the needs of the growing population, estimated at 100 million in 2014? This is the big question in a country that hosts the International Rice Research Institute (IRRI), which has produced several varieties of hybrid rice for decades. However, just like the argument on "yield", which rationalized the establishment of IRRI in the 1960s, sustainable agriculture remains on the debating table.

Field research and studies by the Susi Foundation, Inc.[27] on rice production using organic agriculture practices (after a minimum of three years) show that it is comparable with and can even exceed production by conventional agriculture methods. Organic practitioners attest (at least two organic farmers in Quezon), from their own experiences and testimonies, that yields are greater with organic farming and that farmers have no need for many hectares of land to support the needs of their families so long as they use the right sustainable farming methods. A farmer from the Benguet province (which supplies 70 percent of temperate vegetables to Metro Manila) abandoned her long use of conventional agriculture and disposed of her large areas of agricultural land planted to cabbages, broccoli and cauliflower in exchange for 2 000 m^2 of land dedicated to organic agriculture. Her income improved with organic farming. She was able to market her produce and even act as "consolidator" among her co-organic farmers in Benguet for Metro Manila. These field experiences refute what the proponents of conventional agriculture say, i.e. that yield is not substantial in using sustainable agriculture practices.

9.2 INNOVATION

The Quezon participatory guarantee system (Quezon PGS) is a multiparty certification body composed of organic practitioners, members of civil society organizations (CSOs), and representatives from government line agencies and local government units in the province of Quezon. It was established in February 2012 to assure consumers that all organic products sold at the weekly organic market at the Provincial Capitol are guaranteed organic, and as a concrete and sustainable response to the need for an affordable certification system for smallholder organic producers in the province. Implementation started after the ratification of Quezon organic standards and manual of operations.

Quezon was the first province in the Philippines to adopt and implement PGS. It was given a Certificate of Recognition during the National PGS Conference on 15 January 2013, held in Balay Kalinaw, University of the Philippines Diliman, Quezon City. Quezon PGS was established on the initiative of the Provincial Agriculturist, with strong support from the Provincial Government of Quezon province in cooperation with the University of the Philippines Los Baños (UPLB) Agricultural Systems Cluster[28] and *Magsasaka at Siyentipiko para sa Pag-unlad ng Agrikultura* (Farmer-Scientist Partnership for Development), Inc. (MASIPAG).

[27] The Susi Foundation, Inc., established in the 1990s, was one of the first institutions to use organic agriculture among its farmer-members in Tiaong, Quezon and is a member of Quezon PGS as an NGO.

[28] The UPLB Agricultural Systems Cluster facilitated the workshops in drafting Quezon Organic Standards together with MASIPAG. Established in 1909, UPLB was the first agricultural college in the Philippines before it became a university. MASIPAG provided the technical knowledge and expertise on PGS in formulation of the Quezon PGS standards and operation manual.

Methods for data collection and outline

Data were collected through: (i) direct interviews among Quezon organic practitioners; NGOs; heads and staff, implementers and policy-makers of organic agriculture in the national and local government; UPLB Agricultural Systems Cluster officer; officers of Quezon PGS and *Organikong Kalakaran sa Quezon* (Quezon Organic Way); (ii) utilization of Web sites of CBs, the Department of Agriculture and its line agencies; (iii) review of publications in both hardback and paperback; and (iv) review of presentations for both international and national audiences made available by members of the PGS network.

9.3 INSTITUTIONAL LANDSCAPE

Public policies and regulations

Organic agriculture in the Philippines is governed by the Organic Agriculture Act of 2010. The implementing rules and regulations (IRR), in accordance with its provisions and NOAP, provided guidelines that will serve as reference for the criteria, rules and regulations in the implementation of all programmes, projects and activities of different implementing agencies and bureaus, CBs, producers and other stakeholders pertaining to organic agriculture.

National level

Certification and accreditation of certification bodies (CBs) for organic products. Section 17 of this Act limits the labelling of organic products only for those that are third-party certified, while Section 15 of IRR limits the accreditation of certifying bodies only to third-party CBs. The law is clear: PGS cannot be accredited by virtue of its composition. This means PGS-certified products cannot be sold in large supermarkets, much less exported once the law is enforced in 2016. The same law, however, does not prohibit the existence and operation of PGS at local level.

Moratorium on third-party certification and labelling of organic products. PGS practitioners and advocates filed a petition to NOAB during the National Organic Agriculture Congress in 2012 to widen the arena for CBs, allowing non-third-party bodies but also others, including PGS. In 2013, during the National PGS Conference attended by PGS network members and guest-funders from the International Federation of Organic Agriculture Movements (IFOAM), the same petition was handed over to the Secretary of Agriculture to seek NOAB's immediate action on the accreditation of PGS. This resulted in an Administrative Order issued by the Secretary of Agriculture providing a moratorium on the implementation of Section 17 of Republic Act 10068 and Section 15 of IRR until 2016. PGS-certified products can thus be sold in large supermarket chains until 2016 without fear of being penalized.

Government subsidies. Until 2016, the Government will subsidize certification costs, anywhere from 15 000 to 50 000 Philippine pesos for smallholder organic farmers. This holds true for both individual and group certification. This is a good incentive to further the development of organic agriculture, yet most smallholder organic farmers are not willing to disburse an advance payment of 50 percent for the certification fee. This is because subsidies apply only to farms that have been certified; owners of farms who fail to comply with certification standards are not entitled to reimbursements of advances to the certification body that conducted the certification processes. Sustainability depends on smallholder farmers' capacity to pay certification fees beyond 2016.

Focal person for organic agriculture. All levels of government, national and local, are mandated to assign an organic focal person. This person coordinates the implementation of programmes, projects and training, and oversees the implementation guidelines and procedures on sustainable agriculture. In principle, this is good for the advancement of sustainable agriculture in the countryside. However, confusion arises among smallholder farmers because in practice an organic focal person may also be the agricultural technician assigned to high-value crop production. In many areas of the country, a strange scenario exists. For four days a week, the agricultural technician conducts technology training on the production of a particular crop complete with technologies and recommended chemical inputs among groups/organizations of smallholder farmers. On another day, the technician may be seen introducing sustainable agricultural practices, almost always to the same set of organized groups of farmers.

Agricultural infrastructure projects. Irrigation facilities, processing centres, training and storage centres, greenhouses and nurseries necessary for the development of sustainable agriculture are accessible at the Department of Agriculture under NOAB. The huge budget of 900 million Philippine pesos allocated by the national government for organic agriculture development in 2012, 2013 and 2014 has not been fully utilized because of delays in fund releases and governmental bureaucracy. The Department of Agriculture is aiming for 5 percent of total productive agricultural land in the country to be under organic agriculture by 2016. Lack of investment in agriculture and the need for capital support remain the primary obstacles particularly for smallholder farmers in furthering sustainable agriculture.

Awards and incentives. New recognition by the Department of Agriculture of outstanding organic farmers and implementers from national to local level encourages more aggressive promotion and adoption of organic agriculture. However, smallholder farmers are marginalized in this exercise. Government procedures and requirements, i.e. tax declarations, business permits and registrations that commonly apply to corporate and/or large farmers inhibit smallholder organic producers from participating in this recognition. Organic practitioners and advocates have filed a petition to NOAB to create a new set of criteria for smallholder farmers in these awards and recognition exercises. The new NOAB members installed in the last semester of 2014 have yet to act on the petition.

Local level

The Quezon PGS experience provided the impetus for other local government units to establish their own PGS with organic practitioners in their localities for the benefit not only of smallholder farmers but also of consumers and eventually of the whole organic agriculture movement in the country. The province of Nueva Vizcaya in the northern part of the Philippines established the Nueva Vizcaya PGS (NVPGS) led by the Philippine Rural Reconstruction Movement (PRRM)[29] with its

[29] PRRM is the oldest NGO in the Philippines with partner POs from north to south; it is also a member of the convenors' group that initiated PGS Pilipinas.

farmer-members from various peoples' organizations in partnership with the local government and the Nueva Vizcaya State University.

It had been observed, even by IFOAM, as echoed by its President during the Second Philippine PGS Conference in January 2013 that third-party certification limits the development of organic agriculture in countries where only this certification exists. In contrast, organic agriculture develops more quickly with the existence of other certification entities including PGS, respecting the cultural and social context of the community where PGS and other community-based certifying systems are being implemented.

The absence of a national policy on the banning of GMOs puts organic farms at risk of contamination. Local ordinances, by virtue of the Local Government Code, can fill this gap. For example, two provinces in Negros Islands declared the island to be organic and GMO-free through a local ordinance. This can also work for PGS implementation until it is fully accredited and legally recognized.

Key players

Department of Agriculture

Agencies directly involved in the implementation of RA 10068 are the following.

The *Bureau of Agriculture and Fisheries Product Standards* (BAFPS) acts as the NOAB secretariat and is in charge of accreditation for CBs.

The *Agribusiness and Marketing Assistance Service* (AMAS) provides venues for market-matching activities and works in coordination with the Department of Trade and Industry (DTI) on national and international product exhibitions.

The *Agricultural Training Institute* (ATI) is in charge of organic agriculture training in coordination with the Regional Field Offices of the Department of Agriculture. It accredits extension service providers from among organic practitioners.

The *National Organic Agriculture Program-National Program and Management Office* (NOAP-NPMO) serves as Technical Secretariat under BAFPS, tasked to coordinate and compile all activities and reports of BAFPS, ATI and AMAS on organic agriculture.

The *National Organic Agriculture Board* (NOAB). The Board is composed of eight representatives from different government line agencies; representatives from the private sector are (i) three smallholder farmers (one each from the islands of Luzon, Visayas and Mindanao); (ii) one each from an NGO, agribusiness sector and agricultural college/university. The Board is attached to the Department of Agriculture and is headed by the Secretary of the Department. NOAB is a policy-making body and is mandated to provide direction and guidelines for the implementation of NOAP. NOAB can hear petitions (as in the case of the moratorium on implementation of the law affecting labelling of organic products) and draw up new policies, but it cannot act above the law. Until 2016, only third-party certification will be accredited by the Government. In the meantime, the moratorium provides PGS practitioners and advocates ample time to seek legislation for PGS and other CBs.

MASIPAG

In the Philippines, PGS was initiated by *Magsasaka at Siyentipiko para sa Pag-unlad ng Pagsasaka* (MASIPAG). MASIPAG is a network of farmers, scientists and NGOs working towards sustainable use and management of biodiversity through control of genetic and biological resources, agricultural production and associated knowledge. It helped to organize the Organic Certification Center of the Philippines (OCCP) with the Department of Trade and Industry through the Center for International Trade and Exposition Missions (CITEM) in the late 1990s. In 2004, MASIPAG started the MASIPAG Farmers' Guarantee System (MFGS) among farmer-members in pursuit of their principles on rural development and farmer empowerment. MFGS is a member of the IFOAM family of standards.

Organic Producers and Trade Association Philippines, Inc. (OPTA)

This association was established in 1995. OPTA members include traders, producers, academics, advocates and consumers. OPTA is active in the domestic market, and distributes products ranging from fresh to processed products. It has four marketing outlets in Metro Manila.

Organic Certification Center of the Philippines (OCCP)

This third-party CB has been operating since the late 1990s and was first accredited by BAFPS as a certifying body in 2005. OCCP partners BAFPS in the formulation of organic standards, advocacy and training.

Negros Island Certification Services (NICERT)

This started in Negros as a local CB for the island's organic produce, basically muscovado sugar, rice and coffee. It is now operating nationwide as an accredited third-party certification body offering relatively low certification fees (ranging from 15 000 to 50 000 Philippine pesos).

Spread Organic Agriculture in the Philippines (SOAP)

SOAP is an advocacy group promoting organic agriculture in the country. It partnered with ATI in the publication of the *Organic Agriculture Directory* and is constantly conducting seminars, training, workshops and marketing activities in partnership with respective Department of Agriculture line agencies on organic agriculture.

League of Organic Agriculture Municipalities (LOAM)

LOAM is a newly organized group of local chief executives from different municipalities, headed by the mayor of Dumingag, Zamboanga del Sur and has more than 50 members. Since the establishment of LOAM, members are focused and there is more chance for organic agriculture to spread, given the budget support that local executives can access for their respective municipalities.

PGS PILIPINAS

This newly organized network of NGO and PGS CBs works for the promotion and development of sustainable agriculture in the country. Its primary objective is to push for the legalization of PGS. The Quezon PGS chairperson currently acts as president.

University of the Philippines Los Bãnos (UPLB)

Under the Agricultural Systems Cluster, through its projects in partnership with the Bureau of Agricultural Research (BAR) of the Department of Agriculture, UPLB integrates PGS in its agenda as a means to empower farmers using sustainable agriculture practices. In collaboration with the University of the Philippines Open University, UPLB offers the first online non-formal certificate course on organic agriculture. It facilitated the establishment of Quezon PGS with MASIPAG in September 2011.

Philippines for Natural Farming, Inc.

This is a non-profit organization promoting clean, safe and nutritious food in a clean environment. It was registered with the Securities and Exchange Commission (SEC) in March 2011. It promotes a natural method of agriculture in partnership with farmers, advocacy institutions and government agencies.

Other PGS initiatives

Six PGS organizations, five from Zamboanga and one from Nueva Ecija have recently been established. For the time being, MASIPAG is the centre for exchange of information and acts as the secretariat for PGS Pilipinas.

9.4 INSTITUTIONAL INNOVATION: QUEZON PARTICIPATORY GUARANTEE SYSTEM

Background and organizational structure

Organic production in Quezon province started from pockets of initiatives among smallholder farmers and advocates in search of sustainable agriculture production methods. In order to appreciate the significance of these initiatives better, a chronology of events leading to the establishment of Quezon PGS is set out below.

1989. The Susi Foundation introduced the use of compost among rice farmers in Tiaong and Candelaria.

1994. In Sariaya, *Binhi ng Buhay ng mga Magsasaka sa Bugon* (BINHI) utilized sustainable agriculture practices, i.e. sloping agricultural land technology (SALT), integrated pest management and the use of compost as a means to restore the rich but fragile biodiversity of Mount Banahaw in Barangay Sampaloc Bogon.

2007. The Office of the Second Congressional District of Quezon, recognizing the lack of interest among young people working in agriculture and food production, conducted a district-wide promotion of organic agriculture through *Masaganang Gulay sa Paaralan* (bountiful vegetables in schools) in primary and secondary schools, in partnership with the Department of Education of Quezon, which was expanded throughout the whole province in 2010 by the provincial government.

2008. The Agricultural Systems Cluster of UPLB College of Agriculture, with funding from the National Economic and Development Authority (NEDA) helped farmers establish an internal control system (ICS) as a first step towards group certification with the organic farmers' groups in Tayabas and Pagbilao through the UPLB-DA-BAR Organic Vegetable Project. Certification with third-party certifiers did not succeed because of high certification fees.

2010. The Quezon Provincial Organic Agriculture Technical Committee was created through Executive Order 32 of the Provincial Governor to institutionalize and strengthen organic agriculture in the whole province in line with the provisions of the Organic Agriculture Act of 2010.
2011. Marketing of organic produce was initiated by farmer-leaders of BINHI and the Susi Foundation as early as 2005. Weekly organic *tiangges* (markets) took place in the municipalities of Tiaong and Sariaya, and at the *Sentrong Pamilihan ng Produktong Agrikultura sa Quezon* (trading centre for agricultural products in Quezon). In 2007, BINHI showcased its organic produce in one of the largest chains of shopping malls in the country in an environmental exhibition in celebration of Earth Day. These efforts inspired the creation of *Tiangge sa Parke* (market in the park) in the Provincial Capitol grounds on Fridays. It was launched in May 2011 with other organic producers organized by UPLB from Tayabas and the Pagbilao municipality. It is now called the Friday Organic Market.
2012. Quezon PGS was institutionalized in Quezon province soon after ratification of the Quezon organic standards and manual of operations in February 2012. The same standards are being used in FFS for smallholder farmers conducted by both provincial and municipal agricultural offices over the whole province.

Quezon PGS rationale

High certification fees (anywhere from 15 000 to 50 000 Philippine pesos/year/scope[30] charged by the two government-accredited third-party CBs discourage smallholder farmers from engaging in organic agricultural production. Sustainable organic practices are fine for smallholder farmers in Quezon, but to pay fees for something that they struggle to produce and promote is another thing. They would rather spend their hard-earned money on their family's basic needs than pay fees just to assure outsiders that their produce is organic and sustainable.

By contrast, the Quezon PGS certification fee is 100 Philippine pesos for both smallholders and landed farmers. Inspection and monitoring fees, on the other hand, depend upon the size of agricultural land cultivated by a farmer-member. Inspection fees are from 100 to 1 200 pesos, while monitoring fees are from 200 to 1 200. Quezon PGS certifies the farming system on a yearly basis.

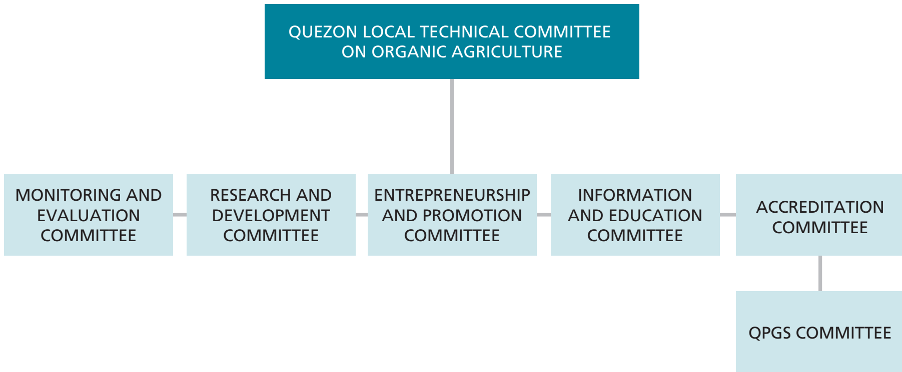
Quezon PGS is a volunteer organization at the service of smallholder organic farmers and sustainable agriculture. Fees for inspectors and evaluators are allowances, not salaries. The vision of Quezon PGS is to sell Quezon organic produce at the same price as chemically grown products in national and local markets.

Organizational structure

Under Section 14 of IRR, local government unit (LGU) executives are mandated to create a local technical committee on organic agriculture (LTC/OA), with a structure similar to that of NOAB. In 2010, the LTC for Quezon was created by executive order of the provincial governor; Quezon PGS falls under the Committee on Accreditation.

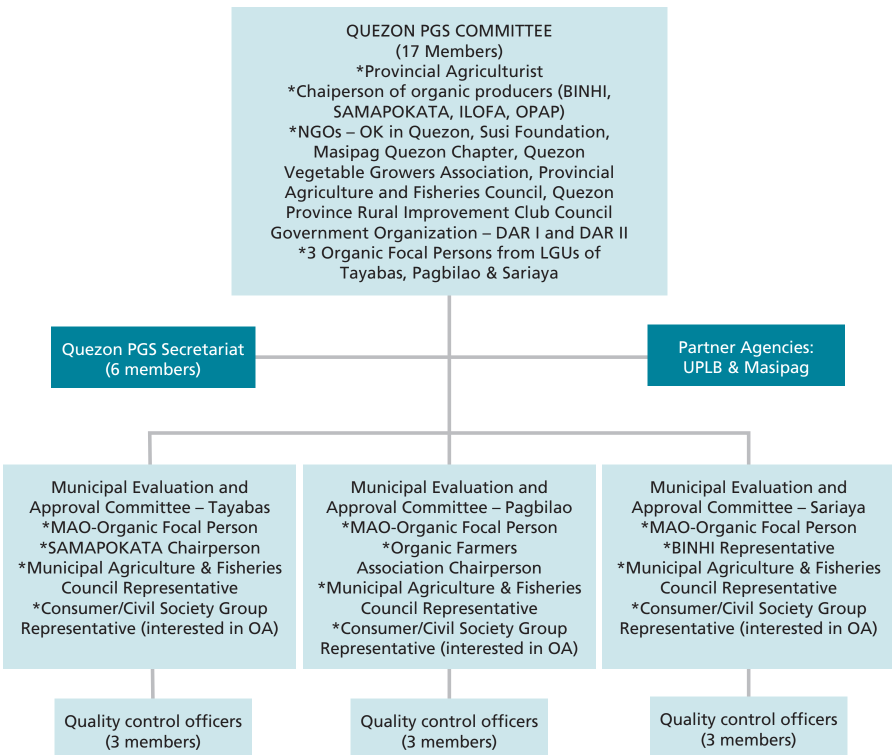
[30] The Organic Agriculture Act of 2010 covers six subjects: (i) conversion to organic agriculture; (ii) crop production; (iii) livestock; (iv) processing; (v) special products; (vi) labelling and consumer information.

FIGURE 9.1
Local technical committee on organic agriculture in Quezon province



Source: authors' elaboration.

FIGURE 9.2
Quezon PGS organizational structure



Source: authors' elaboration.

Figure 9.1 shows the LTC/OA in Quezon created in 2010. Figure 9.2 shows the Quezon PGS organizational structure under the Committee on Accreditation of LTC/OA created in 2011; it is composed of 17 members from smallholder farmers' associations in the towns of Sariaya and Pagbilao and the city of Tayabas; representatives from civil society organizations (CSOs), LGUs and government line agencies in partnership with UPLB and MASIPAG; and provincial and municipal organic focal persons. Inspectors and quality control officers (QCOs) are all farmer-members. Figure 9.3 shows the steps employed by Quezon PGS in organic certification.

Sustainable practices

QPGS farmer-members come from community-based organizations such as BINHI, which for almost 20 years has undertaken environmental protection and sustainable agriculture activities and advocacy for Mount Banahaw; and the Ilasan Organic Pro-

FIGURE 9.3
Steps involved in the Quezon PGS certification process

Source: authors' elaboration.

ducers Association (ILOPA), which is part of the MASIPAG network for organic rice production. *Samahan ng mga Magsasaka sa Paraang Organikong para sa Kaunlaran ng Tayabas* (SAMAPOKATA) and the Organic Producers' Association of Pagbilao (OPAP) are community-based organic groups organized in 2007 by the UPLB Agricultural Systems Cluster for organic agriculture production in Tayabas and Pagbilao respectively, as part of the university's research programme on organic agriculture.

Quezon PGS farmer-members use, promote and help develop sustainable farming practices, depending on the topography and ecosystem of organic farmlands.

Agroforestry

BINHI members primarily utilize agroforestry systems as a concrete response to mitigate climate change, and also to protect Mount Banahaw, which is a watershed and protected area. Agroforestry is used by farmers together with other environmentally sustainable farming practices such as natural farming methods, SALT, diversified cropping systems, crop rotation, companion planting and vermiculture production.

Diversified farming systems

These systems are commonly used by organic producers in Quezon. Two major crops, e.g. cucumber and lettuce, are planted together with okra and herbs such as basil, cilantro (coriander) and celery. Rice farmers plant string beans, tomatoes, aubergines, ginger and various herbs. These practices assure farmers of a weekly income while they wait for their major crops to be harvested. Since 2011, OKQ (acronym for *Organikong Kalakaran sa Quezon* or Organic Way in Quezon) has continuously provided consumers with a steady supply of organic products – rice, fruit, herbs, vegetables, processed products and organic inputs. Diversified farming systems enhance soil fertility while crop rotation and companion planting methods help in pest control and weed management.

Integrated diversified farming systems

Farmers who started early in organic production utilize integrated and diversified agricultural systems to maximize land use for optimum income. Production of livestock (mostly swine and poultry), vegetables and fruit takes place simultaneously. One farmer has already integrated organic fish production on her farm; she also utilizes biodynamics principles and recently *Agnihotra* in her farming practices.

Natural farming technology

Natural foliar from fermented plants, fruit, fish and other agricultural and domestic waste in both farms and households complies with and complements the Solid Waste Management Act of 2003, following its reduce, reuse and recycle component. It has been proved effective in organic production of both crops and livestock. The technology is used together with other sustainable farming practices and was adopted from Korean natural farming methods.

The Quezon PGS manual of operations has clear guidelines to ensure that members implement organic farming practices as outlined in Quezon organic standards. Members are issued certificates guaranteeing that their products are organic; these are renewable yearly. Farmers have to apply yearly certification to enjoy the benefits of being a QPGS member. Quarterly monitoring is also carried out on products sold at organic markets, as well as random chemical residue testing (with a testing technology kit provided by UPLB).

Markets for sustainable products and services

Markets

There are both export and domestic markets for organic products from the Philippines, but we focus here on domestic markets. Historically dominant intermediaries, following the models of conventional (chemical-based products) distribution channels, oversee the market, with a handful of new intermediaries. They subject organic producers to the law of supply and demand by buying organic vegetables and fruit at low prices when they decrease prices for conventional products because of oversupply. This price is far below the minimum price agreed upon by organic producers. There are, however, emerging trends whereby corporate agricultural entities are encroaching on conventional distribution channels with a line-up of organic products that they have either produced or consolidated from among smallholder farmers in their areas of operation. These new players capitalize on the mandate of the government requiring food stores and supermarkets to provide space for organic products. Products of some organized organic groups are now on the shelves of select supermarkets, competing with important market players.

Social marketing of organic produce is also gaining ground in the market. Smart entrepreneurs who are both organic advocates and consumers help in the promotion and expansion of the organic industry. They partner with organized organic producers as a marketing outlet for the producers, emphasizing the positive contributions of smallholder farmers' organic agriculture to human health and climate change. This linkage between health benefits and organic agriculture's ability to mitigate climate change has also been picked up in the regular media (print, radio and television) and has contributed to recent market developments in sustainable agriculture.

A significant market development has been recorded regarding the price of organic produce. Current prices of sustainable products are now much lower than in the last ten years when organic was only available in elite shops for select buyers. With the proliferation of *tiangges* and weekend organic markets in Metro Manila and the key urban cities of Cebu, Davao and Baguio, an increased production of organic products has been recorded.

Quezon PGS markets

In general, Quezon organic producers sell their produce at 20 percent more than conventional producers. This varies in practice, depending on the commodities sold. Lettuce, kale and cherry tomatoes are sold at 100 Philippine pesos (Php)/kg in local organic markets, way below supermarket prices of 250 to 400 pesos (Table 9.1).

Depending on the fruit or vegetables, 50 percent goes to an organic market and the rest are traded in local public markets at conventional prices (Table 9.2). Local markets are the weekly *tiangges* at the provincial, municipal and church premises, which enable producers to interact directly with consumers. At Perez Park in the Quezon Provincial Capitol grounds, in 2011 (year 1), recorded sales amounted to 1.2 million Philippine pesos. In 2012 and 2013, with the implementation of Quezon PGS, sales recorded at 15 000 to 20 000 pesos per week.

This direct interaction engages farmers and consumers in a healthy exchange for producing and buying organic products. Farmers are able to educate consumers on how they produce their crops (inputs, pest management, handling, packaging, standards included), while consumers are able to communicate to farmers their needs and preferences in buying organic produce. Both are able to level up their understanding of organic production and marketing and adjust according to the law of supply and demand.

AMAS Department of Agriculture also organizes market-matching activities at national and local level in the hope that when there is an assured buyer for organic products, organic production increases, and organic agriculture advances. In 2013,

TABLE 9.1

Data from a regular weekly Friday market at Perez Park, Provincial Capitol, Lucena City, Quezon

Produce	Volume	Farmgate price (Php)	Value (Php)
Rice	200 kg	40–60	10 000
Coco(nut) sugar	20 kg	230	4 600
Coco vinegar	24 bottles	75	1 800
Pechay (Chinese cabbage)	10 kg	40	400
Lettuce	10 kg	100	1 000
Mustard	10 kg	30	300
Camote (sweet potato) tops	20 bundles	5	100
Fern	30 bundles	10	300
Aubergines	20 kg	40	600
Tomatoes	20 kg	50	1 000
Squash	50 kg	30	1 500
Chayote (vegetable pear)	30 kg	20	600
Cucumber	40 kg	40	1 600
Bitter gourd	30 kg	60	1 800
Gourd	20 pcs	20	400
Carrots	30 kg	60	1 800
Camote (tuber)	20 kg	15	300
Ginger	5 kg	60	300
Turmeric	2 kg	20	40
Papaya	30 kg	15	450
Bananas	400 pcs	3	1 200
Guyabano (custard apple)	30 kg	40	1 200

Source: authors' elaboration.

in Quezon, UPLB organized a market-matching event on campus; commercial buyers and government institutions were invited to inspire farmers to continue and expand upon what they had started for sustainable agriculture. In market-matching activities, large "commercial" buyers are invited. These buyers are large vegetable traders (conventional) who supply the supermarket chains in Metro Manila. At present, only select supermarkets located in upmarket commercial districts have organic corners, less than 5 percent of the total space for fresh produce. These events can help to increase awareness of organic produce.

Quezon PGS targets marketing its own produce as part of the farmer-to-consumer mode of marketing not only in Quezon but also in Metro Manila. In this concept, traders are eliminated in the value chain, which translates to cheaper organic produce for consumers, more revenues for farmers and healthier environ-

TABLE 9.2
Market channels for Quezon PGS

Local	Weekly Friday market Perez Park, Provincial Capitol, Lucena City, Quezon
	Weekly Friday market in Sariaya Park, Municipality of Sariaya, Quezon
	Organic trading post in Tayabas, Quezon
	Sunday market in Pagbilao Parish Church, Pagbilao, Quezon
	Annual Agritourism Exhibition, Lucena City, Quezon
	Yearly Christmas bazaar, Lucena City, Quezon
Local institutional buyers	Provincial government employees
	Regional/national offices
	Pacific Mall
	Banks and other establishments
	Quezon Medical Centre (QMC)
	Quezon provincial jail (QPJ)
Market intermediaries/traders*	Dizon Farms
	Melendres Farms
	Organic Options
	San Benito Wellness Centre
	OrganiKountry
Trade fairs and exhibitions	Chefs on Parade 2013, Mall of Asia, Pasay
	AgriLink 2013, World Trade Center, Pasay
	First Natural and Organic Fair Products Expo 2013, Philippine International Convention Center
	Organic caravan, 2012, Tiendesitas, Pasig

* These are traders and suppliers to large supermarket chains in Metro Manila.
Source: authors' elaboration.

ments in communities (Figure 9.4). Restaurants offering healthy food are emerging and Quezon PGS supplies to one of them. Quezon PGS sells not only the produce but also the technologies and certification system it uses for the organic products its farmer-members are producing.

Among smallholder farmers, mostly in Quezon province, it is notable that farmers and their families are involved in the value chain from harvesting to selling of organic produce in the marketplace (Table 9.3).

At present, organic patrons in Quezon and other urban centres are considered a "select and/or special" market. They are from well-to-do families, government offices and are professionals who are aware of the benefits of food free from harmful synthetic chemicals. The majority are either health conscious or suffering from chronic diseases; a handful are organic advocates who believe that organic is the "future" when it comes to food production and/or consumption. These consumers are looking for trust (which is the foundation of PGS) in their exchange. Trust is generated by farmers who can articulate the farming system and the different inputs they use and describe how each product is produced. The wealth of experience of farmers in organic agriculture is extremely important.

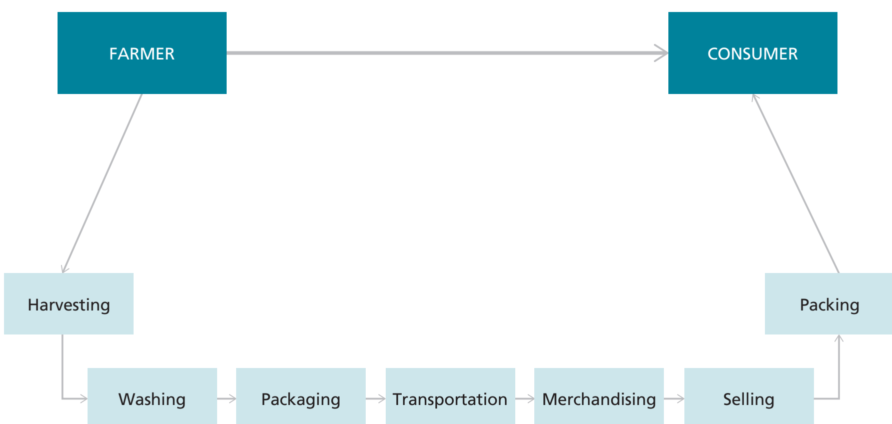
9.5 RESULTS

Agricultural practices

The use of sustainable farming practices made a great impact on smallholder farmer-members of Quezon PGS, particularly the following aspects.

Economy. Since the farming system is certified by Quezon PGS, farm owners produce their own inputs from compost to foliar, which are also sold at organic markets. As a traditional practice, farmers generate their own seeds, especially the native varieties that are being promoted and encouraged by Quezon PGS among its members. These sustainable farming practices enable farmers to save money for

FIGURE 9.4
Value chain map



Source: authors' elaboration.

TABLE 9.3
Farmers' involvement in the value chain

Activity	People involved	Short description
Harvesting	Farmer, wife, family members, farmhand	Weekly harvesting is done in time for the weekend market. When necessary, also done especially for leafy and vegetable fruit products to avoid overmaturity
Washing/drying	Farmer, wife, family members, farm helper/s	Washing is done at the farmer's house or in the vicinity, air drying at a small bamboo hut/table at farmer's house
Packaging	Farmer, family members, farm helper/s	Common activity for farmers – whole family is involved most of the time
Transportation	Farmer and/or wife, marketing coordinator	Transportation of products from farm to market is mostly done by the farmer or wife, marketing coordinator brings produce to marketplace for organized groups
Product display/ merchandising	Farmer and/or wife, marketing person/ merchandiser	Marketing is being done in the Provincial Capitol grounds until a regular display area for organic products within the grounds is finished
Selling	Farmer and/or wife, salesperson/merchandiser	Done at the marketing area
Packing	Farmer and/or wife, salesperson/merchandiser	Done at the marketing area

Source: authors' elaboration.

basic family needs instead of spending hard-earned money on chemical inputs. With diversified multiple cropping systems, farmers are assured of continued production and sustained income throughout the year, especially in the presence of local organic markets. Land use is also optimized with this system.

Environment. Continuous use of compost and organic inputs nourishes and brings back soil fertility. A multiple cropping system not only helps in pest management, but also provides a continuous harvest for farmers as compared with monocropping systems; crop rotation promotes soil fertility and weed control. These insights help Quezon PGS producers in marketing their produce. This was experienced by BINHI farmers in 2011 when they marketed their organic produce in one of the largest supermarkets in Metro Manila.

Health. Sustainable agriculture promotes safe and healthy food not only for consumers but particularly for farmers and their families. Farmers are the first casualties of chemical inputs used in conventional agriculture. They are no longer exempt from modern-day diseases such as cancer, hypertension and diabetes caused by toxins in chemicals which, according to research, are harmful to health. With the increasing demand for "food as medicine" communicated by consumers who are into "healthy lifestyles", farmers are now becoming more aware of the various health benefits derived from organic production.

Other notable changes in sustainable agriculture practices among organic farmers concern documentation. Every farmer-member of Quezon PGS must monitor products marketed against production. Planting calendars help farmers to synchronize the production of fast moving products, thereby avoiding oversupply in weekly organic markets and as a means to prevent competition among producers. Production programming helps to provide consumers with a wider selection of products. Best practices are shared among members during regular meetings of both Quezon PGS and OK in Quezon.

Market organization

Moving towards its fourth anniversary in May 2015, the weekly organic market at the Provincial Capitol in Lucena City continuously sells organic fresh produce as well as organic processed products. From a small group of organic practitioners, it has evolved to a legitimate organic organization registered at the Securities and Exchange Commission as *Organikong Kalakaran sa Quezon* (OKQ organic producers' association in Quezon). It has a marketing coordinator from the provincial agriculture office who is tasked with coordinating, promoting and marketing Quezon organic produce in the institutional market. To date, at least three market-matching activities have been carried out by the provincial coordinator. He has also been the means of supplying organic produce to local supermarkets, the provincial hospital commissary and Quezon provincial jail.[31] The Provincial Governor gave his support by facilitating an exhibition of Quezon organic produce in October 2013 in a prime commercial district in the south of Metro Manila.

As a policy, all members must be Quezon PGS-certified or in the process of being certified for a specified period upon application. PGS orientation, on a one-to-one basis, is carried out during the weekly organic market. A Quezon PGS desk is provided at the market to answer all inquiries and accept applications. It is staffed by either a Quezon PGS officer and/or secretariat staff from the provincial agriculture office.

Benefits

Farmer empowerment is one of the benefits of the participatory approach in the PGS structure. From the formulation of organic standards to implementation in the field, organic practitioners play an important role. PGS certification gives farmers a sense of pride in their dedication and commitment to the advancement of organic agriculture. The PGS "participatory" approach strengthens farmers' resolve to use, develop and promote sustainable farming technologies. The sense of ownership provided by the system also gives farmers a sense of being "actors" or doers, not just mere subject and passive players in a system of certification imposed upon them by third-party CBs.

Organic farmers receive other incentives, such as support regarding inputs and infrastructure (rain shelters, watering systems, etc.) from various government institutions. Because organic agriculture is still developing in the Philippines, Quezon PGS farmer-members are tapped as resource speakers/trainers in organic agriculture fora, seminars and workshops in and outside Quezon. They are invited to sell their produce at the organic weekly market in the Provincial Capitol grounds and at organic exhibits and fairs outside Quezon. Their farms are favourite destinations for study tours, making them a good agritourism revenue source, a value-added component of their organic production, not to mention the fact that organic farmers get premium prices for their organic produce, making them more economically empowered.

[31] Marketing at the provincial hospital commissary and provincial jail does not last long because of late government budget releases on procurement.

Quezon province, as the first province in the country to adopt PGS, has become a favourite destination of LGU executives for study tours and visits so that the development of agritourism happens as a natural consequence.

The participative approach of QPGS strengthened the resolve of smallholder farmers to embrace, expand and promote organic agriculture. Quezon PGS has organized study tours, training, seminars and workshops for 34 farmer-members. From 2013 to 2014, more than 1 000 farmers were given seminars and orientation on PGS during FFS activities of both the provincial and municipal agriculture offices in Quezon province. Recent reports (2014) from the provincial agriculture office on the profile of organic agriculture in the province show that there are 235 organic producers in 15 municipalities from 19 organizations of organic producers in Quezon. A total of 25 farms using sustainable farming technologies are Quezon PGS certified to date.

Changes in the institutional landscape

Changes are marked by the active participation of LGU executives in the development of sustainable agriculture. One important factor is the incentive given by the Department of Agriculture for outstanding organic implementers and practitioners (infrastructure for government units, cash rewards for practitioners).

The creation of the National Program Management Office (NPMO)/NOAP has meant further development in all matters concerning the Organic Agriculture Act of 2010. There is easy access to information regarding the status of programmes and projects on organic agriculture.

The presence of PGS as a CB on the same level as third-party CBs is slowly being felt, mainly as a result of the aggressive demand of PGS practitioners and advocates for its immediate recognition under the law.

At local level, the municipalities of Sariaya and Pagbilao and the city of Tayabas have organized organic farmers’ associations that hold weekly marketing activities in their respective localities. At provincial level, a trading area in the Provincial Capitol grounds, which started in 2011, now sells only Quezon PGS-certified produce. A provincial organic trading post is under way with the support of the Department of Agriculture.

9.6 CONCLUSIONS

The Quezon experience with PGS certification for organic produce fostered strong partnership between and among farmers, and the public sector, represented by the provincial government through its Provincial Agriculturist and representatives of LGU executives at municipal level. The strong commitment of farmers in furthering the development of sustainable agricultural practices was equalled by the strong support of the local government through training, administrative work and coordination activities. Quezon PGS provided space for small farmers and various stakeholders from NGOs, LGUs and representatives from government line agencies to participate in drafting, crafting and implementing their own organic standards and manual of operations. Farmers listened to technicians from government; government personnel in turn listened to and welcomed farmers’ experiences and wisdom in sustainable agriculture production. A tripartite partnership (NGO-people’s organization-Government) works with Quezon PGS, which is the very essence of the local government code of the Philippines.

The impact of sustainable agriculture on the livelihood of farmers is evident among local organic practitioners. Sustained income is derived from sustained production using sustainable farming practices matched by the sustained marketing support initiated by farmer groups and/or local chief executives through local organic marketing initiatives. In general, the participatory approach strengthens and deepens the engagement of farmers with sustainable agriculture. The sense of ownership takes root whenever a farmer shares experiences and knowledge about the innovative system. Broadening the arena in organic certification would mean more options and more informed choices for farmers and consumers. With an array of options, freedom works. When freedom works, the economy is healthy and in a healthy economy progress becomes inevitable, which translates to a more empowered citizenry.

Based on this experience, the following lessons can be drawn. First, the engagement of smallholder farmers not only as producers but also as implementers of a system (certification in the case of Quezon PGS) is crucial for the development of sustainable agriculture. Second, the inclusive approach of PGS encourages a healthy exchange among players from the different sectors involved in organic agriculture. Multiple players working for a common goal promote unity in diversity. Consumers of sustainable products are willing and waiting to be involved in the development of organic agriculture. From the point of view of law of supply and demand, they know that more production equals more affordable prices. Finally, with the strengthening and popular support of the producer to consumer mode of marketing, intermediaries are fewer, prices of commodities are cheaper and consumption is more sustainable. When all actors in the value chain benefit, sustainable agriculture can only move forward.

9.7 RECOMMENDATIONS

Development of sustainable agriculture relies on sustainable mechanisms. PGS is a sustainable mechanism as proved by the experiences of Quezon PGS and MASIPAG among their smallholder farmer-members. It is inclusive and participatory. It is a system where various players in both the public and private sector can contribute to further the promotion and adoption of sustainable agricultural practices not only by smallholder farmers but also by other players in agricultural production.

Recommendations for the advancement of PGS are given in the following comments.

- Institutionalization of PGS as a CB for organic products is fundamental to the success of the innovation. This can be done by amendment of the Organic Agriculture Act of 2010 or revision of the existing law (RA 10068). This should take place before 2016 when the moratorium on the implementation of RA 10068 expires. Inclusion of PGS and other CBs other than third-party will hasten and further advance the development of sustainable agriculture in the country, especially among smallholder farmers who constitute 68 percent of the agricultural sector.
- Impact assessment studies are needed to see how the system can contribute to the advancement of sustainable agriculture, what other tangible and intangible benefits farmers obtain in utilizing PGS and how to develop it further in the context of farming culture and traditions where PGS operates.

- In the absence of a law recognizing PGS, installation and implementation are possible at local government level through the local government code of the Philippines, which gives autonomy to local chief executives to issue ordinances and executive orders in the interest of its constituents.
- Mainstream PGS through workshops, seminars, training and advocacy activities among small farmers who constitute 68 percent of the agricultural sector in the country.
- Globally, a network of PGS practitioners can be created as a venue of exchange on best sustainable practices and experiences to further the development of the system. Policy-makers can also look at PGS, its practices and benefits, in developing new mechanisms for the advancement of sustainable agriculture.

Acknowledgements

Hon. Proceso J. Alcala, Secretary, Department of Agriculture, author of the Organic Agriculture Act of 2010, Elliptical Road, Diliman, Quezon City, the Philippines

Hon. David Suarez, Governor of Quezon Province, Lucena City, the Philippines

Dr Charito Medina, National Coordinator of MASIPAG, Board Member of NOAB (2011–2014)

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Ma. Leonellie Dimalaluan, Focal Person for Organic Agriculture, Office of Provincial Agriculture, Quezon province, the Philippines

Roberto Atregenio, Marketing Coordinator, OPA Technical Staff and OKQ in Quezon, Lucena City

Glem Durana-Maestro, Secretariat of Quezon PGS, Office of Provincial Agriculture of Quezon, Lucena City, Quezon province

Joel Alpay, Information Officer of Quezon PGS, Office of Provincial Agriculture of Quezon, Lucena City, Quezon province

Edgardo C. Alcala, President, *Binhi ng Buhay ng mga Magsasaka sa Bugon*, Sariaya, Quezon, the Philippines

Elizabeth Cruzada, Organizational Coordinator, MASIPAG, Los Baños, Laguna, the Philippines

Rowena Buena, Research Coordinator, MASIPAG and PGS Pilipinas Secretariat, Los Baños, Laguna, the Philippines

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Chapter 10
Moral Rice Network, Dharma Garden Temple, Yasothon province, Northeast Thailand

Alexander Kaufman and *Nikom Petpha*

10.1 INTRODUCTION

Despite governmental policies directed at expanding the industrial sector, agriculture is still vital to the Thai national economy. Census results in 2013 showed that 26 percent of Thai households practised at least one type of agriculture: animal husbandry, arboriculture, aquaculture, salt farming or the cultivation of cash crops and vegetables. Of 5.9 million Thai farmer households, 80 percent worked landholdings of less than 0.5 ha (National Statistical Office, 2011). Despite these relatively small landholdings, Thailand continues to be a global leader in rice exports (FAO, 2013, 2014). Notwithstanding, national agricultural policies have favoured the use of high yielding varieties (HYVs) of rice. Better suited to large landholdings, HYVs depend upon external inputs of synthetic fertilizers, pesticides, herbicides and fungicides. Those farmers with stable access to irrigated water are able to raise multiple rice crops (Falvey, 2000; Panyakul and Pichpongsa, 2007; UNDP, 1994). To assist rice farmers with the capital demands of these modern innovations, the Thai Government has provided comprehensive systems of credit. While rice outputs have soared, many Thai farmers have experienced increasingly high levels of debt (Rigg, 1997).

In the predominantly agrarian Northeast Region (*Issan*) low income levels have raised the concern of civil society organizations (CSOs) and governmental agencies. As of 2010, average monthly income per capita in *Issan* was only 3 657 baht (33 baht = US$1), less than half the wages paid to workers in the capital, Bangkok (National Statistical Office, 2011). Researchers have long argued that low agricultural incomes in *Issan* were the result of natural factors: infrequent rainfall, uneven terrain (an obstacle to irrigation) and poor soil types (Boonman and Anpim, 2006). To make up for a lack of natural soil fertility, *Issan* farmers have expanded and intensified rice production with synthetic fertilizers and agrochemicals (Panya, 2003). Responding to these problems, experts have begun to investigate the impacts of these modern agriculture methods on Thai farmlands and natural resources (Lovelace, Subhadhira and Simarks, 1998). Unfortunately, little is known about the health impacts of agrochemical exposure on *Issan* farmers and their families (Norkaew *et al*., 2012; Prasopsuk and Boonthai, 2011).

Over the last few decades, many *Issan* people have turned to employment in Bangkok or overseas to improve their financial situation. While household incomes have risen, labour migration has left an ageing population to oversee farms and care for young children (Funahashi, 1996; Grandstaff *et al*., 2008). Critics have blamed shifts in rural demographics on the deterioration of community-based social safety nets. Scholars contend that these sociodemographic changes have resulted in the erosion of traditional values (Wasi, 1988).

As a panacea for what scholars perceive as a breakdown in rural society, Thai social activists have put forth an alternative vision of rural development aimed at empowering smallholder farmers. Local scholars have suggested Thailand transition towards a Buddhist-informed economic system (Schumacher, 1973; Sivaraksa, 1990). Bangkok-based CSOs have lobbied on behalf of rural dwellers for decentralized governance, community self-reliance and farmer self-sufficiency. Extension organizations have worked with farmers to improve household food security through the adoption of sustainable agriculture methods. CSOs have built linkages to community-based farmer collectives and provided access to niche markets through organic agriculture certification programmes (Od-ompanich, Kittsiri and Thongchai, 2007; Samerpak, 2006). Agencies under the Thai Government and royal patronage have collaborated to develop approaches to "smallholder agricultural development" through the King of Thailand's Sufficiency Economy philosophy[32] (Chantalakhana and Falvey, 2008). Under the auspices of the Thai Alternative Agriculture Network (AAN), these diverse actors have successfully lobbied for a national agenda supportive of organic agriculture.

While researchers have examined programmes linked to AAN member organizations, there were few published studies on the Dharma Garden Temple, a hybrid Buddhist institution and organic learning centre located in Yasothon province, part of the Northeast Region (Figure 10.1). Under the direction of monks, elders and farmers, the temple created its own form of organic standards, which they decided to call *Kow Khunatham* (Moral Rice). Designed as an alternative to Western organic certification, this standard emphasized the moral development of farmers over heightened levels of production. However, the Moral Rice Management Committee also decided that members should obtain organic agriculture accreditation under the International Federation of Organic Agriculture Movements (IFOAM).[33] This innovation in sustainable agriculture was supported through a value chain comprised of CSOs, government agencies, private corporations and consumers.

This case study is based in part on the author's dissertation research (2007–2012) and latter work as an adviser to the Moral Rice Management Committee. To capture

[32] Since the 1950s, the work of His Majesty the King (HMK Rama IX) Bhumibol Adulyadej of Thailand has focused on building the prosperity of rural society through sustainable development strategies aimed at rural dwellers. Early royal projects (1946–1979) were designed to improve farmer livelihoods through "land development, water resource development, forest rehabilitation, and application of techniques in plant and animal production" (Senanarong, 2004, p. 8). HMK's experiences from working with the Thai people were incorporated into a long-term sustainable development strategy, which he termed the Sufficiency Economy (SE) philosophy. "The pillars on which the SE approach rests are moderation, reasonableness and self-immunity supported by knowledge and information consistent with morality" (Chantalakhana and Falvey, 2008, p. 2).

[33] This article employs the term "organic" as defined by the International Federation of Organic Agricultural Movements (IFOAM): "Organic agriculture is a production system that sustains the health of soils, ecosystems and people. It relies on ecological processes, biodiversity and cycles adapted to local conditions, rather than the use of inputs with adverse effects" (IFOAM, 2012).

FIGURE 10.1
Map of Thailand with Yasothon province

Source: United Nations Cartographic Section, 2011; National Statistical Office, 2011.

the strengths and diminish the weaknesses of qualitative and quantitative approaches, a mixed method design was selected. Data were collected through unstructured and structured interviews with monks, volunteers, farmers and committee members. This study examines the development, framework and implementation of Moral Rice at the Dharma Garden Temple. First, an overview of AAN and the key players in Thailand provides a backdrop to understanding the development path of Moral Rice. Second, the story of Moral Rice exhibits the ontology and theoretical underpinnings of this institutional innovation. Third, the ways that Moral Rice is cultivated, processed and delivered to consumers uncovers the dynamic qualities of its value chain. This paper concludes with a discussion of the benefits of Moral Rice membership and uncovers potential leverage points for change in domestic institutions and markets.

10.2 INSTITUTIONAL LANDSCAPE

In the 1970s, the Thai-based Santi Asoke group (Asoke) formed a society based around Buddhist teachings, natural agriculture methods and a vegan diet. The spiritual leader of Asoke, Samana Bodhirak (defrocked by the Thai Buddhist Central Sangha over ideological conflicts) called upon the Five Precepts[34] as a roadmap for

[34] The Five Precepts of the Buddhist Scriptures: "(1) not to kill any living being (often interpreted as 'not to harm'); (2) not to take what is not freely given by the owner (stealing); (3) not to indulge in sexual misconduct; (4) not to lie; and (5) not to consume intoxicants that lead to carelessness" (Henning, 2002, p. 37).

the Asoke way of life. Members were required to abstain from vices (no alcohol, cigarettes, gambling, illegal drugs or sex out of wedlock) and to engage in manual work. In 1987, Asoke members selected Sisaket province (*Issan*) for the construction of their first agricultural commune. Members were encouraged to produce and grow food through natural agriculture methods. Gradually, Asoke gained financial independence through donations and the creation of *boon niyom* (merit-based) enterprises. Asoke restaurants were set up in Bangkok and regional urban centres to sell inexpensive vegan food. The group also opened cooperative stores that sold natural agricultural products supplied by partnering organizations (Essen, 2005). An extensive civil society outreach programme was launched to promote the concept of self-sufficiency through Buddhist teachings. Courses offered participants the opportunity to learn natural agriculture methods, the fabrication of basic household items (i.e. effective micro-organisms, soap, shampoo, tofu and a variety of rice-based products) and Asoke Buddhist teachings.

Although Asoke helped to expose many Thai farmers to sustainable agriculture methods, there were several local and international sustainable agriculture extension groups working in the north and northeast of Thailand. CSOs and selected government agencies also sought to empower smallholder rice farmers through debt reduction and household food security. To accomplish these aims, many of these programmes were designed to help farmers acquire the skills and capital to set up organic collectives and acquire related agricultural machinery. In the 1980s, the organic farmer collectives of Yasothon (one of 20 provinces in *Issan*) began to share their experiences, knowledge and resources. Many of these collectives received financial support from the Ministry of Agriculture and Cooperatives. Partnerships with Bangkok-based CSOs and private companies helped these farmer-based organizations to develop the skills required to cultivate "organic" rice. The Thai CSO, the Green Net Cooperative/Earth Net Foundation (GN) facilitated exchanges between organic farmer groups, disseminated information on organic certification requirements under IFOAM and later assisted with product development. Critical to GN success was the provision of access to the European marketplace. Samerpak (2006) showed that GN extension programmes in Yasothon province contributed to the absorption of family labour, educational benefits, empowerment of female farmers and a rise in farmers' profit levels.[35] On the other hand, Becchetti, Conzo and Gianfreda (2012) found that *Issan* organic farmers made fewer profits than farmers who used synthetic fertilizers, because of higher labour inputs. Hutanawat and Hutanawat (2006) argued that organic farmers in Maha Chana Chai district (Yasothon province) benefited from non-financial gains: "the adoption of a new vision, the acquisition of new knowledge and greater self-reliance by working together".

Over the last few decades, select Thai government agencies have taken notice of an increase in organic farmers and steady growth in the international marketplace. In response, the National Economic and Social Development Board's Eighth Plan (1997–2001) was aimed at expanding sustainable agriculture to 20 percent

[35] Based on data collected from organic farmers by Samerpak (2006). After a shift to organic agriculture, there was an increase in net income of 53 percent in the first three years, 87 percent in four to six years, and 152 percent after seven years.

of arable land. The Ninth Development Plan (2002–2006) led to the creation of a comprehensive sustainable agriculture programme (integrated farming systems, organic farming, natural farming, agroforestry and New Theory Agriculture) suited to Thailand's diverse biogeographic zones (Samerpak, 2006; Thongtawee, 2006). In 2005, the National Agenda on Organic Agriculture was established through a focus on decreasing the use of agricultural chemicals, increasing farmer income and expanding organic food exports. The goal was to provide 4 million farmers with the skills necessary to make the shift to organic agriculture, and to boost the quantity of certified organic food products for export by 100 percent on an annual basis. Various government agencies began to promote organic agriculture through seminars, training and funds to establish fertilizer factories (IFOAM, 2012).

To support the sale of organic products, the Ministry of Agriculture and Cooperatives developed its own voluntary organic certification programme (see Table 10.1). While this move signalled the makings of a policy shift, European Union members were partial to the local IFOAM accredited organization, the Organic Agriculture Certification of Thailand (ACT). Not only were there multiple organic certifications, but Thai consumers grappled with a number of competing "safe food" labelling initiatives.

Adding to consumer confusion, the Ministry of Public Health decided to launch a competing label (pesticide-safe vegetables). Despite the health benefits, many of these products were considerably more expensive than those grown with synthetic fertilizers and pesticides. Nevertheless, a growing number of Thai consumers were willing to pay higher costs for "safe" and "organic" food. Although little is known about the effect of domestic organic consumption on production levels, growing overseas demand has contributed to an increase in organic products in Thailand (Roitner-Schoebsberger *et al*., 2008). Along these lines, Green Net (2014) reported a steady increase in arable land under organic production (1998–2010: 6 281–212 995 ha).

TABLE 10.1
Major organic standards and food quality labels in Thailand

Standard	Label/type of initiative	Organizational information
Organic Thailand	Official organic label of the Department of Agriculture, Ministry of Agriculture and Cooperatives (MOAC)	Products meet organic agriculture standards. Approved by National Bureau of Agricultural Commodity and Food Standards (ACFS) under MOAC. Products are chemical- and GMO-free
Organic Agriculture Certification of Thailand (ACT)	ACT has its own organic label	Products are certified organic by ACT, the Thai certification body accredited by IFOAM
Food quality and safety	Label signifies a "Thai quality product" and that produce has passed GAP, GMP, HACCP and/or organic standards	Established by ACFS. Products are checked during planting, harvesting and packaging
Pesticide-safe vegetables	Label is placed on fresh food products that meet safety requirements (appropriate amount of *chemical residue*)	Established by the Ministry of Public Health

Notes: GAP = good agricultural practices; GMP = good manufacturing practices; HACCP = Hazard Analysis Critical Control Point.
Sources: Roitner-Schobesberger *et al*., 2008; Wattanasukchai, 2011.

Although sustainable agriculture advocates have criticized the extent of national-level assistance, some governmental agencies have lent support to smallholder organic farmers (Panyakul and Pichpongsa, 2007). Over the last decade, Yasothon's provincial government has spearheaded several programmes to raise the number of organic certified farmers. The Center for Sustainable Agricultural Technology under the Office of the Permanent Secretary, Ministry of Agriculture and Cooperatives office in Yasothon province, has allocated local training budgets. Despite support efforts, government agencies lack expertise in organic agriculture. Consequently, Moral Rice experts have been called upon by government bodies to deliver training programmes around the province.

The Thai Bank for Agriculture and Agricultural Cooperatives (BAAC), the principal lending institution under the Ministry of Finance has been an important source of support for organic farmers. Concerned with rising debts, BAAC initiated a debt restructuring programme that included a provision for farmer members to attend courses on sustainable agriculture (Kaufman, 2012a). Notably, the Dharma Garden Temple was selected as the official training centre for this programme and received a budget to cover training costs.

Despite the absence of formal ties, elder Moral Rice members reported that they had acquired some of their knowledge about organic agriculture from GN-funded programmes. GN has continued to support Farmer Field Schools (FFS) and provided training on IFOAM guidelines. Through advocacy and research, GN has contributed to the growth of Thailand's organic agriculture marketplace and movement. Despite the benefits that Dharma Garden Temple members gained from working with GN, they decided to pursue a non-secular development path.

Although the Dharma Garden Temple is not officially an Asoke subsidiary, it values its working relationship and spiritual ties. Similar to Asoke training programmes, participants in Moral Rice training programmes have learned ways to reduce costs through natural agriculture methods and the production of basic household items. Moral Rice committee members also reported that they collaborate with Asoke on curriculum development for training programmes. While Asoke teachings have influenced Dharma Garden Temple doctrine, most Moral Rice farmers prefer to live outside the Temple grounds. Consequently, Moral Rice has extended its sphere of influence by lending support to community-based farmer cooperatives and building their consumer network.

10.3 INSTITUTIONAL INNOVATION: MORAL RICE NETWORK

Background and organizational structure

The story of Moral Rice began in the early 1970s with the donation of a tract of forest near an old jute plantation. This land, located in the village of Patiew, Yasothon province, was given by two schoolteachers to their spiritual adviser, Monk Khammak. Guided by the Five Precepts, Monk Khammak and his followers established this property as a place for meditation and chose to adopt a vegan diet. Monk Khammak decided to call the temple and surrounding land, the Dharma Garden Community. At this time, Monk Khammak took the new name *Luang Poh Thammachart* (Nature Abbot). To support his vision, followers built a temple and reforested the area. They cultivated rice, fruit and vegetables using natural agriculture methods as a "safe" food supply for resident monks and followers. The homeless were invited to live on the property under the condition they helped with farming and other activities. Eventually, some of these people were provided with small homes and plots of land to farm for themselves.

In 1987, the Dharma Garden Foundation was registered as an official institution under the direction of Luang Poh Thammachart, a committee of monks and a subcommittee of laypersons (primarily organic farmers). Their organizational mission was to promote natural agriculture, according to the teachings of the Buddhist scriptures. Asoke experts were called upon to provide spiritual guidance, training on natural agriculture methods and to assist with setting up a collective.

One-third of the temple lands were designated for religious activities and one-third (150 rai) (1 rai = 0.16 ha) for agriculture. The remaining third was designated as a training centre for farmers. At the time of this study, there were 15 regular resident volunteers, 11 monks and 30 laypersons residing at the temple for different periods. Members cultivated vegetables on several large plots and farmed nearly 100 rai of rice land throughout the property. Since the establishment of their foundation, members have constructed a central temple, *kutis* (huts for monks and nuns), residence halls (for participants on training programmes), a mill, fertilizer factory, cooperative store, holistic health centre, learning centres, a rice bank, vegan restaurant and a radio station.

The Temple radio station (91.5 MHz FM) started with seed funds from the Thailand Social Investment Fund in 2002. The station serves as an outreach tool and attracts farmers and civil society to the Temple with cultural programming, Dharma teachings, news, music and information on organic agriculture. Monks and volunteers serve as announcers and disc jockeys. There is no advertising permitted on air, so that efforts are funded mainly through donations. In 2013, it was reported that broadcasts reached five *Issan* provinces: Ubon Ratchathani, Sisaket, Amnat Charoen, Roi Et and Mukdahan. The Temple radio station is also available online. Temple volunteers reported the number of listeners at 21 000, mostly comprised of farmers (Figure 10.2).

While the Temple was managed by a joint committee of monks, farmers and volunteers, daily activities were overseen by a layperson, Nikom Phetpha, and all Temple staff were volunteers and did not receive salaries. Nikom reported that he maintained an organic rice farm to provide financial support for his wife and two sons. Prior to becoming a volunteer, Nikom served for many years as a lieutenant in the Thai army, after which he worked in organic agriculture extension programmes for BAAC. Nikom's prior experience helped the Temple to gain greater legitimacy and funding from government-linked institutions.

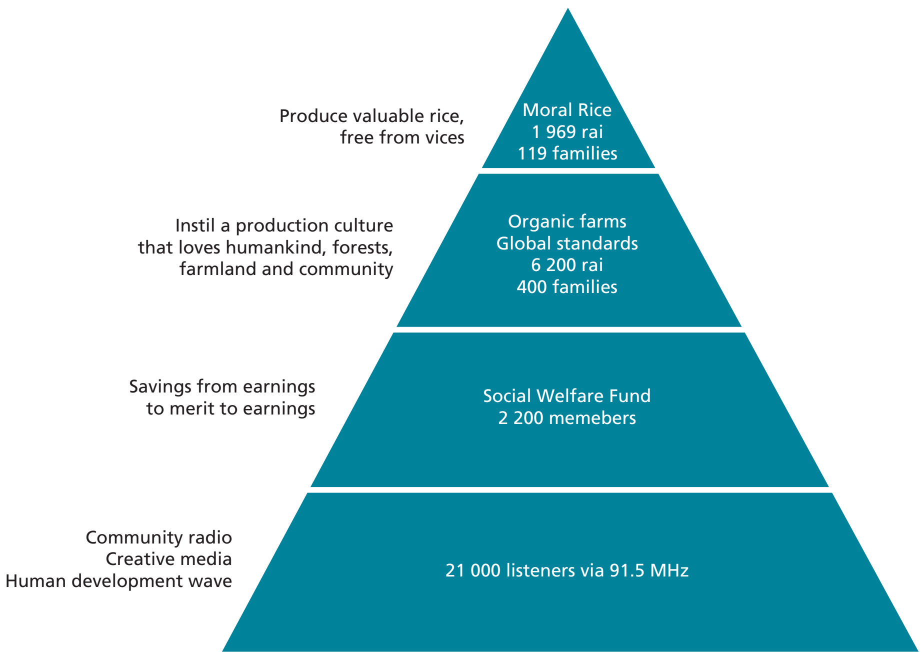
Although the Temple cooperative was accredited to IFOAM standards in 2005, all but a few members were in debt and many expressed the difficulty of committing to the Five Precepts. For this reason, the newly appointed Abbot, *Luang Poh Supatto* and lay members decided to develop an organic standard aligned with Buddhist values, which they called *Kow Khunatham* (Moral Rice). The objective of Moral Rice was to impart Buddhist teachings, expand organic agriculture, reduce farmer debts and encourage a shift to a vegan diet. Members invited farmers from around Thailand to join their programme. In training, prospective members learned leadership skills, team building, detoxification, soap making and ways to raise soil fertility through natural methods.

Elder members of the Dharma Garden Temple reported that the key objective of the Moral Rice programme was to protect farmers from fluctuations in the marketplace and to solve community social problems. They believed that organic certification alone was insufficient to support the moral and spiritual development of their farmer members. The Temple Committee decided to create an organic standard that incorporated the Five Precepts into organic agriculture methods. Through this standard, members believed they would contribute to "a safe environment, safe food for themselves and for sale to consumers". In particular, the programme stressed the importance of household food security over generating surplus production for sale. While organic certified rice offered a higher farmgate price, members expressed that Moral Rice carried "added value" (Box 10.1).

Despite a shortage of Moral Rice farmers, more than 2 000 people from Yasothon and the surrounding provinces subscribed to the Temple's Social Welfare Fund (Box 10.2).

Farmers who chose to produce Moral Rice took a vow that their farms were managed according to seven rules of practice (Box 10.3). Compliance to the Moral Rice standard revolved around a "circle of trust" whereby members monitored each other's progress against the Five Precepts. By following these moral precepts, members believed that they were able to improve rice quality and raise output. In addition to these requirements, members were requested to avoid contamination from neigh-

FIGURE 10.2
Moral Rice Network



Source: Moral Rice Network, 2012.

BOX 10.1
The "added value" of Moral Rice

The benefit of Moral Rice is that it can raise the farmers' level of spirituality, which brings good spirits to the rice and does not produce toxins. Producers do well by making pure food for themselves, their family and for consumers. The aim is for consumers to have good health. To make the rice pure, farmers' spirits must first be pure and then good things will come back to them (Wijit Boonserng, Temple chairperson and farmer).

Source: authors' elaboration.

BOX 10.2
"One day one baht"

The way to start becoming a member of Moral Rice is to join the Dharma Garden Temple, learn to sacrifice oneself and give to others by becoming a member of the savings cooperative. The cooperative gives one baht a day (30 baht = US$1) to support other members when they are in trouble. The fund is separated into two parts: one is for members' welfare, e.g. helping those in hospital, and another is to support Moral Rice activities such as buying rice from members, buying machines and tools for the mill and making fertilizer (Wijit Boonserng, Temple chairperson and farmer).

Source: authors' elaboration.

BOX 10.3
Moral Rice farmer vows

1. Adhere to the Five Precepts, and quit all types of vices (e.g. drinking, gambling and smoking).
2. Members who join Moral Rice must commit to being self-reliant. For example, they must pay (by themselves) for organic agriculture certification at a cost of 360 baht.
3. Members of the Moral Rice or satellite centres must commit to exchanging knowledge at least once a month and participate in quarterly meetings each year at the Temple.
4. Have knowledge of the management process after harvest in order to maintain the quality and standard of husked rice of at least 38 percent (per gram), a moisture content of not more than 15 percent and contamination of not more than 2 percent.
5. Strive to build the Moral Rice brand as a way to help society (good and low-cost rice).
6. Manage the Moral Rice market in two ways: (i) have Moral Rice and its satellite centres process and sell milled rice to the marketplace; and (ii) ensure all members have the power to negotiate the sale of husked rice.
7. Strive to build food security for themselves, their families and society.

Source: authors' elaboration.

bouring *chemi* (chemical) rice farms. They were also encouraged to work in small collectives as a means to produce fertilizers and other organic inputs. These activities were aimed at building *kalayanamitta* (associations of the virtuous) among members.

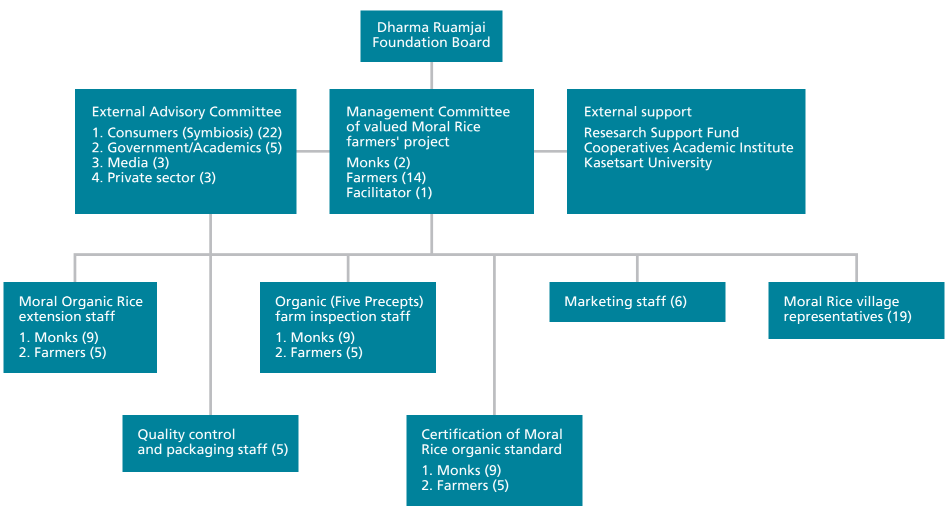
As the Moral Rice Network grew in size, Temple members set up a separate entity to manage the development and marketing of their products (Figure 10.3). Under the Dharma Ruamjai Foundation, a structure was created to monitor and certify organic farmers adhering to the Moral Rice farmer vows.

Despite the significance of their ethical commitment to consumers, the Management Committee also decided to maintain IFOAM accreditation. Committee members expressed the view that IFOAM accreditation offered the added guarantee of product quality and access to diverse marketing channels. In the past few years, Moral Rice farmers have sold a wide variety of organic rice products to domestic retail shops and international exporters. Although there are only 119 Moral Rice farmers, this is a fourfold increase in membership over a seven-year period (2007–2014). Notwithstanding, there are another 400 Dharma Garden Temple farmers certified to IFOAM standards.

Sustainable practices

Moral Rice farmers learned about organic farming methods through diverse sources: family, friends, training courses, field visits and practical experience. Prior to joining the Temple, many members had relied upon synthetic agrochemicals, and few reported learning organic or traditional agriculture practices from family members. After attending the "Symbiosis: Moral Rice Organic Farmer School" participants learned the principles of organic agriculture together with Buddhist teachings. They

FIGURE 10.3
Dharma Ruamjai Foundation organization chart



Source: authors' elaboration.

were also encouraged to share the methods they learned on courses with friends, neighbours and farmers who relied on synthetic agrochemicals. Although most members acquired knowledge of organic agriculture from the Temple, some attended training in other provinces funded by CSOs and governmental organizations.

Dharma Garden Temple experts taught participants how to make and use organic fertilizers on their farms. They were also encouraged to create their own effective micro-organisms (EM™),[36] cultivate legumes to fix nitrogen in the soil and raise animals for manure (and as a source of income). Participants developed their own natural agro-inputs by combining methods learned in training with their own innovations. Moreover, Moral Rice and organic farmer members were required to use methods that were in accordance with IFOAM regulations.

Table 10.2 shows the different ways in which Dharma Garden Temple farmers fertilized the soil prior to planting rice: application of manure/home-made fertilizers, collective-produced fertilizer, propagation of effective micro-organisms and cultivation of green manure.

Organic methods were applied by farmers at different times of the year, based on the availability of natural resources, soil quality, proximity to a collective and their personal finances. As soil quality varied widely between farms (and on each section of the land), members reported there was no set standard or prescription for fertilizer use. Many (75 percent) members used fertilizer manufactured at the Dharma Garden Temple collective in combination with cultivated green manure (67 percent) on their farms. Most of the members (81 percent) accessed fresh manure from domesticated animals in their communities. EMs were produced at home and used by a significant number (94 percent) of farmers. In addition, members augmented soil fertility with rice straw, leaves and other foliage around their rice paddies.

Although Temple membership has offered farmers access to natural resources, the importance of technology was a critical factor in their success. Machinery helped

TABLE 10.2
Dharma Garden Temple farmers:* use of organic fertilizer methods (N=36)

	Yes (%)	No (%)	Total
Collective fertilizer	75.0	25.0	100
Animal husbandry	88.9	11.1	100
Green manure**	66.7	33.3	100
Fresh manure	80.6	19.4	100
Effective micro-organisms	94.4	5.6	100

* The sample includes both Moral Rice and organic farmer members; ** green manure refers to the cultivation of legumes and other nitrogen-fixing plants that are ploughed under to improve soil fertility.
Source: Kaufman, 2012b.

[36] Effective micro-organisms (EM): a highly concentrated liquid fertilizer and trademark of the Kyusei Foundation, Japan (Setboonsarng and Gilman, 1999). Thai farmers produce these biofertilizers themselves and refer to them by the trade name, EM.

to reduce labour inputs and bring members' finished products to market. The Temple facilities and associated village cooperatives provided access to milling, fertilizer-making equipment, packaging machines and delivery trucks. Wealthier members avoided hiring subcontractors to plough their fields by purchasing their own small tractors. Since many members reported a shortage of farmer family members, they were forced to subcontract the harvest process to outside labour or to those who owned harvesting machines. Nonetheless, members reduced costs by using the Temple's rice mill, fertilizer factory and packaging facilities. Moreover, even though many followers were neither Moral Rice nor organic farmers, the contribution of "One baht one day" played a part in sustaining the infrastructure at the Temple.

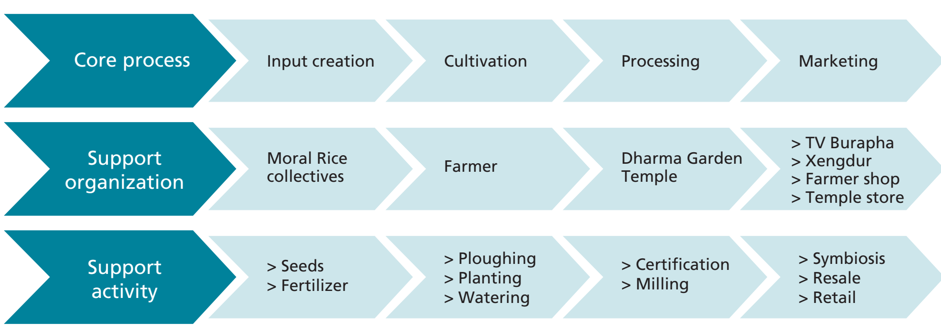
Markets for sustainable products and services

While the initial aim of Moral Rice was to communicate the spiritual and physical benefits of a shift to organic agriculture methods, the Management Committee recognized the importance of building a wide domestic consumer base. To extend sales to urban Thai people, Moral Rice called upon TV Burapha (a private enterprise that acts as a media channel for learning, encouragement and influencing society to build a better future). This alliance led to the creation of a value chain that encompassed all aspects of production, distribution and marketing (Figure 10.4).

In collaboration with TV Burapha and other commercial entities, Moral Rice developed four key marketing channels: (i) the "Symbiosis" programme; (ii) special events; (iii) speciality stores; and (iv) large retail outlets (Table 10.3).

Under the "Symbiosis" programme, rice products were destined for Bangkok-based consumers in what resembled a "farm-to-table" scheme. The primary aim of the programme was to make a contribution to society through the creation of a symbiotic relationship between farmers and consumers. Moral Rice representatives explained that farmers and rice consumers were brought together in a spirit of *kalyanamitta*. Symbiosis members signed up to receive shipments of rice to their homes for a period of three months, six months or one year and were required to make advance payment. However, not all rice managed under TV Burapha was branded as

FIGURE 10.4
Moral Rice value chain



Source: authors' elaboration.

TABLE 10.3
Moral Rice brand: marketing channels (2012/2013 fiscal year)

<table>
<tr><th>Marketing channels</th><th>Rice volume (tonnes)</th><th>Sales locations</th><th>Prices paid to farmers (30 baht = US$1)</th></tr>
<tr><td colspan="4">"Symbiosis" programme under the direction of TV Burapha</td></tr>
<tr><td>TV Burapha</td><td>35</td><td>Direct to customers' home</td><td rowspan="2">16 types: 1 kg bag: 75–150 baht/kg (organic certified)</td></tr>
<tr><td>Siam Paragon, Bangkok, the Mall (department store chain), speciality stores</td><td>15</td><td>Shopping malls and retail shops throughout Thailand</td></tr>
<tr><td>Xongdur Thai Organic Food Co. Ltd,* Bangkok</td><td>20</td><td>China, Hong Kong SAR, Singapore, European Union</td><td>50 kg bag: 47–70 baht/kg based on rice variety (organic certified)</td></tr>
<tr><td colspan="4">Moral Rice Network</td></tr>
<tr><td>Dharma Garden Temple shop and restaurant</td><td>10</td><td>Dharma Garden Temple</td><td>16 types: 1 kg bag: 75–150 baht (organic certified)</td></tr>
<tr><td>Kasetsart University farmer shop</td><td>20</td><td>Campus store</td><td>16 types: 1 kg bag: 75–150 baht (organic certified)</td></tr>
</table>

* Xongdur purchases Moral Rice, but markets products under its own brand.
Source: authors' elaboration.

Moral Rice. A large quantity was sold to the Xongdur Company (a Thai health food brand), which also exports rice-based food products to China, Hong Kong SAR and Singapore, as well as to the European Union (EU).

Moral Rice members cultivated popular heirloom rice varieties that were purchased from farmers at a premium price (Table 10.4). To maintain these rare and valuable rice varieties, members were encouraged to donate seeds to the Temple rice bank for future cultivation. For many of these rice varieties, market prices were higher than those grown through non-organic methods. Black rice was the most sought-after variety at a cost of 120 baht/kg to consumers. Another highly priced variety was mixed 3 jasmine rice, which combines several rare types in one product. The highest price was secured by *gaba* rice (a process whereby rice is sprouted and then milled to increase nutritional value). After cultivation, unmilled rice was transported to the Temple for processing. Products were milled, packaged and labelled in a small warehouse located in the Temple grounds. After processing was completed, packaged products were transported by the Temple's truck to customers in Bangkok and other major cities. Income from sales to Moral Rice retailers went directly to farmers. The small margin earned from retail and consumer sales was reinvested back into the Temple infrastructure.

While TV Burapha was entrusted with the largest quantity of Moral Rice products, the Temple also sold rice directly to consumers. At the Dharma Garden shop and restaurant (a registered community enterprise), Moral Rice was for sale alongside Thai branded health products, agricultural supplies and second-hand bicycles. The Temple also maintained an alliance with the Cooperative Academic Institute (CAI), Kasetsart (Agricultural) University. CAI not only provided a market for Moral Rice at the University farmer shop, but it gave the Temple a grant to carry out a participatory action research project on their various activities.

TABLE 10.4
Rice varieties with farmgate, wholesale and consumer prices, 2013

Rice variety	Paid to farmer: milled rice (Baht/kg)	Retailer group (Baht/kg)	Price to consumer (Baht/kg)
1. Brown Jasmin rice	42	53	75
2. Hand-milled rice	42	53	75
3. Wessuntra Brown Jasmine rice	45	55	80
4. White Jasmine rice	42	55	80
5. Red Jasmine rice	45	57	85
6. Hand-milled Red Jasmine rice	45	57	85
7. Mixed 3 Jasmine rice (Brown, Red and Black)	55	80	110
8. Black Jasmine rice	60	75	120
9. Brown Gaba Jasmine rice (Jasmine 105)	42	85	120
10. Wessuntra Brown Gaba Jasmine rice	45	85	120
11. Red Gaba Jasmine rice	45	85	125
12. Black Gaba Jasmine rice	60	95	135
13. Local Brown rice (Organic 150)	75	105	150
14. Yellow rice, Golden type	60	95	135
15. Short-grained Red Sticky rice	55	80	115
16. Hand-milled Red Sticky rice	44	60	95

Note: it takes 2 kg of unmilled rice to produce 1 kg of milled rice.
Source: authors' elaboration.

As for the 400 organic-certified Temple members who did not qualify under the spiritual requirements of Moral Rice, their products were sold via the newly established Thai Organic Agriculture Foundation. This umbrella organization (also managed by the Temple) created a market for Temple members and unaffiliated farmers to sell organic certified rice at Mini Big C convenience stores (located also at Bangchak petrol stations) throughout Thailand. For those farmers who had time to cultivate a surplus of organic vegetables, it sent their production to "green markets" at rural health centres. This initiative, largely supported by GN, has dovetailed with the Thai Government's preventive health campaign.

In spite of growing demand for Moral Rice's speciality rice products, as of 2013 there were only 119 "qualified" farmers. Moreover, Moral Rice's output of 100 tonnes represented approximately 3 percent of total EU organic rice imports (2013). Therefore, Moral Rice has yet to generate sufficient produce to meet the requirements of the global marketplace. And while data showed that nearly 70 tonnes of Moral Rice is destined for the tables of Thai consumers, only 50 percent of nationwide organic production is designated for local consumption (Thai Organic Trade Association, 2011).

10.4 RESULTS

Although financial benefits were a factor in the decision-making of Moral Rice farmers, they also learned the value of self-reliance. Members came to appreciate improvements in the natural environment on their farms and the bounty available to their families. While members enjoyed the benefits of the social capital they generated in their collectives, they also understood the necessity of working in groups to pool resources and access machinery. Not unlike farmers who are dependent on synthetic agrochemicals, Moral Rice farmers relied on technological innovations and private sector marketing initiatives. Consequently, financial capital was also critical to members' livelihoods and weighed upon their quality of life.

Despite a dependence on technological innovations, members perceived that there was a positive relationship between improvements in the biodiversity of their agro-ecosystems and their mental, physical and spiritual health. Members reported that their physical stamina improved as they shifted away from the use of synthetic agrochemicals and towards a diet based on home-grown organic food. Improved household food security was another important measure of their well-being. They cultivated fruit, vegetables, commodity crops and medicinal herbs. Some raised fish and livestock as an additional form of income. Organic rice paddies also offered a diversity of naturally available food sources. Moral Rice farmers reported that they shared food with less fortunate relatives, friends, neighbours and members of their collectives.

Significantly, as members spent more time on their farms to fulfil the demands of organic agriculture, they began to relinquish material desires. Buddhist teachings inspired the formation of these values and shaped participants' perception, treatment and valuation of the natural environment. These shared beliefs and values provided a lens through which members conceptualized their well-being. While the Five Precepts were the foundation of their values system, they raised their quality of life through practical applications.

- Physical health through the consumption of organic foods.
- Food security rather than production of surplus for sale.
- Reduction in expenditures by making organic fertilizers.
- Building social capital through membership in a collective.
- The Moral Rice standard as a source of pride and product integrity.

Members came to understand the benefits of organic agriculture in terms of their overall well-being: better health, food security, reduced debt and the quality of relationships with their peers. While Moral Rice contributed to farmers' spiritual development, it was also critical to achieving financial security.

10.5 CONCLUSIONS

Governmental agricultural policies and fluctuations in global rice markets have played an important part in the decision-making of Thai farmers. Along similar lines, Dharma Garden Temple farmers were also attracted by price premiums and access to the organic marketplace. While membership in Moral Rice offered comparatively higher farmgate prices, the Temple also constructed marketing channels for those organic farmers who have not yet embraced the Five Precepts. Moreover, all Temple members benefited from access to low cost fertilizers, milling machines and a depository of knowledge about organic agriculture methods.

Despite the advantages of joining Temple programmes, many farmers continued to grapple with a lack of surplus capital, farm machinery, small landholdings and poor water access. There was also a shortage of home-based labour. As members' offspring sought higher degrees or better paying jobs in the city, most Moral Rice farmers were forced to subcontract farm labour. Labour shortages are one of the many obstacles to sustaining and expanding Moral Rice beyond the borders of Yasothon province.

Although the number of Temple followers has risen rapidly, less than 25 percent of the 2 000 Dharma Garden Temple Social Welfare Fund members have completed the transition to organic agriculture and barely 10 percent have qualified as Moral Rice farmers. While acceptance of the Moral Rice guidelines offers potentially greater spiritual and physical well-being, it is a challenge for farmers who must manage both their personal lives and rice plots accordingly. In addition, product assurance is provided by a "circle of trust" that takes the place of an accreditation body and no certificate is issued to qualifying members. Based on researchers' findings, the Moral Rice standard may be more accurately described as a process of continuous personal improvement, rather than a form of certification. To ensure consumer trust in their products, Moral Rice farmers have chosen to maintain IFOAM accreditation.

In terms of building membership at domestic and global levels, Moral Rice faces a number of political, social and economic obstacles. On the economic front, Moral Rice's values are clearly in opposition to the global consumer society to which rural dwellers wish to belong. Hence, the challenge of spreading this innovation across international borders or even across Thailand entails a major paradigm shift. While scholars may advocate a society based around the Five Precepts (not to kill, steal, commit adultery and refrain from lies and intoxication), only a fraction of people are willing to follow a morally righteous path. Consequently, the spiritual and physical benefits of Moral Rice may be insufficient to attract a wider community of farmers and consumers.

Although this case exhibits some of the benefits of living by a "sufficiency economy", members of the Temple community relied on many of the same technological innovations ascribed to modern agriculture. Furthermore, it could be argued that the success of Moral Rice hinges on a less ethical urban consumer base (55 percent of sales volume in 2013). In spite of these deficiencies, Moral Rice's farm-to-table scheme offers farmers, households, intermediaries and manufacturers inclusion in a novel producer-consumer network that bypasses the commercial food supply chain.

10.6 RECOMMENDATIONS

While CSOs and governmental agencies in Yasothon province have done much to promote organic agriculture, the majority of Thai farmers rely on synthetic agrochemicals to sustain their rice paddies. The challenge for Moral Rice and other faith-based sustainable agriculture initiatives lies in changing farmers' and consumers' values and practice. Consequently, a two-pronged approach is suggested: (i) educate farmers and consumers on the benefits of Moral Rice; and (ii) provide farmers with the tools to sustain organic production systems in line with Moral Rice guidelines.

In some cases, Thai government agencies have funded training courses in organic agriculture, but have not provided the tools or the resources necessary to maintain production systems at village level. To overcome these deficiencies, governmental efforts should take on a more collaborative approach that assesses farmers' progress and needs. Government agencies and academic institutions could also benefit from developing programmes that dovetail with Moral Rice programmes.

In spite of the benefits of high farmgate prices for growers, elevated costs make organic food too expensive for most Thai consumers (Roitner-Schobesberger *et al.*, 2008). While Moral Rice has focused on building its domestic consumer base, it is no less costly than other organic products in the Thai marketplace. In this respect, it would be beneficial if government agencies were to funnel support to organic farmers as a means of bringing their prices in line with products grown through high-input intensive agriculture methods.

Moral Rice farmers have reduced their dependence on some costly technologies through working together in small collectives. However, the advantages of membership in organic agriculture collectives are not only about access to production factors. Farmers benefit from cultivating friendships, exchanging knowledge and establishing trusting relationships. As Moral Rice grows in membership, it will have to retain the integrity of its network by nurturing the development of village collectives. CSOs and governmental programmes should funnel their efforts at building the capacity of rural collectives to sustain organic agriculture.

Although community-based collectives are critical to sustain organic agriculture, farmers are first and foremost part of families. Not unlike *chemi* farmers, Moral Rice members also have families who seek greater inclusion in the global economy. While critics of faith-based initiatives argue that marketing schemes are the only leverage point for a shift away from conventional agriculture, this case shows that the adoption of Buddhist values has helped many Thai farmers to sustain organic agriculture. Nevertheless, farmers' mindsets are also influenced by their families, collectives, communities and the larger networks in which their livelihoods are embedded.

Postscript

The authors collected the data for this Chapter from Y2007 to Y2014. In 2016, it came to the authors' attention that the Moral Rice Network had undergone major changes. The collective documented in this research had splintered into three different sustainable agriculture groups. One of the collectives (with approximately 30 members) decided to become a "community enterprise" making it eligible for government assistance and other benefits (but continued to contribute to the Temple's "One Day One Baht" social welfare fund). Another group merged with the larger "Saatchatham" sustainable agriculture group (nearly 300 members) in neighbouring Amnat Charoen province. "Saatchatham" also took over from Moral Rice as the key supplier to the TV Burapha Symbiosis Program. This schism left the Moral Rice group with only 80 members (from a peak of 119 members in 2015). It was reported that Moral Rice farmers have maintained accreditation under IFOAM and continue to follow the Five Precepts. Sources say the schism is in part due to lower than expected sales in 2015 and an unpaid loan used to acquire a rice transportation vehicle. One of the leaders of Moral Rice stated that he has taken on financial liability for the repayment of the loan. The types of problems encountered by the Moral Rice Network are common to many of the community-embedded sustainable agriculture initiatives found in Thailand. In spite of the setbacks encountered by the Moral Rice Network, their work offers a lesson in the importance of balancing power and responsibilities among different members.

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Chapter 11
Brasso Seco Paria community in Trinidad makes agritourism its business

Roxanne Waithe

11.1 INTRODUCTION

Brasso Seco Paria is a small rain-forest community in the northern mountain range of Trinidad. Historically, about 5 000 people lived in and around the village and cocoa, coffee and bananas were the economic mainstay of the area. However, as commercial agriculture declined, so did the population. Currently, there are about 350 Brasso Seco inhabitants.

The Brasso Seco Tourism Action Committee (TAC) was formed in 1997 as a community-based organization (CBO). At that time, its stated goals were to conserve the area's resources and enhance the lives of its inhabitants through sustained economic development. Originally, the group's main activities consisted of organized rain-forest hikes and birdwatching expeditions.

Today, most of the income earned by Brasso Seco TAC is derived from agroforestry and agritourism. Innovation in the Brasso Seco community is driven largely by three factors:

- the need for the villagers to earn money;
- a communal desire to preserve the rural agricultural heritage;
- the will to increase local productivity through youth participation and entrepreneurship.

For these reasons, the innovative approach utilized by Brasso Seco TAC involves a combination of new products, new production processes, new markets, new strategic partnerships and a quest for new entrepreneurial opportunities. This case study examines the agritourism value chain arrangement employed by Brasso Seco TAC and documents the lessons learned from its experience.

Country background

For decades, Trinidad and Tobago experienced economic growth fuelled primarily by their energy sector and over time the economy has become quite dependent on revenue from this area. During the same period, the contribution of the agricultural sector fell from 2 percent of total gross domestic product (GDP) in 1997 to just 0.7 percent in 2012 (Government of Trinidad and Tobago, 2012). Tourism development was also afforded low priority because of the strength of the petroleum sector.

However, the economy has become vulnerable because of fluctuations in oil prices, resulting in more attention being given to diversifying the economy towards tourism and other types of non-petroleum development. The Vision 2020 Tourism Strategic Development Plan (Government of Trinidad and Tobago, 2004) identifies tourism as a growth driver and a source of diversification away from energy.

Similarly, the Government is keen to develop the agricultural sector as global food prices continue to rise in tandem with the country's food import bill. Despite its low contribution to the national GDP, the Government recognizes the importance of the agricultural sector for supporting rural livelihoods. Goal 5 of the Strategic Plan 2011–2015 refers to "securing the interest of agriculture, fisheries and food production" in order to add value to agricultural development and food security in Trinidad and Tobago (Government of Trinidad and Tobago, 2011a).

One of the thrusts for agricultural development is the revitalization of the cocoa and coffee industries, given their potential to make a more significant contribution to the national export economy. The International Cocoa Organization (ICCO) acknowledges Trinidad and Tobago as one of eight producing countries classified as producers of 100 percent fine flavour beans (Van der Kooij, 2013).

Trinidad and Tobago also seeks to promote environmental sustainability through the protection and conservation of its natural resources. Forestry is included as part of the agricultural sector and the Forestry Division has primary responsibility for management of national forests and forest reserves, including state-owned plantations. However, there is limited capacity to patrol the forest to prevent illegal activities. National Parks officers therefore depend on surrounding communities for information about illegal forest activities. Through the National Reforestation and Watershed Rehabilitation Programme (NRWRP), the Forestry Division selects community groups to replant degraded rain forest and protect watersheds.

Case study methodology

The case study was primarily informed by a site visit to Brasso Seco Paria and an in-depth round-table discussion held with the executive members of Brasso Seco TAC (25 November 2013), who gave critical feedback on the original case study proposal. A desktop review of new initiatives, projects and policies related to agriculture, tourism and agroforestry in Trinidad and Tobago was also undertaken. Formal interviews were conducted with the following technicians over the period 26–27 November 2013: Community Development Officer, Ministry of Community Development; two technical officers from the University of the West Indies (UWI), Cocoa Research Centre, St Augustine Campus; a technical officer from the Caribbean Natural Resources Institute (CANARI); and the Inter-American Institute for Cooperation on Agriculture (IICA) Trinidad and Tobago technical team.

Case outline

This paper is organized into seven sections. The first places the study in context and sets the stage for the discussion in sections 2 and 3 on innovation and sustainable practices utilized by Brasso Seco TAC. Enabling agents that contribute to the operation of the agritourism value chain are highlighted in section 2. Section 4 examines the range of products and services in more detail with some emphasis on market supply and sustainability. In section 5, the focus is on the results and benefits of Brasso Seco TAC's activities. The final chapter imparts the lessons of the case with an indication of the impact that Brasso Seco TAC has had at national level, and what are the anticipated challenges to further development in this community.

11.2 INSTITUTIONAL LANDSCAPE

Since Brasso Seco is a small close-knit community, it has traditionally engaged in participatory planning and consultations to make important decisions for the village. This custom has helped to ensure local ownership of Brasso Seco TAC's development plans. However, it is important to recognize the national policies and technical agencies that create enabling environments to support the development of community enterprises and services.

National development policies

The Government of Trinidad and Tobago has numerous social and economic policies that support community-based and rural development. Some are structured as strategic action plans, for example, plans for key areas including biodiversity and protected zones (Ministry of Planning and the Economy, 2012). Other policies such as the National Tourism Policy of Trinidad and Tobago (Ministry of Tourism, 2010) are tied to legislation and, in this case, direct the implementation of the tourism action plan. In other cases such as the National Protected Areas Policy (Government of Trinidad and Tobago, 2011b), proposed actions call for participatory approaches to achieve the strategic objectives.

Despite the somewhat complex policy framework, it is clear that the creation of sustainable livelihoods for rural communities, enabling them to be involved in their own economic development, is a government priority. Some of the policies and programmes that have had significant impact on Brasso Seco TAC are shown in Table 11.1.

TABLE 11.1
Policies and programmes impacting on Brasso Seco TAC

Policy	Agency responsible	Enabling feature
National Biodiversity Strategy and Action Plan, 2001	Environmental Management Authority	Public participation in the development of government policy for the conservation and management of biodiversity
National Protected Areas Policy, 2011	Forestry Division NRWRP	Community participation in management of the nation's forests
Community Development Fund Programme, 2011	Ministry of Community Development	Partnering with NGOs to support community-based projects
National Tourism Policy of Trinidad and Tobago, 2010	Tourism Development Company Limited (TDC) (TIDCO was replaced by TDC in 2005)	Working with local communities to build sustainable tourism products Provide tourism education and training Promote tourism events, products, sites and attractions

Source: authors' elaboration.

Technical support

Brasso Seco TAC has received technical and financial support from several public sector agencies and NGOs. Specifically, they have forged strategic partnerships with the following agencies:

- Ministry of Community Development
- UWI Cocoa Research Centre
- Caribbean Natural Resources Institute (CANARI)
- Inter-American Institute for Cooperation on Agriculture (IICA).

The Ministry of Community Development provided financial assistance specifically for Brasso Seco to package its coffee and cocoa products. The intention is to provide continued technical advice and support to this sector, using the ministry's export centre and Web portal to start regional and international sales for Brasso Seco's products.

Based at the University of the West Indies (UWI) St Augustine campus, the Cocoa Research Centre provided training in cocoa agronomy for Brasso Seco TAC, since cocoa production is a new venture for the group. The farmers learned good agricultural practices for pruning, post-harvest activities (fermentation and drying), and disease control and establishment (preparation of fields and soil, and rehabilitation). The cocoa plantation in Brasso Seco had been lying fallow for more than a decade until the committee negotiated access to work the land. The Cocoa Research Centre undertook significant capacity building for community members, as well as practical work in reviving the cocoa plantation, but it anticipates that Brasso Seco TAC will need further training in cocoa agronomy and chocolate making. Dr Darin Sukha of the Cocoa Research Centre considers that value-added processing of cocoa can significantly increase the income-generating capacity of rural communities such as Brasso Seco. Cocoa beans and residues from the cocoa manufacturing process can be used to make products such as unrefined and refined chocolate, cocoa butter and other commercially valuable products such as poultry and livestock feed, fertilizers and soap.

Brasso Seco TAC members have been attending meetings held by CANARI since 2010. They are one of six communities involved in CANARI's Rural Livelihoods programme. Brasso Seco was included in two projects associated with this programme, namely:

- improving livelihoods in rural communities in Trinidad and Tobago by developing small business ideas based on the sustainable use of natural resources; and
- capacity building for watershed management stakeholders in Trinidad and Tobago.

The main objective is to build the community's capacity to develop small enterprises by optimizing the use of its natural environment. CANARI works in partnership with other technical agencies such as the United Nations Development Programme (UNDP), FAO and the Cocoa Board to administer its projects and plans to include Brasso Seco in its future projects.

Through IICA's agritourism programme, Brasso Seco TAC has received technical advice for its agritourism activities and events. IICA has improved capacity within the community by sponsoring TAC members to attend various workshops and seminars on agritourism and marketing. Some members were afforded the oppor-

BRASSO SECO TAC ENTREPRENEURIAL INNOVATION

Annual indigenous wild meat Cook Fest (2001)

Construction of a visitor facility in Brasso Seco (2004)

Contracted by the National Reforestation and Watershed Rehabilitation Programme to preserve forest and beach areas (2005)

Commenced rehabilitation of a state-owned 15-acre (6-ha) abandoned cocoa and coffee estate in Brasso Seco (2006)

Cocoa and coffee products officially launched (2010)

Agritourism Business Plan developed (2012)

tunity to visit the Belmont Estate on Grenada, and Dove's Tobago Cocoa Estate to interact with experts on agritourism and organic cocoa production. Some marketing assistance was also provided for the design of labels for members' products, and storage bins were installed in Brasso Seco's cocoa and coffee house.

11.3 INSTITUTIONAL INNOVATION: BRASSO SECO TAC

Background and organizational structure

Brasso Seco TAC aims to generate sustainable employment for members of the community, using the natural environment and its indigenous agricultural heritage. TAC has demonstrated its commitment to this cause in a range of ways, including empowering its members by providing training opportunities in areas such as tour guiding, micro-entrepreneurship, customer service, first aid and catering. In 1997, the government-run Tourism and Industrial Development Company of Trinidad and Tobago (TIDCO) sponsored a thrust involving 12 rural communities in the management of their tourism resources through a community-based tourism action programme. This led to the creation of a number of TACs. Brasso Seco TAC is one of the few remaining today.

Through its *innovative institutional approach*, Brasso Seco TAC promotes and preserves its natural environment and safeguards local cultural traditions. In 2000, TIDCO hosted an intercommunity culinary competition in Brasso Seco. The following year, Brasso Seco TAC adopted the event as a community-based Cook Fest held in October during the traditional wild meat season.

Brasso Seco TAC's second strategic move was to construct a visitor facility with assistance from TIDCO to improve the ecotourism experience for hikers and birdwatchers, and to expand its mix of products and services. The plan was to use the visitor facility as the assembly point for dealing with hikers, and sell food and crafts made by community members.

The visitor facility, which is managed by the executive team of Brasso Seco TAC, is now staffed with eight people from the community and is the hub of all commercial activity in the village. The multipurpose site is used for selling locally made goods, as a ground tour operator to arrange for community home stays and rain-forest tours, and as a venue for special events, functions and meetings.

Third, the committee made a successful bid in 2005 to become a contractor for NRWRP to help conserve the nearby rain forest. This project provides employment for 35 community members, who are responsible for the creation and maintenance of 12 hiking trails, benches and sheds made from natural materials in the forest, and strategically placed signs along the pathways.

The following year (2006), Brasso Seco TAC, with support from the Ministry of Tourism, negotiated access to a 15-acre (6-ha) parcel of land that was formerly a cocoa and coffee plantation. IICA provided technical support for the rehabilitation of the plantation and since then the community has been producing cocoa and coffee products.

In 2012, Brasso Seco TAC developed an Agritourism Business Plan that specifically outlines how the group proposes to use the rehabilitated cocoa and coffee estates, cocoa and coffee production facilities, and visitor facilities to increase employment opportunities for members of the community.

Innovation in governance – Brasso Seco TAC

Brasso Seco TAC demonstrates that a well-organized committee is in a better position to manage its natural and human resources in a sustainable way. Its strategy for governance is based on participatory methods of planning and management and sensitivity to community needs. Membership of the Brasso Seco TAC comprises the entire community but the affairs of the village are managed by a 14-member executive committee with specific technical designations, as shown in Table 11.2.

PHOTO 11.1
Brasso Seco cocoa drying facility

© IICA (Inter-American Institute for Cooperation on Agriculture)

TABLE 11.2
Brasso Seco executive committee's technical areas of governance

Brasso Seco technical areas of governance	
1. Sports	8. Religion
2. Youth	9. Culture
3. Senior citizens	10. Environment
4. Women's affairs	11. Agriculture
5. Village Council	12. Ecotourism
6. Business	13. Health
7. Politics	14. Education

Source: authors' elaboration.

The executive committee members are elected at an Annual General Meeting. From this panel of 14, individuals are elected for the positions of president, vice-president, secretary, assistant secretary, treasurer, public relations officer and two trustees. This core group is responsible for hosting monthly community meetings and ad hoc sessions as needed with people from the village.

Because of its institutional strength, Brasso Seco TAC is successful in gaining support for social and economic development in the form of financial flows, technical and capacity building from the public sector, private sector, NGOs and research institutions.

The Toco Foundation – a comparable initiative

The Toco Foundation was originally formed in November 1997 as a community-based multimedia centre for regular agricultural radio programming. Toco is situated on the relatively remote northeastern tip of Trinidad and is the closest point to the sister isle of Tobago. Initially, Radio Toco 106.7 FM served the single village of the Toco community through information sharing and educational programmes related to agriculture and environmental conservation.

As the foundation's broadcast range increased to include 14 villages, collectively referred to as the Toco Region or the Matura to Matelot Region (M2M), it evolved to meet the needs of its rural audience. The foundation is now a registered NGO, which currently employs 65 people. Its main objective is to provide training and professional development for people in the communities it serves, specifically in the areas of wildlife farming, protection of existing biodiversity, organic farming methods and the development of nature trails for ecotourism purposes.

This objective is accomplished through three main activities:

- a communications network that continues to educate and inform listeners with radio programming, including health advice, consumer and environmental capsules, farming, news items and Caribbean music;
- a Social Services Delivery Unit to assist in social strengthening of the participating communities through a parenting project, and a youth and sexuality project; and
- an Agritourism Programme that involves a young farmers' project and a Farmers' Training Institute, a hospitality and accommodation centre, turtle protection, ecotours and environmental protection projects.

Comparably, the Toco Foundation and Brasso Seco TAC operate a similar system of community empowerment to promote economic development through agriculture and environmental preservation. However, their innovations differ in scope and focus. The main thrust of the Toco Foundation is capacity building, with its work having a significant impact on over 100 000 rural individuals in Trinidad's northern region.

Brasso Seco TAC is concerned with enriching the lives and increasing the incomes of the 350 people in its village. Its efforts are more concerned with entrepreneurship.

Sustainable practices

Brasso Seco TAC strives to promote high standards of sustainability in agriculture, environmental management, indigenous agricultural heritage and community involvement. The most notable actions for sustainable development are detailed under three broad themes: agriculture, agritourism and agroforestry.

Sustainable agriculture

Significantly, the Brasso Seco agricultural community is involved in reforestation. This activity promotes soil conservation and farming practices that place lower demands on the productivity of the available arable land.

The executive members of Brasso Seco TAC admit that organic farming is new to Brasso Seco farmers. Of the approximately 100 farmers whose main source of income is agriculture, only three practise strictly organic farming. However, local farmers generally apply ecological principles that conserve natural resources, lower the need for chemicals and pesticides, and make the transition to organic farming much more feasible.

Crop rotation is one of the oldest and simplest means used to maintain the health of soil, reduce erosion and weather damage, and control pests. Brasso Seco farmers use rotten wood from the surrounding forest for mulching to improve soil fertility and fallen trees are also used as barriers for certain crops. Since the village is located in a rain forest, limited irrigation is a customary sustainable farming practice.

Most of the crops grown and sold in Brasso Seco are long term, with the exception of christophene (*Sechium edule*), also known as *chayote*, *mirliton*, *cho-cho*, *pipinola* and vegetable pear. It is the single most important commercial crop produced by local small-scale farmers, who refer to it as "green gold". Christophene is grown on vines on the shady, cool mountain slopes in Brasso Seco with vertical farming methods that combine terracing and the use of poles and wires to hold up the vines.

BRASSO SECO TAC SUSTAINABLE AGRICULTURE

1. Crop rotation
2. Soil fertility management
3. Crop diversity
4. We eat what we grow

PHOTO 11.2
"Green gold" growing on the hills

Given farmers' involvement in agritourism, crop diversity is encouraged. Brasso Seco farmers have to produce a variety of foods for the local farmers' market, for preparation at functions and events, and for making value-added products such as jams and jellies.

A key sustainability factor is that Brasso Seco villagers grow and buy locally. They eat what they grow and grow what they eat. For these villagers, this is not a marketing campaign or an abstract concept, but a way of life that helps to enrich the community. They can effectively feed themselves. This practice also helps to preserve agricultural and culinary customs because young people grow up with some knowledge about how to produce a variety of foods and how to prepare them using traditional methods.

Sustainable agritourism

According to the World Travel & Tourism Council (WTTC, 2015), domestic travel spending generated 50.4 percent (US$835.9 million) of Trinidad and Tobago's direct travel and tourism GDP in 2014, compared with 49.6 percent for visitor exports (i.e. foreign visitor spending or international tourism receipts). Domestic travel spending is expected to rise to US$997.2 million in 2025. The global recession has spiked an interest in national home stays and domestic excursions, giving the Brasso Seco community access to the local tourist market.

BRASSO SECO TAC SUSTAINABLE AGRITOURISM

1. Agro-ecotourism – birdwatching, camping, hiking
2. Agritourism related to cocoa and coffee production
3. Indigenous food festival
4. Community/village home stays

The agritourism value chain exemplified by Brasso Seco's management approach is derived from its distinctive mix of products and services that collectively make each visitor's experience unique and unforgettable. Additionally, its agritourism activities benefit farmers by providing markets in this rural area where the population is small and consumer demand low. The short food supply chain brings farmers, agroprocessors and food service operators closer together, exactly matching new types of supply and demand to meet visitors' needs. The value chain components are considered below.

Agro-ecotourism plays an important role in Brasso Seco because TAC is expected to keep, preserve and use the forest hiking and birdwatching trails and natural watercourses responsibly. Part of this charge involves determining the maximum amount of trekkers on each tour and reporting incidents of damage caused by irresponsible tourists.

Organic cocoa and coffee production generates its own assortment of agritourism activities. For instance, visitors to the community can learn about and experience the process of taking cocoa and coffee from "the tree to the table". The tree experience starts on the 15-acre (6-ha) Brasso Seco cocoa and coffee estate, where guests can get involved in picking, cracking, sweating, drying and shelling the beans. In the cocoa and coffee house, visitors have the opportunity of using the manually operated machine to grind the beans into a powder for making various beverages and for flavouring other types of foods.

In September 2010, Brasso Seco TAC, in collaboration with IICA, the Ministry of Tourism and the Ministry of Food Production, Land and Marine Affairs, hosted a signature event themed "An Exotic Evening of Cocoa and Coffee Tasting". The aim was to introduce the community of Brasso Seco's cocoa and coffee products to hoteliers, owners of bed and breakfast facilities, and other tourism stakeholders in an effort to encourage these operators to purchase Brasso Seco's products. During the Sustainable Tourism Conference in April 2013 (STC-14), Brasso Seco TAC was selected by the Caribbean Tourism Organization (CTO) to host the agritourism study tour, giving patrons an insight into its brand of community-based agritourism.

Brasso Seco's culinary traditions are a distinctive feature of their agritourism experience. Its old-time ways of preparing food include the use of a mud oven for baking treats such as cassava bread and its specially cooked "buccaneer meat", which is first preserved and then smoked over an open flame. Their annual Cook Out, held in October, allows the Brasso Seco community to showcase its full range of culinary skills. The central theme for this event is "Life as it used to be".

The event attracted approximately 400 patrons in 2013 and featured new blends of cocoa and coffee icecream, local confectionery and "jungle juices" that were served instead of carbonated beverages. The entire community is involved in this event: farmers, agroprocessors, cooks, tour guides, entertainers, village hosts and helpers.

Brasso Seco TAC also organizes community home stays that allow visitors to interact with people in the village and become involved in traditional ways of agriculture still existing in this rural area. Tourists can help to harvest crops, learn how to grow vegetables or how to convert freshly picked fruit into jam and chutney.

Sustainable agroforestry

In 2011, the Government of Trinidad and Tobago introduced a new forest policy that allows rural communities to participate in management of the nation's forests. Through its contractual relationship with NRWRP, Brasso Seco TAC was afforded a major opportunity to improve its capacity for forest management.

In 2012, Brasso Seco TAC was selected to participate in an FAO-funded three-month pilot project jointly administered by CANARI and the Forestry Division of Trinidad and Tobago to formulate a community-based site plan for the sustainable use of forest resources in its area.

This project encouraged a community-based approach to forest management planning that produced significant results. The Brasso Seco community first engaged in discussions to identify forest resources and then, with technical support and training from the project facilitators, villagers learned how to use Global Positioning System (GPS) receivers to plot the location of forest resources. The Brasso Seco community documented its plans for forest resources, using videos and photography, and has produced five forest resource profiles that include a description and plan for the following areas:

- cocoa house;
- forest and forest trees;
- river and springs;
- rustic lodge site;
- cocoa and coffee plantation.

Brasso Seco's forest environment has a rich ecology and biodiversity that attract researchers who carry out studies on forest plants, insects, animals and birds. The dynamic research conducted by visiting scientists and academics supports environmental conservation. To date, studies have been conducted on the ecology of the Paria River, and on several animal and plant species in the surrounding rain forest. Social researchers have also conducted studies as to how villagers use plants (ethnobotany) and on the effects of ecotourism development on the Brasso Seco community.

Markets for sustainable products and services

Although the Brasso Seco community depends on agriculture for its livelihood, Brasso Seco TAC does not manage the affairs of village farmers. The visitor facility serves as a local market outlet for fresh and processed foods, but farmers deal individually with city traders who purchase produce in bulk and then sell to

BRASSO SECO TAC SUSTAINABLE AGROFORESTRY

1. Forest management planning
2. Community-based participatory approach
3. Capacity building of village members
4. Documentation of plans for forest resources

supermarkets, hotels, restaurants and other consumers. For this reason, it is difficult to assess the real volume and value of produce grown by the farmers. The sustainability routes that Brasso Seco TAC and village farmers use to market their cache of products and services are identified as follows.

Brasso Seco supply chain

Brasso Seco farmers know the local traditional uses of their commodities, and their production system is substantially influenced by the community's needs. Brasso Seco TAC helps to organize sales in the community market and networks with local farmers to supply produce and processed goods for their ventures. In this way, it performs a marketing role while generating good business for itself. The supply chain starts with an interlocking trading system that works to support the indigenous market and then extends to consumers in other areas.

Given that cocoa and coffee production is still in its early stages, the chain to get products to market is very simple. Members of Brasso Seco TAC grow, harvest and process the beans, package the products and distribute them through the visitor centre or by special order. The supply chain for agritourism is different from the agriculture structure because the main market (tourists) has to come to Brasso Seco to gain access to its products and services.

Brasso Seco TAC accounts for three main sources of income:

- the NRWRP contract;
- agritourism activities;
- cocoa and coffee production.

Table 11.3 illustrates the value chain infrastructure for Brasso Seco TAC's agriculture, agritourism and agroforestry schemes.

Brasso Seco TAC market promotion methods

Brasso Seco TAC has established a distinct community brand based on its distinctive rural experience, which attracts visitors, public sector agencies and technical organizations. The specially branded coffee and cocoa products bear the name of the mountain on which they are grown. They are attractively packaged in travel/taster sizes and for regular household use.

The committee manages a Web site (http://www.brassosecoparia.com), which is the primary marketing tool for communicating the benefits of the range of its products and services, and directing visitors to the village portals.

The Brasso Seco community is featured in *The Rough Guide to Trinidad and Tobago* (2015), a comprehensive publication that showcases must-see places, exciting activities and local cuisine, with photos and maps.

The visitor facility is strategically located at the entrance to the village, and the signs have enough impact to draw visitors in to make inquiries. The public relations function is handled by a designated Brasso Seco TAC executive committee member who coordinates meetings with corporate entities and other key stakeholders. This officer also deals with visitor services that are arranged via Internet.

TABLE 11.3
Brasso Seco TAC value chain infrastructure

	PRODUCERS and products/services	PROCESSORS and distributors	Consumers
Agriculture 	**FARMERS** Bananas Citrus fruit Root crops Herbs and spices Vegetables Coconuts Cocoa, coffee Anthuriums and lilies	**BRASSO SECO VILLAGERS AND BRASSO SECO TAC** Traders Brasso Seco TAC	Brasso Seco community Tourists Retailers Other nationals
Agritourism 	**BRASSO SECO TAC** Airport shuttle service Village tours Community home stays Cocoa and coffee plantation tours Hiking tours Birdwatching tours Culinary festival	**BRASSO SECO VILLAGERS AND BRASSO SECO TAC** Brasso Seco TAC	Local and international tourists
Agroforestry 	**GOVERNMENT OF TRINIDAD AND TOBAGO (NRWRP)** Hiking Harvesting of medicinal plants	**BRASSO SECO COMMUNITY** Brasso Seco TAC Independent ground tour operators	Brasso Seco community Tourists Other nationals

Source: authors' elaboration.

PHOTO 11.3
Brasso Seco Paria packed coffee

PHOTO 11.4
Brasso Seco Paria TAC Visitor Facility

11.4 SUSTAINABILITY OF RESULTS AND BENEFITS

Brasso Seco TAC's work in the community has made an impact in terms of human resource capacity (skills), knowledge and understanding of sustainable agriculture and agroforestry, and infrastructure development. These impacts are manifest through the level of community action and interaction, in addition to an agritourism value-chain function and the continued environmental governance and preservation of agricultural heritage elements.

This evaluation of the sustainability of the initiative is evidenced by:

- the level of collaboration and practical involvement between TAC, the Ministries of Agriculture and Tourism, and regional and international NGOs for the development, funding and implementation of agritourism and agroforestry;
- the investment in infrastructure for the revival of the local cocoa and coffee plantation;
- Brasso Seco TAC's consistent efforts to find sustainable interventions to improve the well-being and livelihoods of its village members through training, development of new enterprises and community-based forest management.

The potential for sustainable agritourism and agroforestry in Brasso Seco is viable because of the cross-scale institutional linkages that have been formed at village, national and international levels. At local level, Brasso Seco TAC has organized its own structure to implement ways to utilize common resources. The formal rules and legislation for managing resources are dealt with by national government agencies, while Brasso Seco TAC has been empowered to mobilize and direct grassroots efforts for conservation of the surrounding forest. Additionally, international organizations such as IICA have provided technical support and seed funding to advance the community-based initiatives. These cross-scale institutional linkages provide enabling conditions for sustainable results to continue over time and spread throughout the Brasso Seco community.

Sustainable benefits

Brasso Seco TAC's agritourism and agroforestry endeavours have accrued positive benefits for all stakeholders involved. In the first instance, the agritourism experience provides a consumer market niche for farmers that requires little marketing effort on their part. Farmers also have an increasing appreciation of agritourism as a revenue stream because locals from outside the village and international visitors are finding out about their agricultural products. The revival of the cocoa and coffee industry in Brasso Seco presents another opportunity for increasing the long-term sustainability of farming in the area.

From a community perspective, Brasso Seco TAC's operations generate revenue for the locals who provide services such as tour guiding, catering or accommodation for tourists. The visitor facility, cocoa house, huts, and benches along the hiking trails have all been installed as a means of upgrading community facilities for residents and visitors. The indigenous Cook Festival helps to preserve local culinary traditions, arts and crafts. The agroforestry contract with NRWRP ensures protection of the natural environment for tourists and residents.

Consumers who use Brasso Seco's products and services enjoy the benefits of customized service and extraordinary experiences in a well-preserved natural environment.

Challenges for growth

While there are tangible and intangible successes, Brasso Seco TAC faces some difficulties to be overcome. There are also some potential opportunities for growth and development that remain untapped. The main challenges for growth identified by Brasso Seco TAC and their strategic partners are:

- securing committed involvement from community members, even though there is transparency and public knowledge of plans;
- serious illiteracy in the village;
- village farmers have not yet formed a trade association;
- there is a need for more diligent recordkeeping pertaining to income-generating activities;
- the transition from a community-based organization to a business entity that can efficiently manage the cocoa and coffee estate in addition to all other activities;
- limited levels of output for value-added products from coffee and cocoa;
- lack of human resources and limited involvement of youth in agribusiness activities;
- the Land Settlement Agency and farmers need to deal with land tenure issues;
- the forest is a shared resource and there are issues with accessibility regarding unlicensed and independent ground tour operators bypassing the visitor centre and taking large groups through the forest.

Opportunities for growth

Brasso Seco TAC's strategic partners pinpoint several opportunities for growth.

- There is potential to gain access to funding for scientific research on account of prior work by certified bird bander Carl Fitzjames of Brasso Seco TAC. Mr Fitzjames has worked with scientists from several universities, monitoring the migratory patterns of different species of birds for research and conservation purposes.

- Sponsorship and partnership with neighbouring businesses and communities.
- Through the Ministry of Community Development's export centre, Brasso Seco has a medium for marketing its products on a regional and international scale.
- Brasso Seco TAC could be the catalyst group for initiating an island-wide cocoa revival in Trinidad and Tobago; the best cocoa in the world is a major selling-point.
- Chocolate manufacturing is a potential revenue stream.
- Speciality foods could be produced for hotels and restaurants.
- A Brasso Seco recipe book could be produced, featuring indigenous cooking.

11.5 CONCLUSIONS

The conclusions to this case study can be summarized as a series of lessons learned. The first lesson in the case of Brasso Seco TAC is that their endeavours succeed because the group is well organized, well informed and seriously motivated. It is a case of community collaboration at its most effective.

The second lesson is that the case exemplifies a way for sustainable agritourism to be developed through the conservation of natural resources and empowerment of rural communities.

The third lesson is that the success of a community-based initiative often relies on the impetus of a core group of dedicated people who have a shared vision and are willing to work closely with each other.

Lesson four is that Brasso Seco TAC has successfully developed its own model or arrangement where agritourism benefits are shared fairly and there are opportunities for villagers to supply products for sale.

The final lesson is that, over the years, Brasso Seco TAC has developed a capacity to engage public and private sector agencies effectively. Consequently, relationships have been developed between individuals such that collaboration is based on strong personal and institutional relationships.

11.6 RECOMMENDATIONS

The 2010 National Tourism Policy of Trinidad and Tobago (p. 20) identifies collaboration and communication among major stakeholders, and local community involvement as two of the major issues to be addressed for sustainable tourism development. One of the pillars of the tourism policy is to develop viable models, policies and strategies for community-based tourism designed to encourage communities to own, develop, implement and manage feasible community-based development projects.

The Brasso Seco agritourism model is an institutional innovation founded on *community self-reliance and economic diversification*. Brasso Seco residents have maintained their traditional agriculture activities parallel to developing agritourism. Brasso Seco TAC has also recognized the role played by other economic activities such as agroforestry and cocoa agronomy and engaged in these enterprises as a way to retain economic benefits in the community.

This model is transferable to other districts in Trinidad and Tobago provided that the target areas have high levels of community-oriented interaction, participation and pro-environmental attitudes. These elements are critical for the development of a community agency and the establishment of locally driven goals and enterprises.

Moreover, it is easier for NGOs, government agencies and international organizations to provide legal, financial, institutional and technical support when there is strong, honest, accountable leadership for community-based initiatives.

What is needed is a key enabling organization for supporting community-based tourism initiatives. In the case of Brasso Seco, it was TIDCO that acted as an important catalyst in helping the community to take on an agritourism project. A similar entity operating at grassroots level could help build capacity within community-led organizations and establish strategic linkages with national associations, NGOs and international agencies.

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Chapter 12
Facilitating social networks by linking smallholder organic farmers in Uganda to markets for sustainable products
The Freshveggies Participatory Guarantee System

Julie M. Nakalanda and *Irene B. Kugonza*

12.1 INTRODUCTION

In Uganda, sustainable agriculture is considered an agronomic and natural resources use that takes care of present day needs while ensuring its continued responsible use and conservation for future generations. At the scientific level, the sustainability debate has been dominated by positive efforts by regulatory public ministries and development agencies. However, there are alternative arguments in public debate that show there are problems. The tendency is to argue that the positive visions for sustainability are flawed, with skewed interpretations, and attempts to solve given sustainability problems usually result in the creation of further problems. This, it is argued, is because sustainability problems are deep-rooted and the capacity of actors to learn continually about how to solve these problems is limited. This has, in the last five years or so, resulted in the emergence of other multidisciplinary stakeholders who are advocating for wider involvement and action within the sphere of sustainable agriculture. They argue that sustainability should be participatory in nature and that information and sustainability strategies for Uganda should be grassroots based and driven from the bottom up, rather than the expert- or policy-driven top-down approaches that have been the norm. The case presented in this chapter explores one of these grassroots initiatives within the fresh fruit and vegetables (FFV) sector of the country.

In Uganda, FFV and cut flowers are non-traditional exports. Since the 1980s, following the Government's export-led growth strategy outlined in the National Trade Policy, production has intensified and exports have grown steadily. This has resulted in significant structural changes in Uganda's export sector. Non-traditional exports, such as fish and fish products, floriculture, horticulture, spices, hides and skins and honey have become more important than traditional exports such as coffee, cotton, tobacco and tea. The former contributed 73.2 percent to the country's export earnings in 2009 (up from 14 percent in 1990).

Horticulture is one of the fastest growing sectors in Uganda and is listed as a strategic export in the Uganda Strategic Exports Programme. The sector employs a large number of people and horticulture exports are worth US$35 million per year. Uganda is currently the second largest producer of FFV in sub-Saharan Africa, after Nigeria, producing about 1.1 million tonnes per year. In 2004, Uganda's FFV production was equivalent to about 1 percent of the world's total production. For cut flowers, Uganda was third in the list of exporters to the European Union (EU) in 2005, with 2 percent of total exports, behind Kenya (40 percent) and Ecuador (6 percent). The monetary value of both FFV and cut flowers has been increasing steadily since 2003. FFV in Uganda is mostly dominated by smallholder farmers, whereas cut flowers are mainly dominated by large firms and export industries. Nevertheless, both subsectors have significant linkages with Uganda's biodiversity resources, both directly through the volume of commodity exports and indirectly through changes in land use, water and energy use and the application of agrochemicals.

The organic agriculture sector in Uganda has proved to be one of the strategically available options for moving many smallholder farmers out of poverty by integrating them into vibrant profitable value chains. The sector in Uganda has been growing at over 20 percent per year for the past five years. For example, organic exports to the EU and the East African Region have been rising in almost all organic value chains, despite a drop in overall Uganda national exports to the same places. Towards the end of 2010, the total number of internationally certified smallholder organic farmers had reached 206 000, representing a growth of over 730 percent between 2001 and 2010. Similarly, the number of exclusive internationally certified organic export companies has grown to reach 44 (NOGAMU, 2016), making Uganda the country in Africa with the highest number of internationally certified organic smallholder farmers, and the second highest in the world, after India (Willer and Lernoud, 2016). Demand is increasing, especially for value-added organic products in international markets (such as dried fruit, juices and pulp – mangoes, pineapples, apple bananas and jackfruit), as well as for organic FFV and other processed products in the domestic and regional markets.

Uganda has a wealth of natural ecosystems and one of the highest levels of biodiversity in Africa because of its location in the zone where the East African savannah and the West African rain forests overlap. The major natural ecosystems in Uganda are forests, woodlands, grasslands, wetlands and open water. Over the last few decades, Uganda has lost its natural resources at an alarming rate. With increasing population, demand for resources is continuously increasing and fragile ecosystems, including forests, wetlands and mountainous areas are being increasingly encroached upon. This encroachment has resulted in declining productivity as a result of a number of interlinked factors.

Climate change effects have been exacerbated by the poor agronomic practices of smallholder farmers, especially in soil and water conservation. *Degradation* of the natural resource base (mainly soil, water and biological diversity) has resulted in diminishing arable land as a result of pressures from human settlements. *Desertification* has increased as a result of uncontrolled tree and natural vegetation exploitation, together with increasing intensive application of external inputs, which is slowly having negative impacts on soils and biodiversity (both crop and animal). These have all increased the country's vulnerability to external shocks and stresses.

The irrational use of agrochemicals has proliferated among farmers, regardless of their scale of operation. With the dwindled extension services in the country, farmers are left to figure out on their own as to which practices to use on their farms to make a profit. This has not excluded poor smallholder farmers. Among these challenges, there is increasing demand for chemical-free foods around the country. This is partly the result of the growing movement of civil society organizations (CSOs) advocating the promotion of environmentally friendly agricultural practices among farmers, while highlighting the imminent dangers that agrochemicals and unsustainable farming practices pose for the health of users on farms, end-users who consume the produce, and the land and environment at large.

Recently, farmers have become more interested and are responding rapidly to active participation in marketing their produce through participatory guarantee systems (PGS) and other direct consumer farmer schemes. They see these as an innovative way for specific product planning, health and agronomy information sharing, and product promotion through the social media, trade shows and other direct potential buyer contacts. This chapter introduces one such experience, that of Freshveggies PGS, which is operating within the rural areas of Kampala. The authors of this chapter are directly involved in the creation and development of Freshveggies PGS and relied upon their own experiences and interviews with Freshveggies members and other institutional actors to collect the data presented in this chapter.

To tell the story of Freshveggies, the current institutional landscape is presented, with information about the organizations and actors that provided an enabling environment for the emergence of the Freshveggies initiative. The initiative itself is then explained in terms of the sustainable practices used and how markets are organized for products. Results of the initiative are presented and conclusions drawn about how this innovative approach enables greater participation of farmers and consumers in activities that promote sustainable agriculture.

12.2 INSTITUTIONAL LANDSCAPE

In Uganda, the organic agriculture policy developed in 2004 by key stakeholders in the sector has been in existence for a long time without cabinet approval. However, great strides have been made in the Ministry of Agriculture, Animal Industry and Fisheries: a draft policy has been presented to the cabinet and a policy implementation plan has also been developed.

While organic stakeholders wait for agriculture policy approval, they are currently working within several public frameworks such as the African Union (AU) Council Decision endorsed at the 18th Ordinary Session. The AU Council Decision EX.CL/DEC.621 (XVIII) on Organic Farming stipulates "(…) the establishment of an organic farming platform based on best practices (…)". The Comprehensive Africa Agriculture Development Programme (CAADP) and the Uganda National Development Plan area among many other public policies involved.

In 2001, the National Organic Agricultural Movement of Uganda (NOGAMU) was established with the Non-governmental Organization (NGO) Board as an NGO, and also with the registrar of companies as a company limited by guarantee. It is a membership-based organization comprising producers, processors, exporters, NGOs and other stakeholder institutions directly or indirectly involved in the organic sector in Uganda. Currently, NOGAMU has a membership of 270 organizations across the country, representing over 200 000 smallholder farmers in Uganda who are participating in international organic trade, some directly, but the majority through membership of their organizations. NOGAMU's vision is "increased incomes and improved livelihoods in Uganda through the adoption of organic agriculture". The core mandate of the organization is to coordinate and promote organic agricultural development in Uganda, through interventions in four strategic areas: (i) promotion of local and export marketing of organic products from Uganda; (ii) promotion of training, research, extension and education in organic agriculture systems; (iii) development and promotion of application of organic standards and certification systems in Uganda; and (iv) creating awareness and attraction of support for the organic sector through advocacy. NOGAMU has been managing organic sector projects since 2004.

Since its establishment, NOGAMU has been instrumental over the last decade in smallholder farmer mobilization, training, facilitating farmer certification and linking organic smallholder farmers to available markets. Supported by the Swedish Society for Nature Conservation, NOGAMU played a key role in building the capacity of the Freshveggies PGS. Under the NOGAMU umbrella, Freshveggies PGS was able to meet other players. These included NGOs such as Kulika and Caritas, who support other farmers. Some of these have since joined or partnered with Freshveggies to supplement our supplies and sales. We were able to meet an individual farmer/handicraft dealer who now supplies Freshveggies with delivery baskets made from only natural products in a local design. This has helped us to improve on presentation and service delivery but also to save on packaging material and promote the use of natural rather than synthetic packaging, which we mainly used as the only available option. We have now greatly reduced the use of synthetic packaging and aim at reducing it to a minimum.

The Uganda National Bureau of Standards (UNBS) has shared information with us on national regulations and the recently adopted Codex Alimentarius, which is a collection of internationally recognized standards, codes of practice, guidelines and other recommendations relating to food, food production and food safety. Other support services have been involved such as those providing appropriate packaging materials, government regulatory bodies such as UNBS for information on quality requirements where applicable and the Uganda Registration Services Bureau (URSB) for legalizing company registration and potential consumers.

12.3 INSTITUTIONAL INNOVATION

Background and organizational structure

Through advocacy and capacity building, NOGAMU has introduced its members to some of the possible ways by which sustainable farming practices can be achieved. Based on the core principles of organic farming that include fairness, health, care and ecology, PGS is one of the latest approaches whereby smallholder farmers can agree to work together, following an established internal standard to produce and market as a group.

PGS are locally focused quality assurance systems where producers are certified, based on the active participation of stakeholders, and are built on a foundation of trust, social networks and knowledge exchange. They involve internal inspections, where members control each other for purposes of improvement and ensuring compliance. Coupled with the fact that these approaches are rewarding in terms of low-cost on-farm inputs (such as the use of animal waste for manure, and crop residues for animal feed), the system is self-sustaining.

Every PGS is different because it is locally adapted and varies with the cultural beliefs and norms of all involved stakeholders. Nevertheless, a typical PGS is based on the following.

- Standards and by-laws that orient its members. In the case of Uganda, the East African Organic Products Standards (EAOPS) are used. Some PGS use by-laws developed by stakeholders. A common logo in Uganda is the East African Organic Mark (EAOM).
- Members who, beyond potential affluent markets, are passionate about farmer empowerment, community development, agro-ecological sustainability, fair-trade and buildup of social, food and cultural sovereignty.
- Non-discrimination and equal participation of all members: women, men, youth and the elderly in decision-making during regular meetings.
- Binding commitment and cooperation for all involved and those who are willing to join.
- Annual PGS "peer reviews" or internal inspections composed of various stakeholders for each producer in the PGS.
- National supervision that has internationally recognized approval and documented procedures.
- Strong focus and drive to market organic products in local markets.

After working with several smallholder farming communities in different parts of the country and experiencing the challenges of low yields and incomes; poor access to markets; failure to realize required marketable volumes; dominance of third-party certification models for export such as internal control systems (ICS); low levels of farmers' participation in decision-making; and no member ownership by farmers, the founder of Freshveggies was inspired by the PGS approach during training organized by NOGAMU. To her, this was a perfect solution to the many challenges faced by the smallholder farmers with whom she usually works and who include her own family.

PGS is a marketing tool that offers a direct linkage between producers and consumers. Producers are able to have a negotiating take in determining prices and consumers are able to give direct feedback to producers on freshness and quality. They are also able to make orders through the respective marketing teams in the different localities, or by e-mail, sms, telephone and social media networks such as Facebook. This has generated trust between farmers and consumers, and strengthened partnerships have led to further growth of clientele through the social media and by word of mouth.

The Freshveggies PGS initiative was established with this background. It is a loose network of organic smallholder farmers working in autonomous community groups under a common production and marketing model. We have been handling small volumes but, because of growing demand, we now envisage the need to recruit more producer members to scale up production. In our recent strategic planning meeting, we agreed to mobilize resources among ourselves to the tune of one million Uganda shillings (US$400) to facilitate bulk purchases, especially from our participating producers at distant locations with relatively large fields and production capacity. Our members are located in the districts surrounding Kampala, and beyond.

The initiative began as a response to promote healthy feeding and sustainable farming practices among members, but also to promote sustainable household incomes from sales and delivery of fresh organic produce to consumers in the Kampala business district and those in areas where member farmers are located. Our vision is to have economically empowered, motivated and healthy farming communities able to produce and supply organic food to sustain a happy and healthy clientele in Uganda. We exist to engage smallholder farmers in Uganda in active organic agricultural production and respond to the growing demand for organic foods for healthy living and economic growth. In addition to in-house training and collective sales, Freshveggies PGS offers information on nutritional values of different products and may provide recipe suggestions for clients.

In Wakiso (on the outskirts of Kampala), members carry fresh food crops, fruit and vegetables from their fields to the main office/collection point on a weekly basis. Those with bulky supplies can be helped by our provisional supply vehicle. From other locations (Bushenyi, Kayunga, etc.), we order produce directly from participating farmers, who send it via our trusted transporters (using public means), who deliver to other collection centres from which we pack/redistribute according to orders placed. At each cluster level, we have a marketing team of three people in charge of sales, rejects and payment records for individual members. The delivery team makes office and home deliveries, invoices sales and/or receives cash payments or sometimes mobile money via available cell phone networks.

The main objectives are to:

- promote local production and consumption of organic food for better health;
- improve household incomes and livelihoods among small-scale member producers;
- promote sustainable farming systems in Uganda;
- foster a closer producer-to-consumer linkage with a functional feedback mechanism for fair and effective service delivery.

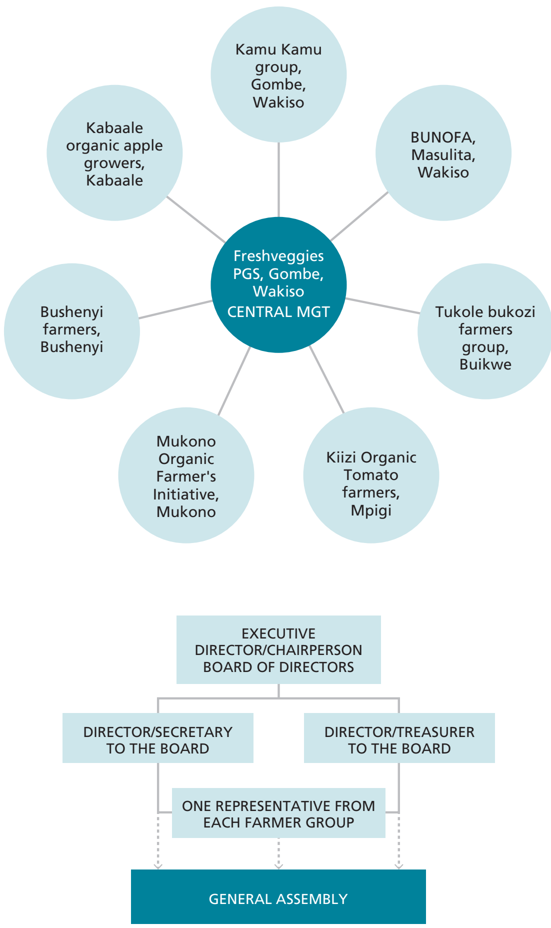
Julie, the founder, joined efforts with two other local young people to formalize the initiative. The trio runs the central management. Freshveggies PGS uses a radial management model with the member community farmer groups and its central management coordinates PGS activities. We are registered under the Uganda Registration Bureau Services as a company limited by guarantee and also licensed by the local government to conduct trade in crop production. At the central management, PGS is headed by the Executive Director (and Chairperson to the Board of Directors) and two other directors who also serve as treasurer and secretary, respectively. These roles are held on an annual rotation basis. The Board's membership has one representative per farmers' group. General PGS membership roles include but are not limited to:

- identifying what they have/are already doing in groups;
- becoming focused on common commercial projects to generate market volumes;
- agreeing to work together on plans to build capacity for all;
- taking a pledge of trust and accountability to all fellow members;

Additional PGS leadership roles (specifically for leaders) include:

- agreeing on PGS group member requirements and standards;
- following up with members on agreed plans and reporting;
- ensuring that members remain within focused commercial crop production through regular monitoring of updates;
- communicating and clarifying requirements to all members;
- coordinating and ensuring that planned individual tasks are effectively carried out by all members;
- mutually agreeing on set targets, e.g. market share to be increased from present to after one year;
- networking to build strategic alliances.

FIGURE 12.1
Freshveggies PGS organizational structure



Source: authors' elaboration.

PGS actively motivated farmers to team up, strengthen their participation to work as a team and agree to market collectively. Up to 200 members have been registered since 2009. To date, 88 members are active, 76 of whom are female.

PGS is in the process of becoming certified so that it can use the EAOM *Kili Mohai*. With support from NOGAMU and the tireless capacity building of the founder members, PGS members are being continuously trained on organic production principles that enable them to mitigate climate change effects and be able to produce consistently for sustainable markets in the peri-urban and urban centres within and surrounding Kampala.

Sustainable practices

Members of Freshveggies PGS have to respect the four organic principles of care, health, fairness and ecology. The Freshveggies PGS has its own member-generated set of rules, simplified in form of do's and don'ts, followed by all members. These include sustainable agricultural practices such as:

- saving own seeds on farm to ensure continuous production and conservation of indigenous crop/plant varieties, including those used for making natural pesticides and other such beneficial uses;
- raising mostly indigenous or locally adopted varieties of crops/plants;
- crop rotation to enhance soil fertility and break pest cycles to minimize pest and disease attacks and spread on farms;

PHOTO 12.1
Freshveggies members work together to set up raised vegetable beds, using locally available resources, during seasonal production in one of the PGS training sessions on a member's field

- raised beds to improve on drainage, increase usable soil depth and improve productivity over several seasons;
- addition of farmyard manure or compost to ensure soil nourishment for sustainable high yields –manure is produced on farm and is thus sustainable;
- use of plant hedges, ditches, L-bridges and *fanya juu/fanya chini*(terracing) with grass bands to control soil erosion and maintain soil fertility;
- intercropping and agroforestry to promote nutrient recycling, maximize nutrients and space by using different crops of different sizes to increase yield per area;
- marketing approach that is locally motivated with autonomy at all levels, having a direct linkage with consumers who provide feedback for improvement;
- participatory approach in all aspects of Freshveggies' operations such as meetings, committee leadership and on-farm training, which helps in continuous capacity building among members for improved competences in the various committees where members serve on a rotational basis;
- local certification: Freshveggies is working towards achieving PGS certification under EAOPS, which is affordable and locally accessible.

Among the don'ts are: no use of agrochemicals, no uncontrolled bush burning, no parallel production (practising both conventional and organic agriculture), no use of GMOs and no use of forced labour. Additional requirements include overview maps indicating the location of each member; growers' lists; participatory committees to handle marketing, seed purchasing and family cohesion through working together for the promotion of family health care and education; and internal inspection that approves or issues sanctions for violations in case such issues arise.

On average, each member farms between 0.125 acres (0.05 ha) and 0.25 acres (0.10 ha) especially for vegetables. Those with greater access to land have 0.5–1 acre (0.20–0.40 ha) for other food crops. For each season, each group buys a variety of seeds worth US$40 (individual contribution is about US$1.5 per person per season), which may include 100 g leeks, 100 g spinach, 100 g lettuce, 100 g carrots, 100 g kale, 100 g beetroot and 100 g red cabbage. The group may buy other seeds such as amaranthus and *jobyo* (Spider weed). Some members grow sugar cane, apple bananas, sweet potatoes, cassava, *matooke* (cooking banana) and tomatoes.

The practices listed above ensure ecosystem resilience through biodiversity conservation (no use of non-selective chemical pesticides), soil health, social and economic empowerment, as well as promotion of healthy feeding by participating farmers and their customers. Freshveggies is part of the organic network that promotes organic agriculture principles for sustainable production.

Farmers involved in Freshveggies have adopted some of the sustainable practices as traditional practices that have been used over the years in the region. Introduction of complementary organic practices by NOGAMU was a strategy to enable farmers to improve traditional practices to enhance farm productivity, respond to climate change challenges and qualify for organic certification, which would enable them to use the EAOM *Kili Mohai* mark as a marketing tool to acquire premiums and attain sustainable livelihoods.

The founders of Freshveggies, with support from NOGAMU, have continuously engaged members in on-farm training sessions or FFS activities to build their capacity in understanding the benefits of adopting sustainable practices through integration, internal inspections by fellow members and use of simplified illustrated versions of EAOPS. With continued use of these practices in an integrated approach, farmers have been able to notice the difference in the form of improved soil health – soils have the ability to hold water and support the life of several beneficial soil organisms for prolonged periods, even during dry seasons; reduced pest pressure and regeneration of natural enemies to pests; and high-quality produce from their fields. The continued use of organic practices based on the principles of care, health, fairness and ecology has now become a culture among organic farmers in the region and their benefits are obvious. This has attracted other farmers into the organic system to enjoy the benefits of these sustainable practices.

Sustainable practices are natural and cheaper options suited to smallholder farming systems in the region. In line with the principle of health, PGS members are trained about the hazards that may result from the use of agrochemicals, such as inhalation or skin contact during field applications and through ingestion of crops that have been sprayed. The residues of these chemicals not only cause health complications for humans but also affect the environment, since they kill beneficial insects and plants as well as pests and weeds, thus limiting biological (life) activity in the soil, which may contribute to poor soils and reduced yields. For the principle of ecology, members are introduced to the interdependence of all life forms and their interactions, citing simple examples of the food chain, such as earthworms feeding on micro-organisms in the soil, and in turn enhancing soil fertility through aeration.

Members are also informed about how these interactions for both plant and animal life (biodiversity) are important in controlling pest populations and enhancing micro-environments. For example, the shade of a tree has a cooling effect on surrounding plants and trees play a role in nutrient recycling. There are nitrogen-fixers such as legumes, repellents, and cover crops for soil and water conservation. It was emphasized that all these processes occur naturally. Humans (as farmers) just need to learn more about their farm environment to make deliberate efforts to promote these processes and enhance performance. For the principle of care, members learn how organic farming emphasizes care for all. Animals reared should be well-fed, treated when necessary, have proper shelter and be allowed to behave naturally. Members learn to care for crops by adding acceptable fertilizers such as compost to the soil, weeding, mulching, proper spacing and pruning. As for the principle of fairness, PGS members benefit from lower production costs since there are no intermediaries in organic markets, and they usually receive a better price from consumers after supplying a good healthy product. Likewise, farm workers accordingly receive a good share of this pay, have access to health services, clean water and other social services and their children acquire education.

The internal control system (ICS) is organized as described in the following sections.

At each group level, there is a committee in charge of production, one in charge of marketing and sales, the seed committee, internal inspection committee and documentation committee. Each committee should have at least three members. Members are encouraged to work at least on one committee per tenure/term of one year.

Internal inspection is carried out by members within the same group at least once a year. The committee can create other smaller inspection teams of at least three people. These should declare any conflicts of interest such as close relatives, friends and in-laws so that the constituted teams may do their job without compromise.

The groups usually meet on a weekly basis, especially to collect weekly individual savings for their respective Village Savings and Loan Associations. This creates a great motivation for regular attendance among the village membership and a platform for discussing other development issues or matters arising. It is during these meetings that updates about upcoming events such as on-field training sessions, internal inspections and market orders are shared. The general assembly meets once a year.

PGS membership is dynamic particularly in terms of active participation. All members are free to exit at their own will, but entry into the group is determined by the members of each local group.

Markets for sustainable products

Although young, PGS has quickly built up a brand in the marketplace and has a direct link to supply individual clients who are mainly busy people such as bankers, embassy staff and others in the category of elites. The Freshveggies market network also includes other channels such as supermarkets and local restaurants. Orders and supplies are on a weekly basis, while payments are made on agreed terms in consultation with consumers, ranging from cash-on-delivery, cash payments after two weeks or every month, mobile money[37] or bank services, and now the Freshveggies joint bank account. Word-of-mouth marketing works through our current contented and satisfied consumer base, which keeps sharing its great experiences with friends, family and others about Freshveggies products, services and related benefits. In a similar approach, the Directors of Freshveggies share their Freshveggies experience at professional meetings such as workshops or business meetings, and thus make new contacts. This also offers a great opportunity for business growth.

Freshveggies PGS is an association registered by the Uganda Registration Services Bureau (URSB) under the URSB Act of Parliament. The name of the association is Freshveggies PGS Ltd. We pay a stipulated annual licence fee to the local authorities in the area where our offices are located and therefore operate as authorized traders in crop production.

The Freshveggies market is different from the conventional market chain that is dominated by intermediaries. At Freshveggies, members are mentored in ways of dealing directly with consumers and of having a long-term engagement with them. Apart from a few central stores/supermarkets, these include their neighbours who buy on farm, those to whom they deliver within their local communities, but also the elite communities in Kampala. The latter are interested in fresh organic produce for their health benefits, high quality – since produce is fresher than in stores and markets – and the convenience of the additional service of office or home delivery. This clientele has been largely built up through social media such as Facebook and word of mouth from contented customers who introduce us to their friends in need of similar services. All our individual clients to whom we make direct sales

[37] This is an arrangement where cash transactions are made on clients' mobile phones as opposed to banks. It is currently very popular in Uganda since most smallholder farmers do not have bank accounts.

are well aware that our produce is sustainably produced. We give them information about our practices, sharing the Freshveggies story via e-mail or during face-to-face discussions. Since they introduce us to new clients in their networks, we believe that they care and are happy clients.

On a weekly basis, each group makes sales of between 125 000 and 250 000 Uganda shillings (US$50 and US$100) to up to ten clients, plus some supermarket sales. Clients buy different volumes depending on their family size. Individual deliveries range from 3 to 4 kg to about 12 kg of an assortment of mainly vegetables, some fruit and at times food crops, all seasonal. Before the establishment of the Freshveggies PGS, members were not in active business. They were purely subsistence producers who would sell to intermediaries every so often, but would otherwise have no ready market for their surplus produce. They would sometimes make total on-field losses because of the lack of ready markets.

Each farmer earns on average US$200 per month from the sale of vegetables through collective sales during the whole season, which lasts for six months. Some of the sales are made individually and produce used for home use is not captured in figures. Thus, with a total investment of US$40 for about 30 people per group, US$1 200 is realized in a period of six months, of which about 5 percent(US$60) is spent on labour, although in some cases no labour costs are involved. On average, each member is able to earn a minimum of US$40 per season as per the recorded collective sales. This money is used to attend to basic household needs but, most important, it helps members to make weekly savings. These range from US$0.8/2 000 Uganda shillings (one share) to US$4/10 000 shillings (five shares). These savings enable members to generate a financial resource pool of up to US$120/300 000 shillings per week, or US$480/1 200 000 shillings per month. Consequently, members can respond to larger outlays such as school fees, and expand other businesses such as retail shops and so forth. This money is returned with a profit that is shared accordingly at the end of each 12-month cycle. Members are then able to attend to their realistic annual targets.

Prices differ from conventional market prices, as shown in Table 12.1 (inclusive of delivery).

Generally, since most Freshveggies producers also grow food for their home consumption, 25–50 percent of what they produce is consumed at home and 50–75 percent of the remaining produce is sold via the Freshveggies marketing scheme. In situations where logistical arrangements challenge the usual process, producers may sell some of their produce (say, 20 percent) in ordinary markets.

12.4 RESULTS

Both producers and consumers have benefited from the Freshveggies innovation. Consumers now make a special effort to give their families fresh, healthy produce on a weekly basis, which has greatly improved their health, according to the testimonies they share during our meetings. Farmers are able to save weekly and also attend to their immediate home needs. The innovation has created a completely new market chain that was previously non-existent in the area. Farmers are able to benefit fully from their farm work and have access to a fair deal in the market through direct sales to consumers. This was not the case in the past when they had to rely largely on intermediaries.

TABLE 12.1
Freshveggies prices versus conventional prices

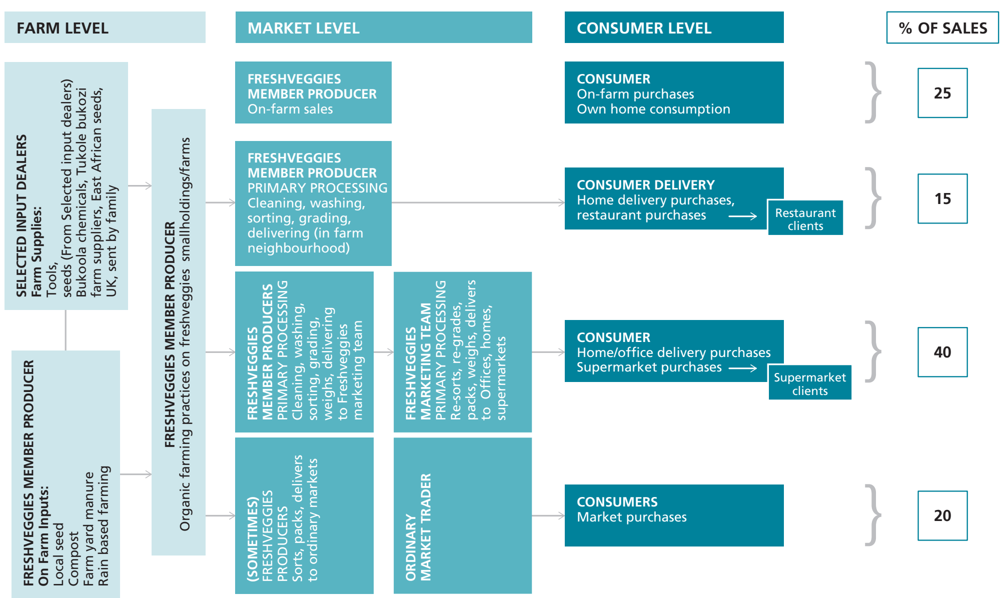
Freshveggies price list			**Conventional market price list**	
Dollar rate used: US$1 = 2 500 Uganda shillings Cost of these products is usually the same throughout the year At Freshveggies, producer members sell directly to consumers. In situations where deliveries are made on behalf of other farmers, the farmer receives between 500 shillings per bundle of vegetables and 1 000 less per kg of fruit/vegetables			(In this market, produce is usually sold in heaps rather than kg, so that costs are estimated) In times of plenty, products are usually cheaper, and costly in times of scarcity. These are selling prices for buyers in the market and not what they would pay to farmers, who normally receive a much lower payment	
Produce	**Uganda shillings**	**Item**	**Produce**	**Uganda shillings**
Apple banana cluster (0.5–0.75 kg)	2 000–2 500 (US$0.8–1)	1	Apple banana cluster (0.5–0.75 kg)	1 000–2 000 (US$0.4–0.8)
Avocado piece (1 fruit) (1/3–0.5 kg)	800–1 000 (US$0.32–0.4)	2	Avocado piece (1 fruit) (1/3–0.5 kg)	300–600 (US$0.12–0.24)
Chayote (2–4 fruits – 1 kg)	2 000 (US$0.8)	3	*Chayote* (2–4 fruits – 1 kg)	500–800 (US$0.2–0.32)
Beetroot (3–4 tubers – 1 kg)	4 000	4	Beetroot (3–4 tubers – 1 kg)	2 000–3 000
Carrots (7–10 tubers – 1 kg)	3 000	5	Carrots (7–10 tubers – 1 kg)	1 500–2 000
Peeled sugar cane (1 kg)	2 500	6	Peeled sugar cane (1 kg)	1 500
Spinach pack (750 g bundle)	1 500	7	Spinach pack (750 g bundle)	500–1 000
Kale pack (750 g bundle)	1 500	8	Kale pack (750 g bundle)	500–1 000
Ddodo (750 g bundle)	1 500	9	*Ddodo* (750 g bundle)	500–1 000
Jobyo (750 g bundle)	1 500	10	*Jobyo* (750 g bundle)	500–1 000
Bugga (750 g bundle)	1 500	11	*Bugga* (750 g bundle)	500–1 000
Leeks (750 g bundle)	1 500	12	Leeks (750 g bundle)	500–1 000
Gooseberries (250 g)	2 500	13	Gooseberries (250 g)	1 000–1 500
Paw paw (500 g–1 kg)	2 000–3 000	14	Paw paw	1 000–2 000
Mujaaja (herb) (100 g)	1 000	15	*Mujaaja* (herb) (100 g)	–
Lettuce pack	2 500	16	Lettuce head	800
Strawberries (250 g)	4 000	17	Strawberries	–
Passion fruit (1 kg)	4 000	18	Passion fruit (1 kg)	2 500–3 000
Eggs – one tray (30 eggs)	15 000	19	Eggs – one tray (30 eggs)	8 000
Pumpkin (1 kg)	3 000	20	Pumpkin (1 kg)	1 000–2 000
Mangoes (1 kg)	2 000	21	Mangoes (1 kg)	1 000–2 000
Tomatoes (1 kg)	6 000	22	Tomatoes (1 kg)	2 000–4 000
Fresh beans (1 kg)	3 000	23	Fresh beans (1 kg)	1 500–2 000

TABLE 12.1
(continued)

Produce	Uganda shillings	Item	Produce	Uganda shillings
Cassava	1 500	24	Cassava	1 000
Sweet potatoes	1 500	25	Sweet potatoes	1 000
Yams	1 500	26	Yams	1 000
Pineapples – one piece	2 000–3 000	27	Pineapples – one piece	1 000–2 000
Matooke cluster	2 000–3 500	28	*Matooke* cluster	1 500–2 500
French beans (1 kg)	3 000	29	French beans (1 kg)	2 000

Source: authors' elaboration.

FIGURE 12.2
Freshveggies PGS market value chain



Source: authors' elaboration.

Consumers have shared stories related to specific health benefits. They appreciate the quality of "fresh from the field" and the resulting high nutrient values. The sustainable agricultural practices used by Freshveggies members have improved the micro-environments on farms. This is evident from the reintroduction of biodiversity, such as natural pest enemies – lace wing flies, ladybirds and praying mantis among others. There is improved production for both commercial and non-commercial crops that are benefiting from well-nurtured soils. Members participate in constituting PGS internal standards to uphold quality. This makes it easier to ensure conformity and maintain good agricultural practices and sustainable production. Working together as smallholders provides a platform to address common credit problems, and enables farmers to generate quantifiable volumes that attract and sustain a stable consistent market, promoting the business side of the initiative.

Apart from groups dealing in specialized crops such as organic tomatoes that are experiencing some challenges with production costs, the cost of production for other vegetable crops is reduced to zero since members farm on very small gardens that they manage themselves as part of their routine. Compared with conventional farming where most producers are in the habit of using herbicides, artificial fertilizers and then pesticides, in sequence, as part of their routine practice, organic producers in the Freshveggies PGS do not spend on such inputs since they are not allowed in the system. However, members with more land still face the challenge of weeds, particularly during the rainy season. Nevertheless, this is counterbalanced by the profits they gain from direct sales to organic consumers in Freshveggies PGS, which may earn them twice as much had they been paid by intermediaries.

To summarize, the benefits of PGS are the following.

- It has enabled members to meet their household food security and nutritional needs.
- It has introduced a commercial aspect, resulting in increased household income.
- PGS products are a healthier option for farmer households and consumers.
- PGS and organic production principles work with nature to ensure suitable and responsible production, which results in direct benefits to farmers, such as crop protection against harmful pests.
- PGS principles help build synergies and networks that result in harmony and better relationships with spouses and other family members within the farmers' social networks.
- PGS members bulk organic produce and market it collectively, which has attracted other enthusiastic members. They save money that they can use for further income-generating activities.
- PGS has resulted in fresh market opportunities such as the new idea of selling produce in PGS marketing chains.
- PGS has enabled members to purchase seeds together, which has minimized costs and reduced sourcing of poor-quality seeds.

12.5 CONCLUSIONS

Freshveggies PGS represents a new business model of a farmer-owned social network that is designed to address farmers' problems of income and fair markets while upholding internal standards, and promoting healthy feeding and sustainable production. The challenge ahead of Freshveggies is to concretize the idea of a going business concern among its members to strengthen the initiative further and harness the intended benefits for all members now and in the future.

To benefit from economies of scale, Freshveggies PGS has to attract more producers of matching credibility (trust, interest and competencies), in terms of numbers so that we respond to the current growing demand for organic products in terms of volumes and a wider product range. These will require capacity building to learn more about EAOPS and PGS operations so as to qualify for PGS certification. We need to mobilize finances to invest in the business and to finance logistics (payment of producers, packing trays, baskets, fuel and daily allowances for packing and delivery teams) so that the Freshveggies business can grow in capacity, profit margins and service delivery.

12.6 RECOMMENDATIONS

With the existing challenge of unsustainable forms of production in Uganda and a collapsed extension service structure, initiatives such as Freshveggies need to be replicated. They should follow a farmer-led approach with full participation at all levels, in order to address the current challenges of over-reliability on external inputs, the existence of unproductive farming systems and the low incomes of smallholder farmers. The Freshveggies PGS initiative will continue to grow in size and service delivery within the established social networks to foster and contribute to the development of a thriving and sustainable local economy. This is sustainable since regenerative crops grow in the region. With increasing demand for healthier foods from healthy farming systems, there is great potential for continued linking of sustainable production to markets for sustainably produced products and services in Uganda. The Freshveggies PGS initiative currently faces the challenge of capacity building among its membership for scaling up business to meet the growing demand for sustainable products in the area. If the required capacity is met and the necessary structures put in place, Freshveggies PGS will be able to expand as a viable business covering a wider area with a larger consumer base.

Hundreds of thousands of smallholder organic farmers are currently benefiting from these market opportunities through access to sustainable markets. However, underlying constraints hinder the successful participation of smallholder farmers. These include:

- low supply volumes attributed to lack of organization of smallholder farmers into groups/associations/cooperatives, coupled with a lack of collective marketing mechanisms to generate volumes;
- lack of proper quality management systems among smallholder farmers, resulting in failure to comply with international and regional certification requirements;
- limited processing value addition and insufficient post-harvest infrastructure;
- lack of sufficient promotion, packaging and branding, resulting in inconsistent trading relationships, consequently bringing low returns from some markets.

Given that this initiative is new, there are numerous future possibilities to scale it up in terms of participants and influence among its networks. Freshveggies has plans to expand its client base. Fifty more clients have been enrolled for the coming season for direct sales and home/office deliveries. This will mean improving our logistics and staffing levels. Freshveggies could hold open farm days for better transparency; organize school farm visits and fun days on farms; and run educational programmes on sustainable agriculture through the mass media.

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Chapter 13
Role of cooperatives in linking sustainable agro-ecological farming practices to markets
Kangulumira Area Cooperative Enterprise (KACE) in Uganda

Sylvia Nalubwama, Stephen Anecho, Muhammad Kiggundu, Norman Kwikiriza and *Yahaya Wafana*

13.1 INTRODUCTION

Agriculture remains the backbone of Uganda's economy, with total arable land estimated at 82 811 km². The sector employs 80 percent of the rural population, who depend upon it as a source of livelihood, food security and income (MAAIF, 2010). There is a popular belief that Uganda needs to increase agricultural production to match the ever growing population; the current government drive is to commercialize the agricultural sector in the country, with the aim of increasing productivity and household incomes. The sector is dominated by smallholder farmers who grow crops for subsistence and only sell when a surplus is available. Nevertheless, there is a small percentage of isolated commercial large-scale producers. Despite the continued policy shift towards commercialized production, mainly directed by the Plan for Modernization of Agriculture (PMA), outlook for the sector continues to be critical, with frequently fluctuating prices for agricultural produce on the local, regional and international markets. Furthermore, the contribution of the sector to gross domestic product (GDP) continues to decline, despite its being the biggest foreign exchange earner for the economy, with coffee at the top of exports (MAAIF, 2011).

Major cash crops grown are coffee, cotton, tea, tobacco, cocoa, sugar cane and horticultural produce; the main food crops are bananas, maize, cassava, rice and sweet potatoes among others. According to FAO (2010), Uganda is divided into seven agro-ecological zones/farming systems based on major crops grown, amount of rainfall received, and the level and role that livestock plays in the system. These systems are the following.

- *Banana-coffee system* where farmers own small plots, livestock is generally not integrated and major crops include robusta coffee, bananas, maize, beans, sweet potatoes, cassava, horticultural crops, tea and groundnuts.
- *Banana-millet-cotton* system where rainfall is less stable and annual food crops are more important. Livestock is the main activity in drier areas and crops are cotton, robusta coffee, beans and maize.

- The *montane system* is found between 1 500 and 1 750 m.a.s.l. Population in this area is high and plots of land are small. Crops are arabica coffee, bananas, cotton, maize, beans, wheat, barley, millet, rice, Irish potatoes, sweet potatoes and cassava.
- In the *Teso system*, where rainfall is bimodal with a longer dry season, mixed agriculture of crops and livestock is practised, with free grazing of livestock after harvest in the dry season. Major crops are cotton, finger millet, sorghum, maize, groundnuts, sesame, cowpeas, sunflowers, sweet potatoes and cassava.
- In the *northern system,* rainfall is bimodal, but less pronounced, with about 800 mm annually. Rainfall in the far north and northeast of the country is unimodal and below 800 mm, so that only drought-tolerant annuals are cultivated. The area is known for its semi-nomadic pastoral system. Crops grown include cotton, tobacco, sesame, finger millet, sorghum, cassava and sunflowers.
- The *West Nile system* has similar rainfall to the northern system; mixed cropping is common with a wide variety of crops. Livestock activities are limited by the presence of tsetse flies. Crops grown include tobacco, cotton, arabica coffee, sesame, finger millet, sorghum, cassava and groundnuts.
- The *pastoral system* has rainfall below 1 000 mm and is characterized by short grassland with nomadic, extensive pastoralism. Crops grown include finger millet, cassava, sorghum, beans and maize.

Land degradation in Uganda is widespread and serious although it varies from one part of the country to another, depending on farming practices, population pressure, vulnerability of the soil to denudation and local relief (MAAIF, 2010). To address some of these challenges, the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) initiated sustainable land management (SLM) to address some of the problems associated with land degradation. Of late, the poor rains and regular droughts have severely affected the performance of the sector with outputs from cash crops declining by nearly 16 percent in the 2010/2011 financial year, reducing the overall growth of the sector from the previous average of 2.4 percent to 0.9 percent (MAAIF, 2011)

According to UBOS (2010), the national average size of agricultural plots is about 1.1 ha with the northern regions having the largest (1.6 ha) and the western regions the smallest (0.8 ha). However, individual landholdings within the regions vary considerably, with some farmers owning very small and often fragmented pieces of land. This, in addition to other factors such as limited capital and limited access to credit, continues to hinder modernization and mechanization of the sector. Although the Government of Uganda is setting up strategies to mechanize the sector, for example by providing tractor services at subcounty level, most farmers cannot afford the cost of hiring equipment.

Because of the fluctuating prices of agricultural produce, many young people have abandoned agriculture amid rising youth unemployment (Ahaibwe, Mbowa and Lwanga, 2013). This may undermine the government's strategy to drive economic growth through agriculture. There has recently been an increased exodus of youth from rural communities to urban centres for easy paying jobs such as riding commuter motorcycles. Uganda is signatory to the Maputo pledge in which African leaders pledged to spend at least 10 percent of their annual budgetary allocation on agriculture. However, the reality is that the government still has some way to go towards honouring this commitment (Lukwago, 2010). In addition, there are no customized agricultural financing options available for agricultural credit, and many commercial banks are not willing to lend to agriculture-based projects. Despite the fact that farmers cite shortage of capital and credit as their single biggest constraint to improving farming, the Government of Uganda has not invested enough resources in providing credit to farmers. For example, only 4 percent of PMA funds are allocated to rural finance services, which include increasing access to credit. Worse still, most financial institutions have not developed suitable lending instruments for agriculture, in that agriculture receives less than 10 percent of lending from commercial institutions.

Sustainable production systems have of late attracted international recognition in the face of global climate change and growing concerns for environmental and human health. However, sustainable agriculture is perceived differently by different stakeholders in the country (PELUM, 2010). In light of these various definitions, a number of policies and laws in Uganda appear to be in support of sustainable agriculture aimed at promoting best agricultural practices that ensure increased agricultural productivity as well as environmental protection. On paper, all the policies and legislation in place or in the offing are a clear indication of the will and desire of the Government of Uganda to promote sustainable practices that guarantee environmental protection for future generations. However, there are still constraints in mechanisms and financing of policy implementation.

Several national policies, plans, programmes and strategies that favour sustainable agriculture explicitly or implicitly have been formulated or are in the process of development.

- National Environment Management Policy (NEMP), 1994
- National Land Use Policy (NLUP), 2007
- Uganda Forestry Policy (UFP), 2001
- National Policy for the Conservation and Management of Wetland Resources (CMWR), 1995
- National Fisheries Policy (NFP), 2004
- National Water Policy (NWP), 1999
- Uganda Food and Nutrition Policy (UFNP), 2002
- National Biotechnology and Biosafety Policy (NBBP), 2008
- Draft Uganda Organic Agriculture Policy (OAP), 2009
- Draft National Agricultural Policy (NAP)
- Draft National Soils Policy (NSP)
- Draft National Indigenous Knowledge Policy for Uganda (NIKP), 2004
- Draft National Irrigation Policy (NIP), revised final edition, 2005
- Draft National Seed Policy, 2009
- MAAIF Development Strategy and Investment Plan (SIP), 2009/10–2013/14

Organic agriculture, which promotes sustainable farming practices, has received numerous policy threats over time, as a niche subsector. This has probably stifled the smooth approval and implementation of the Uganda Organic Agriculture Policy (OAP). It is important to note that the majority of traditional smallholder farmers in

Uganda are considered to be "organic by default", meaning that they rarely use synthetic chemical fertilizers and pesticides because of unaffordability or inaccessibility of these inputs. However, many of these farmers have no awareness of organic farming approaches and no training in organic practices to improve their productivity and profitability based on local resources. Nevertheless, it is much easier to convert them to organic production with sustainable farming practices than it is commercialized conventional farmers. In the bid to promote sustainable agriculture, there are fundamental debates going on in the country. People ask each other questions.

- Can organic agriculture feed the fast growing Ugandan population?
- Can the productivity of small organic farmers ensure food security?
- Can productivity (yields) of organic systems match conventional yields?

Critics of sustainable agriculture and organic agriculture in particular argue that organic agriculture has lower yields and therefore needs more land to produce the same amount of food as conventional farming. The yield gap is much less significant for certain crops, and under certain growing conditions, according to some researchers. On the other hand, proponents of sustainable agricultural practices state that many of the smallholder farmers, who constitute the majority, have small plots of land (0.5–2 ha), which implies that they have to utilize their land in a very intensive manner in order to meet all the competing demands. They thus have to adopt sustainable practices that ensure the future sustainability of their production systems.

Furthermore, foreseen challenges to sustainable agriculture, particularly organic agriculture, are evidenced by the current campaign against the reintroduction of DDT for malaria disease vector control in Uganda and the genetically modified organism (GMO) debate. Attempts by the Government of Uganda to implement a comprehensive indoor residual spraying (IRS) programme for malaria vector control through the United States of America President's Malaria Initiative (PMI) was stalled, citing numerous complaints by the sustainable agriculture proponents. Stakeholders against DDT argue that it has a longer residual effect. As such, it poses the risk of severe economic impacts from spillover effects and from deliberate misuse in agriculture by smallholder farmers. This would greatly affect their livelihoods should their products be banned from the world market. The authors believe that this trend is in contravention of the United Nations (UN) political goals of strengthening the capacity of countries to transfer safely to reliance on sustainable alternative products, methods and strategies, and the goal of the Stockholm Convention on persistent organic pollutants (POPs), which is ultimately to eliminate the use of DDT. Although malaria is one of the main global health problems with devastating impacts on many populations in Africa and particularly in Uganda, there are alternatives to DDT to deal with this disease, as demonstrated by examples from Kenya, Ethiopia, Mexico and Viet Nam.

In-country debates on GMOs predate the Government of Uganda's National Biotechnology and Biosafety Policy (NBBP) of 2008. However, the Biotechnology and Biosafety Bill of 2012, commonly known as the GMO law, specifically to promote GMOs on a massive scale in Uganda, was halted by Parliament because of complaints from its opponents. Drafting of the bill has taken more than five years and has received opposition from sustainable agriculture proponents. The argument is that the bill ignores the traditional methods of genetics and intends to contaminate crops with foreign genes that have disastrous effects on health and the environment. Sustainable agriculture activists have been eager to warn farmers of rapacious multinationals. These, they say, will not hesitate to patent seeds, jack up prices and lay waste to the country's biodiversity and subsistence farming culture, including making organic farming practices defunct. Ordinary farmers fear that when GMOs are introduced, traditional organic foods and cultures will be eroded. They would have to buy fertilizers, insecticides, acaricides and equipment, and develop a dependency on the multinational companies that own and sell GMOs. The uncertainty surrounding the bill continues and there are many questions open to debate. For example, with its lush green forests, fertile soils, abundant rainfall and a surfeit of other sources of water, does Uganda really need GMOs?

In the context of this article, the authors retaliate by advocating the dire need for government programmes to address the current problems of on-farm post-harvest losses, currently estimated between 5 and 15 percent for cereals and legumes, 20–25 percent for root and tubers, and over 35 percent for fruit and vegetables. These losses occur along the chain from farm to fork, resulting in higher food prices and lost revenue for producers and consumers, leading to both food and nutrition insecurity. Efforts to develop the emerging niche organic markets for certified organic agricultural products alongside the conventional market are generally consistent with the literature on the economics of organic farming in developed countries. Looking at the relative revenue effects of organic and conventional agriculture in the European Union (EU) and the United States of America, the authors find broadly similar levels of profitability for the two farming systems, where price premiums and lower non-labour input costs compensate for organic agriculture's normally lower yields (Gibbon, Lin and Jones, 2009). Although organic farming may not be able to feed the growing population on its own, it has an important role to play in feeding a growing niche population while minimizing environmental damage.

Given the above debates on sustainable agriculture in Uganda, a case study on the Kangulumira Area Cooperative Enterprise (KACE) takes the view that sustainable production systems can be developed by linking sustainable agro-ecological farming practices to high-value markets through innovative products and services, as well as novel institutional approaches. KACE represents a model where farmers are organized to market agricultural products farmed according to agro-ecological/organic practices.

KACE is located in Kayunga district, central Uganda. It is a membership-based farmer cooperative set up in 2003. The cooperative has three core enterprises, namely pineapples, coffee and maize. Pineapples are most important in terms of land area planted by farmers, volumes of harvest and subsequent revenue. All pineapple farmers are organic certified (Institute for Market Ecology [IMO] certification standard) and a small number are in the process of changing over to organic production. KACE also works with a small number of conventional producers, mostly coffee and maize farmers.

The pineapple growers in Kayunga district can be classified as high- or low-input farmers. The distinction is based on landholding and degree of commercialization. High-input farmers typically own an average of 3 acres (1.2 ha) of pineapples in dedicated commercial production. These farmers invest in synthetic chemicals and substantial amounts of coffee husks as fertilizer sources. Low-input farmers grow pineapples on small landholdings averaging 0.5 acre (0.2 ha) and mainly depend on their on-farm resources for improvement of soil fertility and weed control. Informed estimates based on average expectations for high- and low-input farmers in Kayunga district are shown in Table 13.1.

Research methodology

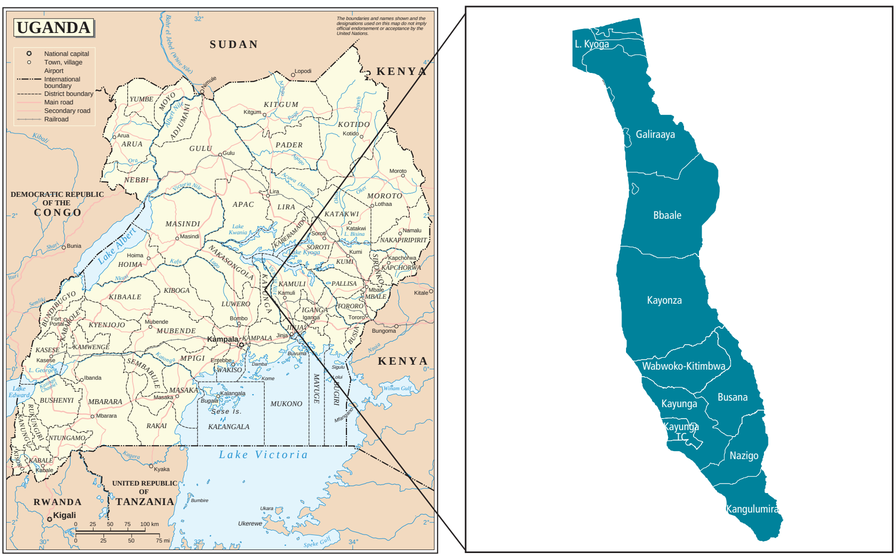
This paper is based on data gathered during several baseline surveys conducted by the authors between 2011 and 2012 under the Productivity and Growth in Organic

TABLE 13.1
Estimated average production for high- and low-input farmers in Kayunga district

Input level Number of farmers	High 1 500	Low 4 500
Average fruit size (kg)	3	2
Number of pineapples harvested/acre/season	8 000	6 500
Area planted (acres)	3	1
Total harvest volume/season (tonnes)	108 000	58 500
Estimated total annual production	50 000	28 000

Note: one acre = 0.4 ha.
Source: authors' elaboration.

FIGURE 13.1
Location and boundaries of Kayunga district



Source: United Nations Cartographic Section, 2003; National Statistical Office, 2003.

Value Chains (ProGrOV) project.[38] Primary data were supplemented with secondary data from KACE records, exporters and Web-based resources. In addition, a focus group discussion was used to substantiate data in the surveys and secondary sources. The paper has been organized in seven sections. The first section provides background information and research methodology. The second and third sections describe the innovative institutional landscape and the sustainable agricultural practices promoted by KACE. Section 4 examines the available pineapple markets, consumer product attributes of market players and consumption patterns. Section 5 provides a summary of the authors' findings, before drawing conclusions about the role of KACE in promoting sustainable agricultural practices in section 6. Finally, recommendations are made on the way forward in terms of upscaling the innovation and overcoming some of the challenges identified.

13.2 INSTITUTIONAL LANDSCAPE

The operations, successes and failures of KACE are greatly influenced by the institutional environment in which it operates. Figure 13.2 shows the institutions with which KACE is linked. KACE is one of the cooperative societies overseen by the Uganda Cooperative Alliance (UCA). UCA is currently reviving cooperatives after they collapsed in the 1970s because of political turmoil, and after the liberalization policies of the 1990s.

The cooperative movement in Uganda was born in 1913 to fight against the exploitation of private European and Asian interests that sought to monopolize domestic and export marketing, especially of cotton and coffee. As the two major income earners, coffee and cotton became the centre of cooperative activities in Uganda in which both the colonial and post-independence governments were keenly interested.

The cooperative movement expanded immensely and, by 1961, Uganda had 21 registered cooperative unions, including UCA and 1 662 primary cooperative societies, with a membership of 252 378. Following Uganda's political independence in 1962, the Government favoured cooperatives as policy instruments for rural development. It put policies in place to ensure the achievement of that aim. The 1952 Ordinance was repealed by the 1963 Cooperative Societies Act. By 1971, there were over 2 500 primary cooperative societies with more than 750 000 family members and 36 unions, including four national unions, owning 53 cotton ginneries with an average turnover of over 440 000 bales, worth more than 315 million Uganda shillings (UGX). They also owned 31 coffee factories and 34 pulperies with an annual turnover of 147 000 tonnes of clean coffee worth more than UGX455 million. The cooperative movement had assets valued at UGX500 million.

The slow death of cooperatives began in 1971, as Uganda started changing governments through wars, which also saw the expulsion of Indians in 1972. The

[38] ProGrOV is a multidisciplinary research project that is currently being undertaken in three East African countries and other partner universities in Denmark. The partners are Makerere University in Uganda, University of Nairobi in Kenya and Sokoine University of Agriculture in the United Republic of Tanzania. The project started in 2011 and will be closed in 2015. It is funded by DANIDA and implemented by the International Centre for Research in Organic Food Systems (ICROFS) as the lead institution.

departure of other expatriate personnel because of Ugandan policies, plus increasing pressures of economic and political self-interest, exacerbated the situation. Cooperatives became a bed of mismanagement, corruption and embezzlement. Moreover, the enormous expansion of the cooperative movement surpassed the cooperative department's ability to monitor operations of the cooperatives closely.

From 1986 to the early 1990s, there were heightened expectations as the government in power at the time was supportive in amending the 1970 Cooperative Societies Act to restore considerable autonomy to the cooperative movement through the 1991 Cooperative Societies Statute. The real revival of cooperatives began in the 1990s with the defunct Entandikwa credit scheme and the Youth Enterprise Scheme (YES), which collapsed through poor administration. In 2006, the Savings and Credit Cooperative Societies (SACCOs) were established under the Prosperity for All (PFA) scheme. SACCOs were intended to provide people with safety nets against market effects. They are also a channel through which the Government can instigate positive action for youth, the elderly and women to engage in production. Increasingly, it is being realized that a revitalized cooperative movement could hold the key to problems related to sustainable, people-centred and equitable development.

FIGURE 13.2
KACE's institutional environment

KACE tertiary linkages	Fruits of the Nile (FON)	Certification and training
	Government bodies, e.g. National Agricultural Advisory Services (NAADS)	Training; obtains clean planting materials from KACE farmers
KACE secondary linkages	National Organic Agricultural Movement of Uganda (NOGAMU)	Coordination of organic sector
	Fruits of the Nile Association (FONA)	Buys pineapples from various associations
	Kayunga District Farmers Association (KADIFA)	Institutional support; market lobby
	ABi Trust	Institutional support
	Other NGOs (TechnoServe, Netherlands Development Organisation [SNV], German Agency for International Cooperation [GIZ])	Training; market lobby
KACE primary linkages	Uganda Cooperative Alliance (UCA)	Advises/monitors activities of KACE
	Kayunga Fruits of the Nile Growers' Association (KFONA)	Bulks dried pineapples from KACE

Source: authors' elaboration.

Area Cooperative Enterprises (ACEs) perform a number of functions, which include bulk marketing, value addition, sustainable use of natural resources and formation of microfinance institutions. ACEs are essential in reducing poverty and social exclusion and in promoting rural and national development (Develtere, Pollet and Wanyama, 2009). The success and vibrancy of cooperatives are a result of adherence to the cardinal cooperative principles of "member owner, member user and member control" as well as to the values of honesty, transparency and accountability. The support provided by UCA has enabled the management of KACE to receive training in governance, financial management, auditing and cross-cutting issues such as HIV/AIDS.

KACE, however, is unique among many other ACEs in the country. It is one of the few where farmers in their producer organizations are directly involved in value addition and selling of high-value products. ACEs promote sustainable agriculture practices as one of their core objectives, which is not apparent in many of the ACEs that operate in the country. KACE has different marketing channels – the largest is the Kayunga Fruits of the Nile Growers' Association (KFONA), where it sells dried pineapples. Under KFONA, pineapples from KACE are bulked together with those from other 25 pineapple processors in the district. Prior to the formation of KFONA, farmers sold conventional dry pineapples individually to Fruits of the Nile (FON), an exporting company. However, in 2006, export markets insisted that pineapples be organically produced, according to fairtrade standards. Thus, KFONA was formed and, since 2009, its role is primarily in bulking organic pineapples from various processors, including KACE.

The secondary linkages in KACE's operations are NOGAMU, KADIFA, FONA, aBi Trust and other Non-governmental Organizations (NGOs) (Figure 13.2). The National Organic Agricultural Movement of Uganda (NOGAMU) coordinates the organic sector in the country and is involved in all stages of the organic value chain. KACE benefits from NOGAMU through lobbying and advocacy, provision of services such as organic market information, training in organic agriculture and quality control. NOGAMU is primarily involved in pushing organic policy through parliament; the policy is still in draft form.

Kayunga District Farmers Association (KADIFA) is an important partner for KACE. It is an umbrella association for all organized farmer groups in the district. For example, KACE has been able to gain support from aBi Trust to procure solar drying equipment. Other services that farmers have received from KADIFA include training in entrepreneurship, leadership, gender issues, good fruit processing practices, certification of KACE products, savings, health and environmental protection. KACE in turn provides routine performance reports to KADIFA.

The presence of KACE as an organized cooperative is important for other NGOs to be able to link and work with it. NGOs that have worked with farmers in the space of three years include TechnoServe, the Netherlands Development Organisation (SNV) and the German Agency for International Cooperation (GIZ). These NGOs have been crucial in supplementing KACE's efforts in searching for markets. For example, through SNV, farmers were able to access markets for pineapples in Nairobi and in South Sudan.

KACE is closely linked to FONA (Fruits of the Nile Association) through KFONA. FONA bulks export commodities for FON. Specifically, it aggregates dried pineapples supplied by KFONA. FONA is responsible for certifying farmers and ensuring adherence to quality and compliance with organic and fairtrade standards. FONA holds the organic and fairtrade certificates for producers in KFONA, including KACE producers. However, KFONA and FONA make the value chain longer and, as a result; there may be delays in payments or mistrust among actors because of non-direct contacts with end buyers.

Tertiary linkages include FON and government bodies, especially the National Agricultural Advisory Services (NAADs). FON is an exporter company that buys and sells dried pineapples overseas. Although not directly involved with farmers, FON ensures through FONA that farmers adhere to organic and fairtrade standards, maintain quality and receive payments and training. NAADS are the Government's agricultural extension arm. They offer demand-driven training from farmer groups. Training does not necessary target organic farming but does focus on sustainable production practices. NAADS benefit from KACE organic farmers because most of the clean planting materials they distribute to conventional farmers in the district or other districts in Uganda are obtained from KACE. Occasionally, farmers access NAADS government financial support that is channelled through the KACE SACCO.

The organic policy environment in which KACE operates is weak. Currently, there is no organic policy in the country to support the young organic sector. The policy has been in draft form for more than ten years, awaiting a parliament bill. The organic sector thus operates in a state of uncertainty in the face of other legislation that may potentially suppress it, specifically the GMO bill debate and the use of DDT for indoor spraying in a bid to prevent malaria. These are seen by organic agriculture promoters as policies that could compromise organic agriculture development. However, there are a number of non-direct government policies and legislations that enable organic systems to thrive. NDP prioritizes agriculture as a key driver in development (NDP, 2010). The importance of sustainable production systems is emphasized in the plan as a production method that ensures sustainable agricultural growth through increased productivity, value addition and access to markets. There are a number of other national policies that partly relate to organic agriculture such as NAP, NIKP and NEMP. However, these policies do not have functioning programmes specifically to support organic agriculture and organic production principles.

13.3 INSTITUTIONAL INNOVATION: KANGULUMIRA AREA COOPERATIVE ENTERPRISE (KACE)

Background and organizational structure

KACE was established in 2003 and is a member of UCA, the national umbrella organization mandated to oversee the successful operation of cooperatives in the country. The objectives of its formation were to: (i) organize small producers to enhance market opportunities; (ii) train farmers on sustainable farming practices; (iii) create linkages with development partners; and (iv) engage farmers in a credit and savings scheme. It was envisaged that through KACE farmers would access better markets and bargain collectively for better prices for their organic pineapple produce. It was also envisaged that through KACE farmers could obtain training on sustainable production and be linked to preferential markets. Pineapples are the most important enterprise in terms of land area, volumes of harvest and subsequent revenue. Conventional producers who wish to convert to organic farming undergo a mandatory three-year conversion period before their products can be marketed as organic. KACE works with organic pineapple farmers to link sustainable agro-ecological farming practices.

KACE currently comprises 32 smallholder farmer groups, also known as rural producer organizations (RPOs). Each RPO contributes a share capital of US$20[39] annually and US$6/farmer as an annual subscription to the cooperative. An RPO has a democratically elected leadership of nine members (five males and four females). KACE is able to reach out to a total of 3 234 individual farmers: 1 068 male adults, 687 male youth; and 973 female adults and 506 female youth. The cooperative gives pineapple farmers avenues for bulking, processing and marketing their produce. As mentioned earlier, KACE works in partnership with other institutions, and works through committees to extend services to its members. A committee on extension and advisory services is responsible for ensuring that farmers receive training and advice on sustainable farming and good post-harvest methods.

Although intensifying the productivity of pineapples has been a priority on KACE's agenda, approaches such as organic production and value addition have been a means to tap into market opportunities. Over time, the cooperative has provided demonstrable results in providing a viable avenue for greater developmental impact in terms of improved farmer incomes and livelihoods. This has been a result of various factors such as organic premium prices, improved productivity resulting from sustainable agro-ecological practices, organized marketing and product value addition.

There are no strict formal contractual arrangements between KACE and those responsible for buying and/or selling their produce. Contracts between KACE and buyers are flexible and not binding. Although it is realized that contracts are important, there is apprehension about indulging in binding commitments because of fear of failure to honour all the terms of the contract. Working under contract may also expose the cooperative to losses should the strong party in the contract (the buyer) fail to honour its obligation to buy produce, especially in peak harvest periods when farmers have invested a great deal.

FONA, which subscribes to fairtrade, has found fit to let farmers have flexibility in selling their produce to a buyer offering the best prices. However, the long-term commercial relationship without binding contracts between KACE farmers and KFONA has existed because it provided farmers with a steady market and price for their produce. According to farmers, this is better than the erratic markets of South Sudan, for example, which provide high prices but fluctuate as at present, when the market is at a standstill through civil strife.

KACE and its clients have continued to coexist as a result of the evident mutual benefits accrued by both the exporters in the form of bulked products and the pineapple farmers who are assured of ready markets, with KACE acting as the hub. Linkages between producers and markets, mainly organic, are enforced through an internal control system (ICS) to ensure adherence to organic standards throughout the production and processing of pineapples. ICS is a documented quality assurance

[39] Exchange rate used: US$1 = 2 500 Uganda shillings.

system for monitoring and ensuring compliance with organic standards among smallholder farmers (producers) and associated handling and processing, if any. It is developed and implemented by the operator (KFONA) to ensure compliance with organic production standards. It binds all farmers to produce in an organic manner and contains procedures for constant monitoring and handling of violations and deviations from organic standards.

Sustainable agricultural practices

Collective marketing under KACE has demonstrated that pineapples are a profitable enterprise. However, years of continuous cultivation with little or no strategy to replenish soil fertility have resulted in a gradual decline in productivity. To ensure continued production, farmers have adopted several sustainable production strategies. These include the use of coffee husks as both fertilizer and mulch.

Mulch is essential in conserving soil moisture and suppressing weed growth. Conventional farmers use minimal synthetic agrochemicals to control pests and weeds, while organic farmers use alternative approaches such as herbal remedies for pest control, and hand weeding. To ensure minimal contamination from synthetic chemicals, KACE encourages organic farmers to plant elephant grass (*Pennisetum purpureum*) on the boundaries of their plots to prevent chemical drifts from neighbouring conventional farms. The grass helps to prevent soil erosion and is used as animal feed.

Intercropping of pineapples with bananas is a common practice. In the first 12 months of planting pineapples, they are intercropped with annual crops such as maize and beans. After 12 months, they are intercropped with bananas. Benefits are twofold: first, the maize, beans and bananas are sold for additional income; and second, bananas and beans are staple foods and therefore farmers are assured of food for their families. Other fruits such as paw paw, which have a high domestic market demand, are usually planted on the boundaries of the pineapple plantations.

Integrated farming involving livestock is a practice encouraged by KACE. Livestock help in nutrient recycling through the use of animal manure for improving soil fertility, while crop residues serve as a feed resource. Livestock provide high biological value proteins of animal origin in the form of meat and milk for both sale and home consumption, thereby improving household nutrition and incomes. Such integrated farming systems have enhanced efficient on-farm resource utilization and waste management, leading not only to economic but also to environmental benefits in the form of improved ecosystem health.

How KACE promotes sustainable agro-ecological practices

KACE has the opportunity of soliciting training on behalf of its members from NGOs and local government authorities. It also organizes field exchange visits to successful farmers so that they can share their experiences and benefits with farmers in the cooperative, thereby accelerating adoption. By targeting preferential markets such as organic markets and those that are fairtrade certified, KACE has been able to promote sustainable farming practices because these are specific requirements for such markets.

KACE has an open policy of working with researchers focusing on developing technologies that address farmers' challenges, and solving them with agro-ecological practices. The latest collaboration has been on developing organic agricultural strategies for addressing the challenges of pineapple pests, particularly mealybugs, soil fertility and the use of pineapple waste as dry season feed for livestock under the ProGrOV project. KACE has encouraged its members to be part of this on-farm research to evaluate farming practices as solutions to the challenges of sustainable pineapple production.

Incentives for adoption of sustainable agro-ecological practices

Bulking, storage and value addition services offered by the cooperative have enabled pineapple farmers to realize a steady market and a better margin for their products as compared with their counterparts who are not members of the cooperative. The cooperative receives consignment orders from several bulk buyers who do not deal with individual farmers. Through its network of contacts, the cooperative has access to international, regional and local organic markets. This has stimulated more KACE farmers to practise organic farming with its strict requirement to adhere to sustainable agro-ecological practices.

The cooperative, with support from its development partners, has acquired the standard mark of the Uganda National Bureau of Standards (UNBS) for its dried pineapples, with wines and juices yet to be certified. Attainment of this mark, which also comes as a result of good farming practices, has improved the market share of the cooperative's products to beyond the radius of the cooperative.

KACE is linked to companies that are fair-trade certified. According to farmers, premiums accrued from the sale of pineapples are sent back to them for community development purposes. This has encouraged them to adhere to the sustainable practices promoted by fair-trade. An additional incentive has been knowledge enhancement through training on pertinent issues such as integrated pest and soil fertility management, value addition and financial management. In partnership with its FON clients, KACE has mechanisms ensuring that farmers adhere to sustainable production practices. These include supervision by an extension team from FON at the start of every season for compliance. An internal supervision committee visits and takes note of specific changes in farmers' fields. Spot auditing is carried out by the third party responsible for certification of the organic farmers' category. The organic farmers in KACE are both fair-trade and organic certified.

Markets for sustainable products and services

KACE markets both fresh and dried pineapple as its major produce and also offers a market for dried bananas, dried tomatoes, juices and wines. It accesses markets for fresh pineapple through two main market channels.

Domestic markets. These mainly include the public markets of Kampala, e.g. Nakasero, Kalerwe, Owino and Nakawa. Other city markets are also important but there are insufficient data available as to the contribution of these markets across the country. The domestic market absorbs about 30 percent of pineapples produced. Interviews held with trader organizations in the main public markets of Kampala, and estimates made of the total supply of fresh pineapple entering the domestic market are shown in Table 13.2. The figures represent the number of Fuso trucks (nominally containing 12 tonnes of pineapple, but usually much more).

Regional and extraregional markets. Fresh pineapples are destined for Nairobi, other towns in Kenya and Juba in South Sudan. For the Nairobi market, and on the

TABLE 13.2
Average weekly truck deliveries of pineapples to Kampala markets in high and low season

	High season (December/January/February)	Low season (March/June/July)	Total (tonnes)
Nakasero	60	25	
Kalerwe	15	5	
Owino	12	2	
Nakawa	16	8	
Weekly truck volume	103	40	
Seasonal truck volume (12 weeks)	1 236	480	
Seasonal tonnage (12 weeks)	14 832	5 760	20 592
Total estimate off-season tonnage (28 weeks)			7 500
Total annual tonnage for Kampala			**28 092**

Source: interviews with trader organizations in the main public markets of Kampala.

basis of a Fuso truck holding 5 000 pineapples, export costs range from duty at the border of US$70; weighbridge charges of US$46.4 (there are several compulsory weighbridges en route to Nairobi); payment (US$116) to Nairobi City Council for offloading at the market; and fuel and driver costs. All-in costs per truck servicing the Nairobi market are approximately US$870.

At Juba market, Ugandan exporters can sell direct to retailers rather than brokers, and there are no weighbridge charges, but there are offloading charges levied by the market (US$70/truck). Charges at the border are about US$520/truck but, because of the distance, poor roads and delays, fuel costs are currently running at US$2 000/truck, plus driver costs and incidentals.

Interviews with export traders in Kayunga revealed that typical export volumes to Nairobi and Juba were about fifteen 12-tonne truckloads[40] per week to each of the two destinations in the main supply season (December to February), and about seven 12-tonne truckloads per week to each market in the low season (May to July). Outside the two principal supply seasons, exports are infrequent and small in volume, because of low harvests and the high domestic prices enjoyed during such periods. Table 13.3 summarizes the seasonal and annual volumes of pineapple destined for Kenya and South Sudan.

[40] Fuso trucks are of a standard size and are used in the transport and export of most fresh produce, including pineapples. These trucks are nominally rated at 10 tonnes but are systematically overloaded to around 12 tonnes of fresh pineapples. This overloading, while saving transport costs for the truck operator, presents many problems at border posts and official weighbridges en route to Nairobi. The weighbridge staff know only too well the recommended maximum tonnage for Fuso trucks and oblige truck operators either to pay an on-the-spot fine or come to some informal arrangement. It is therefore debatable as to whether overloading export trucks saves costs or not.

TABLE 13.3
Volumes of pineapple destined for regional markets

Destination market	High-season volume (12 weeks)	Low-season volume (12 weeks)	Off-season volume (28 weeks)	Annual volume (52 weeks)
Kenya	180 trucks	84 trucks	28 trucks	292 trucks
South Sudan	180 trucks	84 trucks	28 trucks	292 trucks
Seasonal volume	360 trucks	168 trucks	56 trucks	584 trucks
Seasonal tonnage	4 320	2 016	672	7 008

Source: interviews with trader organizations in the main public markets of Kampala.

The major market outlet for sales of *dried pineapple* is FON and also the owner and manager of Tropical Wholefoods in the United Kingdom. Local markets for KACE dried pineapples are commanded by FONA, Amfri Farms Ltd, NOGAMU and Tropical Foods Processing and Packaging Investment (Trofoppi). According to KACE, 90 percent of sales are to FONA through KFONA and only 10 percent through local markets. Despite low demand, local markets fetch a higher price (US$4/kg) compared with the export market (US$3.3/kg). However, local markets are not consistent and only peak in the low harvest season as opposed to selling to FON, which provides a market throughout the year for dried fruits.

Processed pineapple wine. Pure fresh pineapple juice does not appeal to the majority of local consumers, so the brands on the market are largely blends and cocktails, mixed with other fruit. KACE has specialized in extracting pineapple juice to process into wine. Forty-eight squeezed fresh pineapples make 20 litres of juice, to which 3 kg of sugar are added, plus yeast to kick start the fermentation process. The wine takes nine months to mature but is worth the wait because 25 bottles are obtained from the 20 litres of juice. Each bottle of pineapple wine costs US$4. If compared with the initial price of US$0.2 per pineapple (48 x 0.2 = US$9.6), it is extremely profitable. The wine is stocked by local supermarkets but is currently not sold under a particular certified brand, except KACE.

Organization of the supply chain

KACE's supply chain is typified by three major stakeholders: KACE, KFONA and FON, plus the actors in local and regional markets. The roles of the different actors and linkages in the chain are summarized in Figure 13.3.

Description of production volumes, prices and gross margins of fruit produced by KACE

- KACE pays US$0.2 for fresh pineapples and the average weight of a pineapple from Kayunga is 2 kg. The farmer therefore earns US$0.2 per pineapple.
- The fresh to dry ratio of pineapple is approximately 6:1.
- Therefore, six pineapples (12 kg) are required to produce 1 kg of dried fruit. The farmer earns US$1.2 from six pineapples.

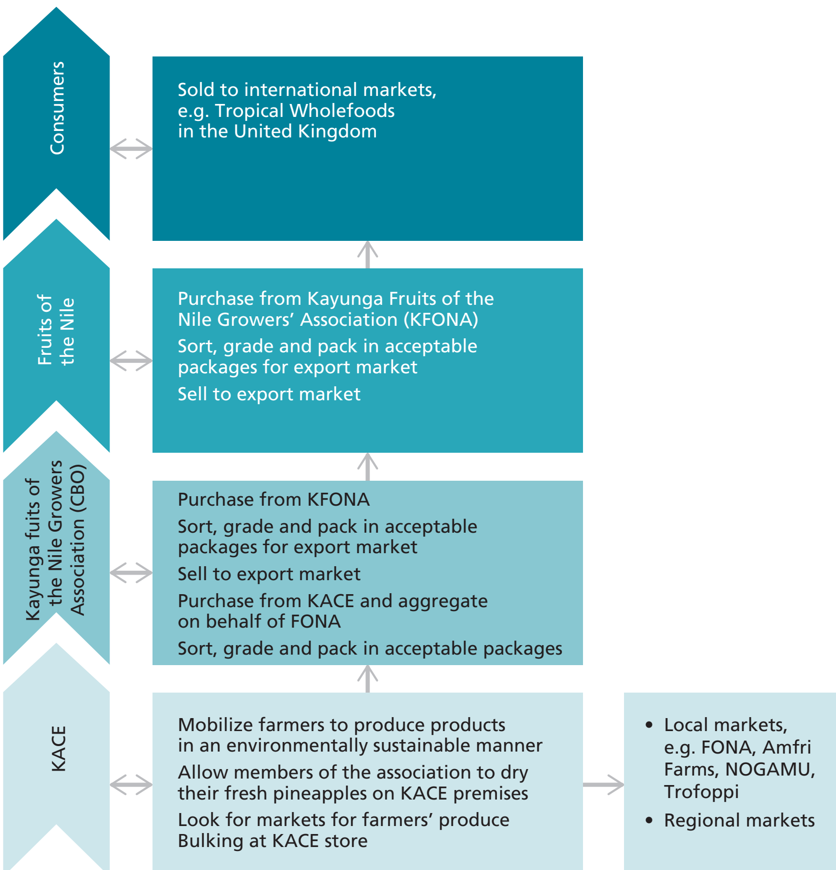
If farmers opt for value addition, KACE allows them access to equipment. Value addition first involves sorting, then storage for ripening, sorting for drying, cleaning before slicing, slicing, loading of trays, drying, offloading solar driers, sorting and grading, packaging, storage and marketing.

On the basis of the above, and compared with sales of fresh pineapple (6 x US$0.2 = US$1.2), a farmer sells 1 kg of dried fruit at US$3.4 to KFONA and US$4/kg at the local organic market.

By contrast, one bunch of fresh apple bananas (costing on average US$2) produces 3 kg of dried fruit. Each kg of dried apple bananas at the local market costs about US$2.8. Table 13.4 shows the cost of produce processed by KACE, the prices at which products are sold and the gross profits attained.

Export sales prices were not available from FON because of confidentiality issues. In addition, other small costs related to machinery, labour, entrepreneurship and continued training of farmers are all deducted at the margin charge of approxi-

FIGURE 13.3
KACE supply chain



Source: authors' elaboration.

mately US$0.06/kg for every type of fruit that is sold through the cooperative. Table 13.5 shows KACE's estimated monthly revenues for peak and off peak seasons for the different product types, while Figure 13.4 highlights the value created along the dried pineapple value chain.

Promoters of the markets for sustainable products

Companies that deal in exports of products to organic and fairtrade markets have done a great deal to promote agro-ecological production, which is a requirement for such markets. In return, farmers selling to these companies receive a premium price for their products. This is demonstrated in KACE where FON, which is accredited to fairtrade, receives a premium for organically produced products that it later extends back to the farmers for community development projects such as the provision of clean water and tree planting.

TABLE 13.4
Purchase price of products, selling price and gross margins

Product	**Unit cost** (US$) **Farmgate purchase price**	**Sales price** (US$)	**Gross margin** (US$)
Dried pineapples	0.2 x six pineapples = 1.2	3.3	2.1
Pineapple wine	0.2 x 12 pineapples = 2.4 Sugar 3 kg @ US$1.2/kg = 3.6 Yeast and sodium benzoate = 1.2	4 x 25 = 100	92.8
Apple bananas	2.0 x one bunch = 2.0	2.8 x 3 kg = 8.4	6.4

Source: authors' elaboration.

TABLE 13.5
Projected annual production and sales of fruit sold through KACE (average tonnes)

Product	**Dried fruit**	**Unit price (sales price)** (US$)	**KACE/farmers' total revenue (peak and off peak)** (US$)	**Supply pattern**
Dried pineapples	6 000 (peak = 3.5 tonnes; off peak = 2.5 tonnes)	3.3/kg dried fruit	19 800	Peak season months (Dec, Jan, Feb and March); off peak (June, July and August)
Fresh pineapples	138 000 (peak = 70 000 pieces; off peak = 68 000 pieces)	0.6	82 800	Peak season months (Dec, Jan, Feb and March); off peak (June, July and August)
Dried apple bananas	180 kg/ month x 8 = 1 440 kg	2.8	4 032	Eight months on average in a year
Pineapple wine	Five jerry cans in a year	(25 x US$4.0 x 5)	500	All year
Tomatoes	200 kg	4.8	960	Still a new enterprise

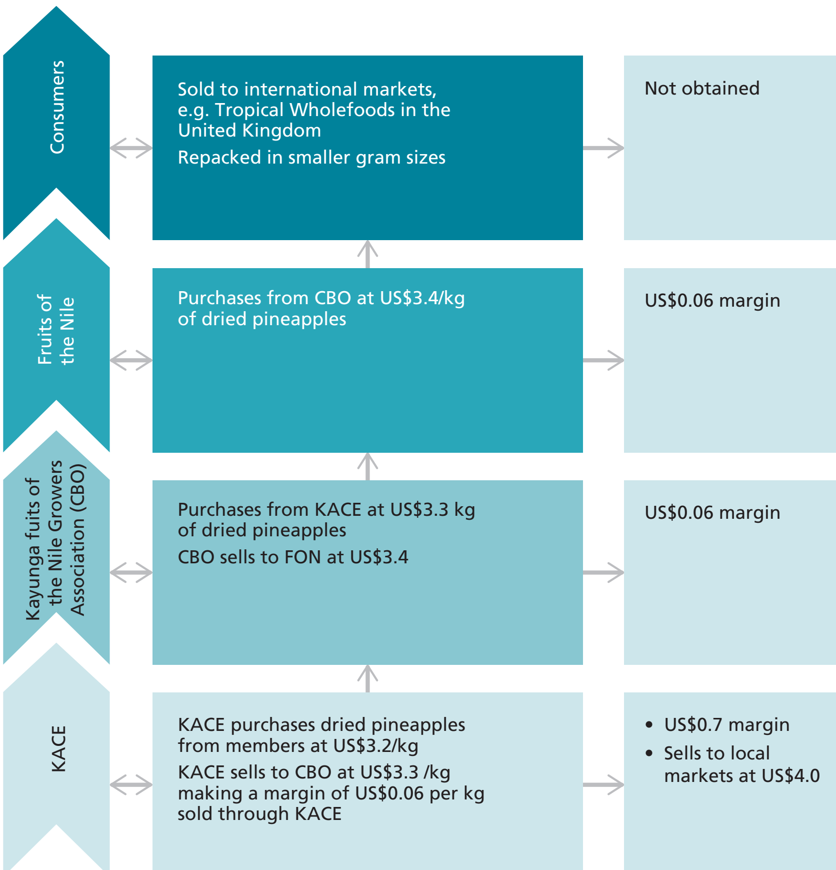
Source: authors' elaboration.

13.4 RESULTS AND BENEFITS

Through KACE, farmers have gained bargaining power and are thus offered better prices for their pineapples than when they sold as individuals. Members of the cooperative have the advantage of selling their pineapples to organic buyers at a relatively better price in times of plenty, compared with individual farmers who sell at very low local prices. Farmers have received other benefits such as training on agronomic practices, post-harvest handling, processing and marketing.

Moreover, farmers have benefited from better access to basic services because of enhanced income levels. KACE has instigated a savings culture in its members, which has enabled them to build cash reserves that have improved their livelihoods. For example, farmers in the cooperative are able to send their children to better schools and can afford items such as mosquito nets that are essential in controlling malaria. They do not need to wait for government donations.

FIGURE 13.4
Value creation along the dried pineapple value chain



Source: authors' elaboration.

The organization of farmers in a cooperative has attracted support from other NGOs. These have mainly been important in training farmers, searching for markets and training in other socio-economic aspects, etc. Some have been helpful in providing equipment such as solar drying equipment, and equipment for making wine and juices. KACE's innovative approach has also received the benefit of attention from the media. It has featured on local television and radio as one of the successful agribusiness enterprises that has been able to fight rural poverty. Because of this publicity, KACE has continued to receive other organized farmer groups seeking to learn about the management of product development through value addition.

There are some problems between KACE and its partners, particularly with FONA, a key partner. The main problems are delays in payment to farmers after delivery of the dried fruit, and the fact that prices offered are low compared with the labour costs involved in the production process, especially for farmers who weed rather than using chemicals for weed control. This can discourage them from ecological practices. However, they generally remain involved because FONA gives them a consistent and ready market and price even in peak seasons when prices are generally low elsewhere.

13.5 CONCLUSIONS

Overall sustainable farming practices, particularly organic farming, are widely applauded for their contributions to people, animals and the environment through the sustainable production of food, feed, fibre and fuel, without the use of any contaminants such as synthetic pesticides and herbicides, GMOs or growth regulators. By their nature, organic crop management practices can contribute to mitigating and adapting to the impacts of climate change, and enhancing the resilience of farms and rural livelihoods. While Uganda's policies, plans, programmes and strategies are in support of sustainable agriculture, most of them remain on paper and are not widely implemented. The focus therefore should be on how to produce more food sustainably but not necessarily with increased productivity and commercialization at the expense of sustainability. It is a fact that current conventional farming practices have resulted in problems such as deforestation, land degradation, water scarcity, greenhouse gas emissions, decline in pollinators, malnutrition, diet-related diseases, land grabbing, human rights abuse and ecosystem toxicity. Therefore, as a first step, the Government of Uganda needs to improve and increase the enforcement of already existing policies that promote agricultural sustainability.

Moreover, there are wider in-country debates currently surrounding sustainable agriculture practices, such as the debates on GMO and DDT. The KACE case study provides a model to develop organic agriculture as an important tool in sustainable food production. The model illustrates avenues for coexistence between different farming systems. At present, there are large overlaps between traditional farming that is organic compatible ("organic by default"), traditional farming that may sometimes use conventional inputs depending largely on the fertility of soils and whether smallholders can afford these inputs, and certified organic production, which is highly regulated. Important to note is that in KACE's case, a key driver is the trade-off practised by all, ensuring that environmental concerns are addressed and markets drive sustainable production. The flexibility in the model allows for greater innovations that bring on board different actors through public-private partnerships (PPPs).

The model is self-sustaining in the sense that it operates as a hub – incorporating other services such as SACCOs, village savings and loan associations (VSLAs), input providers, output markets and extension outreach. Therefore, KACE's institutional innovativeness lies in the welding of a marketing cooperative, a SACCO and product processing within one organization. It has embedded standards, technologies, financial resources, education and markets within one structured network.

Amid its achievements, KACE faces several challenges. Currently, it is still underfunded to be able to invest in a wide range of products for value addition. It has received some processing equipment from its development partners such as aBi Trust, but the machinery is working below capacity because of electrical load shedding and high electricity tariffs. In addition, because of delays that farmers sometimes experience in receiving payments for the fresh produce they sell to the cooperative, they may opt to sell directly to traders in order to get immediate cash despite the fact that these traders often exploit them by paying very low prices.

To address some of these challenges, the cooperative continuously emphasizes the benefits of collective effort. Farmers also undergo training on sustainable production practices. The leadership of the cooperative continues to engage in training so as to run the cooperative more efficiently. Currently, the initiative has attracted a lot of media attention, including television documentaries, about its activities, which gives an opportunity for other cooperatives in the country to learn how to improve the running of their own affairs.

13.6 RECOMMENDATIONS

In recognition of KACE's market-driven sustainable practices, the key recommendations of this study are the following.

- Need for integration of livestock and crop production to enable the production of valuable livestock products while sustaining the fertility of the production system through recycling and production of plant absorbable nutrients, aided by composting.
- Integration of trees and other perennials into crop production, which facilitate uptake and recycling of nutrients for different soil layers, while intensifying production through multiple additional services such as fruits, nuts, organic matter and fodder from leaves, soil cover and habitats for beneficial insects, and the provision of carbon sequestration, windbreaks and shade. Such sustainable intensification of production and resilience is highly suitable for many smallholder farmers who sell sustainably produced products.
- To stimulate growth and circumvent supply-side market failures that emerge when organic products are not segregated and are non-existent on the shelves of high-end markets, the Government of Uganda needs to introduce regulations concerning the certification and labelling of organic food. These will satisfy market demand for information and create incentives for demand of sustainably produced foods. In the absence of a unifying domestic logo, organic food consumers are not able to ascertain the nature of the products they purchase. Currently, Uganda has local brands for organic products based on Ugandan and East African organic standards, but these are not yet popular among local consumers. Therefore, the Ugandan and East African *Kilimo Hai* organic mark needs to be popularized through vigorous advocacy campaigns so as to stimulate local consumption of organic products.

- Through partnership between government and the private sector, the institutional capacity of organizations such as KACE to engage end markets for their produce needs to be strengthened. This will lessen the number of actors in the chain, increase margins and reduce the transaction costs associated with longer chains.

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Chapter 14
Songhai model of integrated production in Benin

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14.1 INTRODUCTION

This chapter introduces an innovation within the agriculture sector in Benin: the Songhai Centre's integrated production model. The centre focuses on an integrated production system, but its innovation is in creating a solid network of regional hubs that excel in sustainable production and have established local markets for sustainably produced goods that are accessible and affordable for the majority of the population.

The agricultural sector in Benin comprises some 550 000 farms, mainly small family farms focusing essentially on mixed food crop farming and small animal farming. More than 60 percent of male workers and 36 percent of female workers in full employment are in agriculture (second General Population and Housing Census [RGPH2], INSAE, 2004). Approximately 34 percent of farms have less than 1 ha of land, while only 5 percent of farms in the south of the country and 20 percent in the north boast more than 5 ha (MAEP, 2011). Current production methods are still predominantly based on extensive systems that are highly dependent on natural resources. Significant progress can increasingly be observed with the creation of modern farms (orchards, intensive small animal farming, fish farming, etc.) by private promoters.

Generally speaking, the agricultural sector represents 70 percent of all employment, generates between 70 and 80 percent of export revenue and accounts for 15 percent of state revenue. Its contribution to the gross domestic product (GDP) of the primary sector, which includes agriculture, stock farming, fishing and forestry, has grown steadily from 351 billion CFA francs (XOF) in 2003 to 490 billion in 2012. We observe a regularity in the ratio (38 percent) of the contribution of the primary sector and GDP at constant prices. More than 72 percent of this contribution is provided by the agriculture subsector. Nevertheless, agriculture in Benin remains essentially a prime example of subsistence farming with a low level of mechanization and with little use of technologies and improved inputs. It is consequently unattractive to the younger generation who prefer to invest in new non-agricultural activities such as the sale of black market petrol and driving motorcycle taxis, if indeed they do not head to neighbouring Nigeria to sell their labour.

There are a number of sustainability problems within the Beninese agriculture sector. First, farmers still use only a little organic fertilizer and few phytosanitary products for crop cultivation, and few veterinary products or improved inputs for livestock. This limited use of the essential inputs for production is key to explaining the considerable productivity gap between results obtained by producers and those obtained in research trials. Small traditional tools also remain predominant in most farming practices, which means that a great deal needs to be done in terms of mechanization, processing and post-harvest storage in the agricultural sector.

Second, the funding situation in the sector continues to be marked by a mismatch between capital costs and internal profitability, resulting in difficulties in paying back loans and producer over-indebtedness. Production value chains are not competitive and, with the exception of the cotton value chain, the collection and marketing channels for agricultural products have little or no formal structure. The rate of adoption of innovations remains low because these new technologies are not always suitable and/or producers are not always aware of them. There is therefore a need to develop appropriate technologies at the research stage, to give producers the capacity to adopt these technologies by means of extension and support/advice and to train a large number of people who will be capable of training others.

Third, Benin has considerable natural resources (water, land, flora and fauna), enabling agriculture to form the foundation of its economic and social development. However, there is no consistent operational strategy for the promotion of agriculture and particularly the development of managed agricultural cropland (including the rehabilitation of agricultural tracks), which is much needed within this sector. Beninese agriculture generally remains at the mercy of the vagaries of the weather; producers are bound by seasonality with somewhat inconsistent harvests demonstrating peaks and troughs with huge losses. Globally, the country's agriculture remains almost exclusively rainfed, extensive and pastoralist, based on a traditional slash-and-burn system. Moreover, livestock rearing is not integrated with crop cultivation. This system is confronted by the three challenges of productivity, competitiveness and sustainability that are necessary in order to satisfy the food and nutritional needs of a constantly growing population, and to procure currency for the economy while protecting the productive base of natural resources for future generations.

Fourth, there are clear environmental pressures on current land-use practices. Forest resources, which cover 65 percent of the country (approximately 73 450 km^2), have been deteriorating for several decades because of the combined impacts of anarchic extension of agricultural and pastureland, practices not conducive to the sustainable management of natural resources, bush fires and plantation fires and soil nutrient depletion. The uncontrolled use of forest resources to satisfy the population's needs in terms of lumber and household energy is one of the main factors contributing to this deterioration and represents a serious threat to the preservation of national forest reserves. According to a study conducted by FAO in 2006 (MAEP, 2011), the rate of deforestation in Benin is estimated at 70 000 ha/year. The actions being developed to protect and manage forest resources are not yet able to compensate for the forest resources needed to satisfy the population's demand for fuel, lumber and agricultural production.

Finally, land registration leading to landownership remains inaccessible for the majority of the population because of the cost and complexity of the procedure (less than 1 percent of all land is registered in Benin). Consequently, almost all land continues to be governed by customary law characterized by secular rules and practices that are not documented in official registers, which serves as a source of insecurity, particularly in regions subject to a high level of agricultural land pressure (MAEP, 2011).

Given these environmental, social and economic sustainability challenges, attempts to ensure the sustainability of agricultural production is at the heart of all development policies within the sector in Benin. In the Strategic Recovery Plan for the Agricultural Sector (PSRSA) (MAEP, 2011), a number of measures are planned to guarantee this sustainable agricultural development:

- definition and implementation of a specific operational plan relating to soil fertility management with a view to ensuring sustainability of farming systems;
- integrated water resources management (IWRM), in particular by means of equity and solidarity between users in terms of space and time;
- definition of a sustainable fisheries resources management plan.

The sustainability of agricultural production in Africa is the challenge for which the Songhai Centre intends to provide a tangible solution. This involves providing the populations with healthy agricultural products at a lower cost. The emergence of single-crop farming (in particular cash crops) with an increasingly pronounced use of large quantities of chemical fertilizers and pesticides is not conducive to protecting the environment and natural resources for future generations. Sustainability of agricultural production corresponds to a rationale of food security that will allow African populations to enjoy a better lifestyle and grow older better, and that will also prevent illness.

The Songhai model focuses on the need to raise the level of Africans by creating entrepreneurial skills, while providing effective solutions to the problems of food insecurity, climate variability, wasteful use of natural resources and constant increase in youth unemployment. The model develops technical, moral and entrepreneurial skills within the local communities in general and among young people in particular through effective and functional training programmes within the framework of regeneration or an autonomous economic system. In this system, care is taken to promote the relative advantages of individuals, communities and regions to ensure efficiency and increased synergy.

Data used in this case study were collected during 2013 as part of a sustainability assessment of the Songhai integrated production model, carried out by FAO (Agossou, 2014). The case study presents highlights from this study and focuses on the questions pertinent to this book, which is on the innovative institutional arrangement that enables the Songhai Centre to link its sustainable production model with markets for sustainable products within Benin. This article will present: (i) the institutional innovation; (ii) description of the sustainable practices developed at the Songhai Centre; (iii) description of markets; (iv) results and advantages; and (v) recommendations for the replicability of this approach.

14.2 INSTITUTIONAL LANDSCAPE

Legislative and regulatory context

In Benin, public policies in general and agricultural development policies in particular are often oriented towards increased productivity and growth with a view to satisfying the needs of a rapidly growing population. Sustainability is not excluded from concerns, as seen in the vision laid out in PSRSA: "… make Benin a dynamic, competitive, attractive and environmentally friendly agricultural power by 2015, which creates wealth in line with the economic and social development needs of the population" (MAEP, 2011).

At the legislative, regulatory and institutional level, there is no national code of conduct, nor is there a directorate in a ministry or a special national programme relating to agricultural sustainability that focuses exclusively on ecological or organic agricultural practices. However, in several existing regulatory provisions relating to agriculture, food, trade and the environment, allusions are made to sustainable agriculture, organic agriculture or the ecological balance and health of the population (OBEPAB, 2013). For example, Law No. 98-030 of 12 February 1999, constituting the framework law on the environment in Benin, and defining the foundations of environmental policy in the country, takes advantage of the main keys of environmental policy such as:

- the precautionary principle and the polluter pays principle;
- the orientations of PSRSA for the promotion of specific fertilizers and other organic inputs for the sustainable management of soil fertility and for the rational use of agricultural equipment suitable for all farming operations;
- staggered targeted control (STC) promoting threshold application, which is less polluting for the environment than conventional programmes for cotton phytosanitary treatment;
- the increasingly numerous organic agriculture initiatives.

Beyond these provisions promoting sustainable agricultural practices, it must be acknowledged that the general trend is towards the adoption of polluting practices to obtain immediate quantitative results with a view to resolving present-day problems. The issue of preserving natural resources to enable future generations to satisfy their needs has not always been of prime concern. A perfect illustration of this general trend is the importance accorded to conventional cotton in Benin. Every year, the promotion of this crop requires the efforts of all, and the majority of the country's resources. Producers use large quantities of chemical fertilizer, with an average of 67 377 tonnes of fertilizer used over the decade 2001/2002 to 2011/2012, representing 45 327 tonnes of NPK, 19 446 tonnes of urea and 2 605 tonnes of potassium chloride (KCl) (UEMOA, 2013).

These different requirements in favour of conventional agriculture call on the majority of resources and efforts to the detriment of sustainable practices such as those advocated by the Songhai integrated agricultural production model.

Stakeholders of sustainable agriculture in Benin and partnership networks

Within Benin, Ecological Organic Agriculture (EOA) networks have been developed to promote ecological and/or organic agriculture. Some of these networks carry out activities such as information, training and advocacy aimed at changing people's behaviour, while others develop products for local, regional and/or international markets in addition to these activities. Structures promoting EOA include OBEPAB, the Songhai Centre, the Réseau de développement de l'agriculture durable [sustainable agriculture development network] (REDAD), Bio Phyto Collines, CIEVRA [International Centre for Experimentation and Development of African Resources], Centre LABEL Bénin [shopping centre], JINUKUN and KARETHIC. The secondary entities promoting EOA include the Directorate of Agriculture (DAGRI), the Directorate of Agricultural Advice and Operational Training (DICAF), MEHU (Ministry of Environment, Housing and Urbanism)/ DGE [General Directorate for the Environment], ABePEC [Benin Trade Promotion Board]/Ministry of Trade and the German Agency for International Cooperation (GIZ). There are numerous partnership networks in EOA in Benin, foremost among which are those of the Songhai farmers, organic cotton, organic market gardeners, Bio Phyto, KARETHIC natural shea butter and REDAD. The organic pineapple network is important for local consumption but, more important to seize the export opportunities available is the Plateforme de l'agriculture biologique et écologique [organic and ecological agriculture platform] (PABE).

14.3 INSTITUTIONAL INNOVATION: THE SONGHAI MODEL

Brief history, activities and objectives pursued

The promoter of the Songhai approach is the Dominican friar Godfrey Nzamujo, supported by a group of Africans keen to return Africa to its former glory by restoring the fundamental values of courage, creativity, a sense of the common good,

PHOTO 14.1
The Songhai symbol

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discipline and solidarity, which are tending to disappear from the habits of young Africans. Created in 1985, the centre derives its name from the powerful, flourishing and prestigious West African empire of the fifteenth century: the Songhai Empire, which evokes pride and hope for a dignified and prosperous Africa.

The Songhai initiative has two components: the first is the development of a functional, competitive and efficient agricultural system (parent farm); and the second the incubation of agro-entrepreneurs and promotion of services to increase their productivity, thereby creating a snowball effect through the formation of a critical mass of young agricultural entrepreneurs and the creation of a framework conducive to the successful development of producers across the African continent.

The Songhai model incorporates three key sectors of the economy into a network. It is organized in such a way as to create synergy and complementarity. It is an industrial cluster model, a model of a productive and autonomous "green rural town". The model ensures perfect integration between primary, secondary and tertiary production. The network focuses on the development of appropriate innovative technologies and training. Primary production relates to vegetable crops, annual crops, perennial crops, stock farming and fish farming. This diversified production (mixed farming and stock farming) was designed to facilitate technical synergies and complementarities between the different links while ensuring better promotion of the environment than mono-specialized systems. No link functions without a relationship with one or more other links. This new approach is based on the imitation of nature (biomimicry). It incorporates principles such as mutuality, synergy, symbiosis, interrelations, complementarity and networking. It contributes to the development of new, authentic and noble values and technologies.

Training, extension and communication

Training is one of the key missions of the centre. It is organized in all the Songhai centres (Porto-Novo, Kinwedji, Savalou and Parakou) and remains essentially practical in nature (about 75 percent of the total duration). The approach adopted is that of the master and apprentice (mentor-mentee, learning by doing) and the training is based on a system of values, knowledge and expertise.

The centre primarily trains two categories of people: pupils and trainees. Training for pupils is reserved for young people of Benin who have dropped out of school and wish to become agricultural entrepreneurs. This training lasts for 30 months, 18 months of which focus on practical training divided into a common core lasting three months and 15 months of specialization with crop farming as the common module. Pupils complete the training with 12 months of application, either in a regional station or on their own farm. They launch their farms on the basis of a business plan defined and approved at the end of the first phase of training and are monitored during this final phase. At the end, a positive evaluation will enable them to obtain an agricultural entrepreneur's diploma and thus to set up business.

Trainee training lasts between one and 18 months and is open to all nationalities. Those participating in the training are socio-economic entrepreneurs, agricultural professionals who want to specialize, students of agricultural colleges and agronomy faculties and senior officers in public or private administration.

The training provided at the Songhai Centre is based on a non-material foundation, comprising a system of human, moral and ethical values: commitment, thoroughness, discipline, excellence, and punctuality and honesty at work. This training forms people who can put on the moral and technical cloak of authority, enabling them to steer their own lives. They are endowed with the functional skills necessary to create and manage a viable agricultural holding with a view to helping to stimulate the local community.

The extension approach founded on expertise relies on those trained at Songhai who, by implementing the agricultural and para-agricultural production techniques received at the centre, act as a relay in their respective environments. This is combined with the initiative of the Songhai Centre which, having noted the low agricultural productivity of farming areas, has recruited and trained a number of producers. The production zones therefore serve as extension areas and are accessible to all. The centre receives more than 20 000 visitors per year, primarily from Benin and the countries of the subregion, who come to draw inspiration from the model.

The Songhai Centre has also implemented the purchasing office's policy that enables inputs to be provided to Songhai farmers and other producers. These are, in particular, high-quality seed and appropriate technological packages for the production of raw materials (maize, soybean, rice) in sufficient quantity and quality. As the parent centre, Songhai has introduced industries that can facilitate the processing of products from farmers in its purchasing office network. A rationale of traceability is also introduced with a view to guaranteeing product quality. The centre thus procures its supplies from the network of Songhai entrepreneurs and in exchange represents a key marketing outlet for them.

The Songhai Centre's communication strategy, based on the internal production and dissemination of audio documents, overcomes the deficit created by the unavailability of radio frequency. Newsletters are produced and disseminated in house and to partners, and there are documents on conservation/low-till agriculture and organic agriculture. There are also documents from the World Bank, International Fund for Agricultural Development (IFAD), FAO and other development and sustainable agriculture bodies as well as scientific journals and publications on the selection of plants and biotechnology.

Innovation combines business and research institute approaches while using the concept of an authentic green rural town. Songhai is active in research and development, implementing its technological platform (technology park) with several innovative technologies. The park is used for the development of African agriculture by providing solutions to the numerous difficulties faced by producers and that make agriculture appear a gruelling and unattractive activity. These include access to quality genetic inputs, the fight against pests, soil fertility management, irrigation and weed management. Once tested and proven, these technologies are turned into production factors through the industrial park composed of the production units. Particular emphasis is placed on simple and accessible new agricultural technologies that treat nature and the environment as partners and give pride of place to the values of the resulting products. The different production workshops at the centre are:

- primary production, including crop production, stock farming and fish farming;
- secondary production: agro-industry with plastic recycling and bottle production units;
- tertiary production: the services at the start and end of the system – training, communication, marketing, library and reception.

Administration and management of the centre

The Songhai Centre is administrated by a Board of Directors consisting of volunteer resource persons with proven experience and who, through their positions, provide the necessary support for the development of the centre. There is also a think tank. The day-to-day management is carried out by a team of management executives under the aegis of the General Manager. The organizational chart presented in Figure 14.1 highlights the different levels of responsibility and the relationships that ensure good governance of the activities at head office and in the regional centres.

Sustainable practices: Songhai, sustainability as keynote

Autonomy, the cornerstone of sustainable agricultural systems (Vilain *et al.*, 2008), is the foundation on which the agricultural practices developed by the Songhai Centre are built. The three components of the model are primary production, agro-industry and services.

Primary production includes annual crops, perennial crops, stock farming and fish farming. This diversified production (mixed farming and stock farming) was designed to facilitate technical synergies and complementarities between the different links while ensuring better promotion of the environment than mono-specialized systems. No unit functions without a relationship/link with one or more other unit (Agossou, 2014).

Because of the synergies inherent in the model, the functional relationships between the units are highlighted in the presentation. Thus, stock farming is presented with the production of organic fertilizers that represents the entrance to the model, while crop production is presented with livestock fodder and stock farming with fish farming.

Stock farming and the production of organic fertilizers

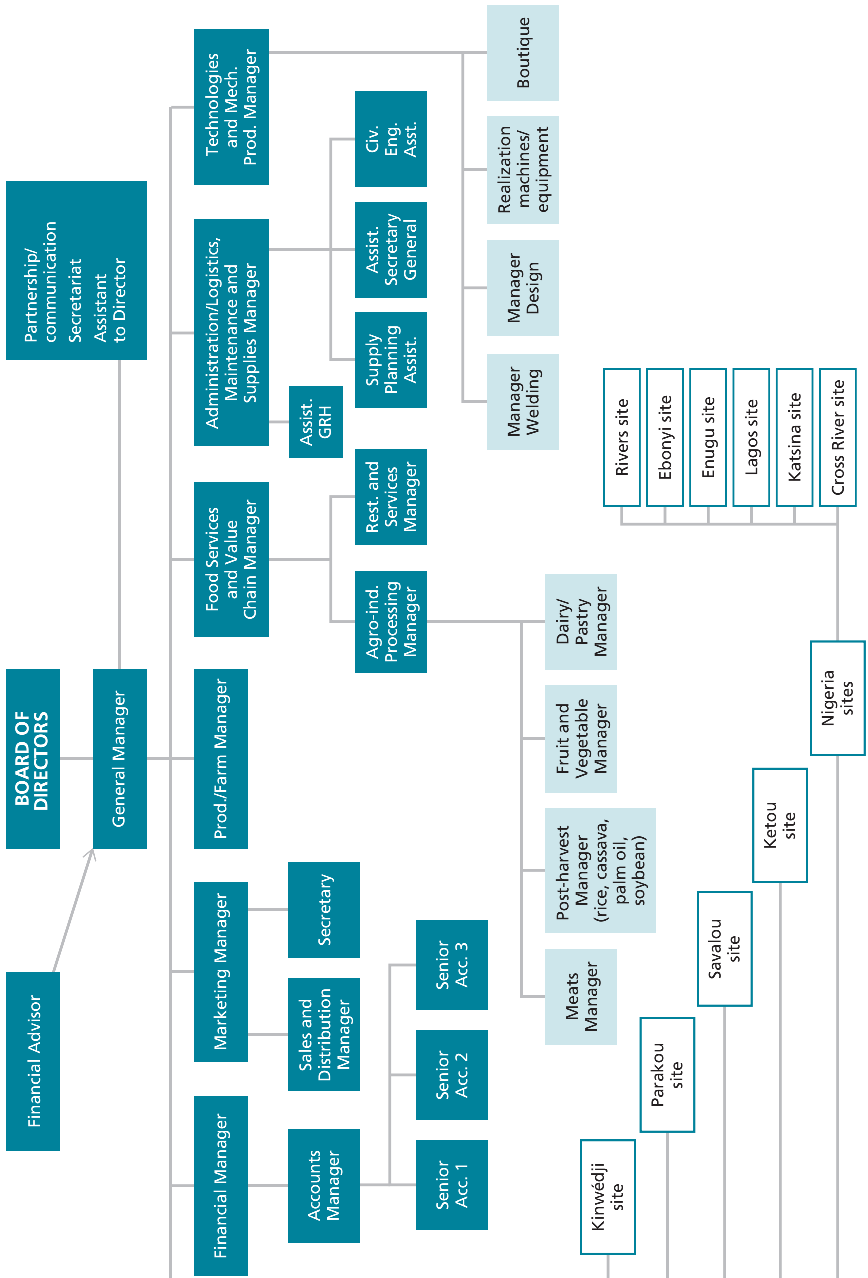
The stock farming activities of the Songhai Centre (Porto-Novo and regional sites) concern several species, all eaten in Benin, namely:

- poultry, such as quail, hens (Cou-nu, Sussex, Rhode Island red, red), turkey, guinea fowl, geese and ducks;
- rabbits, with breeds including Californian, Fauve de Bourgogne, local, French Papillon and New Zealand;
- pigs, with large whites, Landrace and crossbreds;
- cows, with Goudaly and Borgou breeds;
- Djallonke sheep.

These forms of farming are the main sources of organic material fertilizing the soil on which annual and perennial crops are farmed.

Breeding caged hens allows droppings to be collected in two different ways. First, they may be collected on a mat, without being mixed with the soil. In this case, they are placed directly in a digester to produce biogas for heating in agro-industry and for cooking, for the benefit of the pupils and trainees at the centre. This biogas production gives rise to a liquid effluent that constitutes a rich fertilizer for different crops. Droppings may also be collected from huts on stilts, periodically mixed with ramial chipped wood (RCW) and soil for a period of six months, and regularly inoculated with micro-organisms that effectively manage odour. They are then col-

FIGURE 14.1
Songhai organizational chart



Source: authors' elaboration.

lected and piled into heaps that are regularly turned to make compost and use as an organic fertilizer on farmed land.

For some time, thanks to the development of technological soil fertilization platforms, effective micro-organisms (EMs) have been used to strengthen the fertilizing power of liquid effluents from the production process and that of the compost manufactured. The effluents and compost are watered with solutions of these EMs. The result is remarkable on soil treated with these organic fertilizers both for annual and perennial crops. In Songhai language, this fertilization "feeds the soil which, in turn, once transformed into a super soil, feeds the plant".

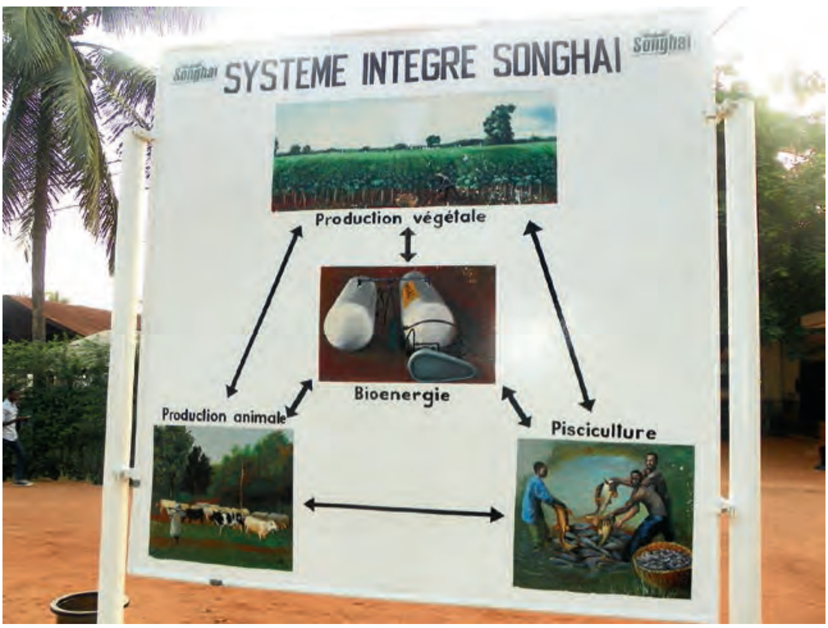
As with the droppings of laying hens, the manure of all other animals reared are used to manufacture super soils. Since the soil is the plant's "home" and larder, stock farming is a key component of the integrated agricultural production system developed by Songhai.

In the Parakou and Savalou centres, and in particular with ruminants, the system of *kraalage* is adopted, which involves ranching these animals on plots of land intended for crops. They defecate on the land and the soil is then ploughed before being sown (basic organic fertilizer).

Crop production and livestock fodder

Stock farming serves to produce super soils on which annual and perennial crops are grown. In return, production of these crops serves first and foremost to feed

PHOTO 14.2
Songhai integrated agricultural production system



the animals reared. With regard to animal fodder, feed produced in agro-industrial workshops uses raw material from the crop production workshop, primarily maize, soybean, cassava and *moringa*. Maize is the main cereal used to produce feed served to animals. Rice, and in particular rice bran, is also an important ingredient of the feed. Soybean is the most frequently used source of vegetable protein found in animal feed. Cassava root is an excellent foodstuff for pigs and is also used in other livestock fodder. Cassava leaves are also much appreciated as feed for laying hens, which then produce eggs with a rich yellow colour, a quality sought by consumers.

Crop production, stock farming and fish farming

Fish farming at the Songhai Centre has impressive results and stock farming plays an important role in feeding the fish. The centre has maggot farms to produce maggots that are eagerly eaten by the fish since they are rich in proteins and amino acids. Animal droppings, in particular from pigs and cane rats, are collected and placed in open pits together with rotting animal waste from meat (viscera, unused meat leftovers). Through the fetid smells they release, the maggot farms attract flies that land on them to feed and lay the maggots that are then collected to feed the fish.

PHOTO 14.3
Red Royale papaya trees growing on super soil, Porto-Novo centre

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PHOTO 14.4
Cattle ranching for organic soil fertilizers (*kraalage* system), Parakou centre

PHOTO 14.5
Fruit juice production chain, Porto-Novo centre

The centre has recently made progress with the development of technological platforms for the management and protection of genetic inputs; soil fertilization and regeneration; improved agricultural production techniques (production in tropical greenhouses for hot countries, irrigation) and livestock fodder production; use of EMs; implementation of the plastic mulching technique to reduce the arduous nature of agriculture and make it more attractive to young people; and the development of animal and fish genetic inputs (e.g. Songhai tilapia, which can reach 500 g in six months).

Secondary production: agro-industry

Stock farming products, primarily meat, are not often delivered to the consumer in their raw state. The centre (mainly in Porto-Novo) processes them to add value. Similarly, crops are processed before being delivered to the consumer in the form of semi-finished or finished products. This processing is carried out in three industrial units. Processing workshop 1 handles meat, smoking, syrup production, pasties and dairy products. Workshop 2 handles the processing of palm fruit (palm oil, palm kernel oil and palm kernel cake), processing of cassava to produce *gari*, rice husking, production of roasted almonds and production of soap. Processing workshop 3 handles plastic recycling, bottle production, pretreatment and filling operations for the production of water, juice, tomato and mango concentrate, etc. With a capacity of 6 000 bottles per hour, this new installation strengthens the network of agricultural entrepreneurs supplying raw materials, pineapple, mango and baobab powder.

Markets for sustainable products and services: building the local market

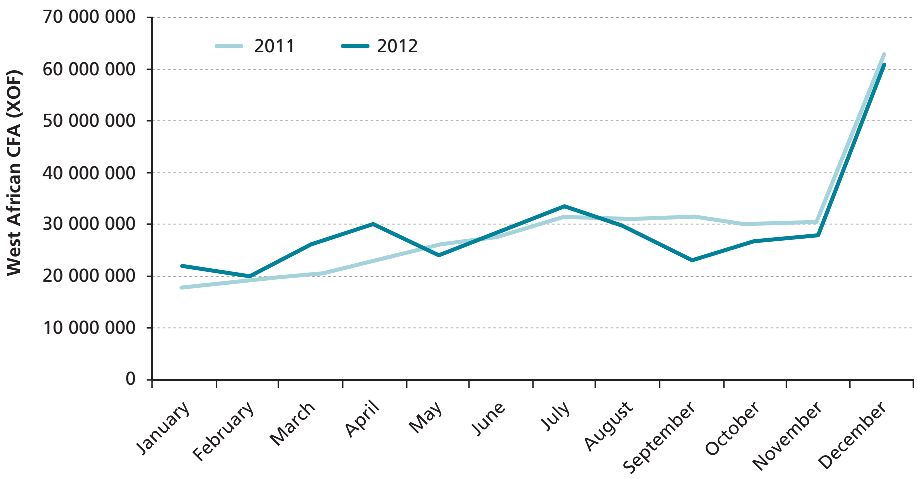
OBEPAB (2013) described the markets for ecological and organic agricultural products in Benin as follows:

- local markets comprising demand recorded in the production zones;
- urban markets in the major cities, in particular Cotonou, where the products most in demand are foods declared to be organic, natural or vegetarian; organic vegetable products; organic papaya; non-conventional stock farming products (chickens, local breeds of guinea fowl) and non-wood forest products;
- the subregional market, in particular the Economic Community of West African States (ECOWAS), Nigeria, the Niger, Mali and Burkina Faso where there is high demand for natural shea butter, organic pineapple and pineapple juice;
- the international market, with demand for certified organic products (organic cotton, cotton made in Africa, natural shea butter, organic pineapple, organic soybean and organic papaya).

Markets for Songhai products and services are primarily local markets. The centre's aim is to produce for the well-being of the communities living near the other centres. Production is therefore primarily intended for local markets, and thus local consumers. Within Benin, the main markets are in Porto-Novo, Cotonou, Parakou, Savalou and Lokossa, as well as in other towns around the country.

Four product categories are marketed: seed, inputs (organic fertilizer and organic livestock fodder), fresh produce (fruit, vegetables, meat and eggs) and processed products. The processed products in particular are labelled Songhai (fruit juice,

FIGURE 14.2
Monthly change in turnover in 2011 and 2012



Source: Agossou, 2014.

purified water, yoghurt, soap, soybean oil and pastries). Honey is also a reference product of the Songhai Centre and many customers know the centre for the honey it sells. Eggs are currently the product most sold. Sales figures show that peak sales occur at the end of the year (Christmas period). The trend was more or less the same in 2011 and 2012, with a slight increase in total sales in 2012 (a total of XOF350 005 510, or approximately US$700 000).

The centre does not use intermediaries outside the Songhai network. All sales logistics are managed internally by Songhai. With its trucks, the centre implements logistics and delivers to the points of sale, supermarkets and wholesalers. The customers or consumers of Songhai products can also purchase products on site via the on-farm shops. For products such as vegetables, consumers can visit the farm and choose the products themselves. The centre also has a delivery office in town to facilitate purchases for people who cannot go to the farm. Finally, the reception and restaurant services at each regional centre also represent a convenient means of providing the population with Songhai products.

Both trade internal to the Songhai network and sales of processed products are managed by the centralized sales unit within the Porto-Novo hub. The regional sites are charged with sales of inputs and fresh produce at their sales points, while the overarching marketing strategy for the centre is centrally handled. Non-negligible quantities of fresh produce and cleaning products are also sold internally to the centre's catering service, students' canteen and workers' and visitors' restaurant. Certain products, such as eggs and poultry, are sold to hotels and other private distributors.

The markets for processed products are relatively diversified. At the end of November 2013, the centre's marketing team launched a marketing strategy to target sales of specific products, such as mangoes and pineapples to hotels in Cotonou, to different market outlets. When the local market is satisfied, the products are sold in other markets. This is the case for drinks on the Nigerian market, thanks to the installation of pretreatment and filling chains for the production of water and juice. Agricultural machines are sold in several countries within the region including Nigeria, Togo, Ghana, Côte d'Ivoire, Liberia, Sierra Leone and even as far afield as the Congo and the United Republic of Tanzania.

Employees at the Songhai centres and farmers who received training at the parent centre provide a ready consumer base for Songhai products. Yet there is also a wider consumer population made up of people concerned for the well-being and maintenance of the environment and those who specifically seek organic/sustainable products. Consumers, who are aware that they are buying more sustainable products, are ordinary consumers who buy their products from the Songhai shops at the head office in Porto-Novo and on the regional sites. The trainees, partners and visitors to the centres are also consumers of Songhai products and account for 60 percent of total sales.

All products are labelled with the Songhai brand and these labels provide sufficient information about the health benefits of the products. Some processed products (juice and yoghurt) have the word "bio" on them. Thus, the consumer can find the following information on the label: product name, ingredients used in the product, nutritional values, expiry date and addresses/contact details of the Songhai production centre. This information is in French and English to facilitate access to the products for a wide range of consumers.

Consumers buy sustainable products because of the comparative advantages these products enjoy over conventional products, primarily in terms of quality. Products from the Songhai sustainable production model are healthy and the consumer runs no risk of finding residues from chemical inputs. Songhai products (tomatoes, eggs, purées, jams, smoked chicken, etc.) keep better than conventional products. Juices are natural with no additives or colouring. Songhai also incorporates the natural virtues of its probiotic micro-organisms into these products, thereby endowing them with enhanced value for well-being. Another advantage for the consumer is the relatively affordable price adopted by Songhai, which takes account of the consumers' budget.

To satisfy the demand of an increasing number of customers, the Songhai Centre has developed an active communication strategy and adopted a marketing plan that is centrally managed, which takes account of consumer demand and expectations. This plan combines a direct sales strategy and a network of distributors. The marketing team itself organises tasting sessions for new products in order to bring them to the attention of consumers. Canvassing, attentiveness and communication operations are continuously carried out with customers.

The pricing policy adopted allows the Songhai centres to resist price competition from the local market, since Songhai applies lower prices for an equivalent quality. With the production system based on the "low-input agriculture" principle, products from the Songhai model benefit from this advantage as 90 percent of inputs necessary for their production are available on site. In the current plan (end 2013), the marketing circuits for processed products remain oriented towards the Nigerian market as a result of the trade liberalization in place. Over time, the introduction of the marketing plan has led to greater awareness of the demands made by consumers who now distinguish between the quality of the Songhai products and that of others. Diversification has also been a key priority of the Songhai strategy – diversification of the supply of products and diversification of the buyers and/or distributors. In the medium term, this will facilitate a significant presence of Songhai products on the market.

The challenge for the marketing programme will be to ensure effective continuity management of the supply of raw materials for the Songhai processing industries, which add value to the raw products. Moreover, it is important for the marketing unit to continue facilitating dialogue with buyers/distributors with a view to ensuing satisfaction in terms of quality and quantity. Demand for processed products is steadily climbing, and in 2013 and 2014 outpaced supply.

14.4 RESULTS: SOME ADVANTAGES LINKED TO THE EXISTENCE OF THE SONGHAI CENTRE

In the short and medium term, Beninese farmers will be able to derive certain advantages from the existence of the Songhai centre. The integrated agricultural production model will become increasingly common among farmers who are beginning to see the inconsistency and counterperformance of conventional agriculture. In the southern region of Benin, land constraints are forcing farmers to abandon extensive farming practices. They have to adopt sustainable intensification, making do with less land.

The Songhai integrated agricultural production model has numerous advantages for the community.

- Training young people who have dropped out of school, or university graduates, in entrepreneurship. With practical work accounting for 75 percent of the training, it offers them the opportunity to set up their own businesses, thereby avoiding an inflated number of job seekers.
- Supply of sustainable agricultural products with an organic label, which have huge advantages for consumer health, unlike conventional products that may contain residues of the chemical inputs used.
- Supply of services – in great demand – provided by the assembly workshops for agricultural machinery and agrifood processing equipment.
- Recycling of scrap metal and plastics that lie in the street and pollute the urban landscape.

Songhai is a training centre for rural entrepreneurship providing both short, technological training courses and longer training courses promoting the emergence of entrepreneurs and leaders. Since its creation, Songhai has trained 7 500 people.

IDEA method for evaluating sustainability

IDEA (*Indicateurs de durabilité des exploitations agricoles*) [Farm sustainability indicators] is an analytical tool that can be used at farm level to evaluate sustainability, based on a system of 41 sustainability indicators covering the three dimensions of sustainability (agro-ecological, socioterritorial and economic) (Vilain *et al.*, 2008). The agro-ecological scale of indicators covers environmental concerns such as diversity, organization of space and farming practices; the socioterritorial scale includes social aspects of the farm such as quality of products and land, employment and services, and ethics and human development. The economic indicators fall under the categories of economic viability, independence, transferability and efficiency. Using the IDEA diagnostic method, a recent study conducted by FAO evaluated the sustainability of the Songhai integrated agricultural production model and that of 35 Songhai farmers located in different agro-ecological zones in Benin (Agossou, 2014). These evaluations highlighted the strengths and weaknesses of the Songhai model in terms of sustainability and identified, particularly for farmers, the changes they could make on their farms to enjoy greater sustainability.

The Songhai model demonstrates numerous strengths at all levels of sustainability, in particular with regard to agricultural practices at agro-ecological level. The restrictive element in the sustainability of the model is the socioterritorial element. The Parakou and Lokossa sites demonstrate a sustainability that is limited at the agro-ecological level, whereas the Savalou site is limited in terms of socioterritorial sustainability. The challenges raised by reproducing the Songhai model on a grand scale concern the optimization of water, production of organic fertilizers, pest control using organic products, and agricultural mechanization.

Songhai farmers' activities are characterized by a sustainability limited at socioterritorial level. To achieve a greater level of sustainability, scope for progress available to these farms can be found in the domestic diversity and special organization elements (agro-ecological level); the product quality, employment and services elements (socioterritorial level); and the economic viability element (economic level). The difficulties encountered by these farms in attempting to achieve a greater level of sustainability primarily concern inadequacy of funding and the unavailability of certain factors of production (certified seeds, fry, and livestock). In addition to the families of employees (15 000 people in total), of trainees (30 000 people) and of the farms created (7 000 people), the population benefiting from Songhai can be evaluated at 100 000 people since the centre was founded 30 years ago. The impacts of Songhai must also be measured in relation to the machine tools produced in the centre to increase productivity and reduce the toil of agricultural work. Other elements should be taken into account such as the new varieties of plants introduced, the creation of telecentres, the development of new crops (*jatropha* for the production of energy) and livestock. Every year, 20 000 visitors come to Songhai and are introduced to the integrated production system and the functioning of green cities.

The model of economic development in rural areas – the rural green city promoted by Songhai – is easily adapted to the agro-ecological and socio-economic context of West Africa, where it is currently established in 15 towns. It is not simply an infrastructure project but also a method of generating sustainable, inclusive rural growth through the creative use of the local resources available, thereby helping to resolve the problems of poverty, unemployment and the rural exodus. The solution provided by Songhai demonstrates a certain originality in this approach to transforming people and their communities. Consequently, the Songhai model was promoted by the United Nations system in 2008 as a holistic model of development to be adopted by states in their efforts to change the precarious socio-economic situation experienced by the population. Since then, the model has been reproduced in several countries within the subregion and across the continent (Nigeria, Sierra Leone, Liberia, the Congo, Malawi and Guinea). Other developing countries (Ghana, Côte d'Ivoire, Senegal, Burkina Faso, Kenya, Togo and Gabon), as well as countries outside the continent of Africa (for example, Haiti) have also voiced their interest.

The people involved in disseminating the Songhai model within the region are the trainees who have spent time in the Songhai centres, governments, economic operators and company managers. The projects designed to replicate the Songhai model within the subregion are promoted by states or by individuals. They are tasked with mobilizing financial resources via their partners while Songhai provides technical expertise.

The Songhai Centre incorporates three key sectors of the economy into a single organizational form that links sustainable practices to local markets. It is organized in such a way as to create synergy and complementarity between sustainable production methods based on an integrated production system that includes vegetable, pulse, cereal and fruit crop production; livestock raising; aquaculture; and biogas production. It includes an industrial cluster model, where artisanal and modern food processing takes place (e.g. fruit juice, snacks, popcorn, baked goods, bread, fresh cuts and cured meats, soap, plastic recycling, plastic buckets). The centre also organizes the production and sale of sustainable inputs (seeds, manure, compost and EMs), provides agritourism and Internet services, and is involved in developing appropriate technologies for sustainable production.

The Beninese network is currently made up of the main demonstration site in Porto-Novo and five satellite centres in regional urban centres that source, when necessary, from surrounding rural farms. No link functions without a relationship to one or more of the other links and the satellites are governed through a centralized, hierarchic chain of command that permits horizontal linkages between network members. There is a central procurement and marketing service that organizes the procurement of raw materials for processing and sales of processed products from the Porto-Novo hub. However, each satellite is also responsible for local sales of its fresh produce and artisanal processed goods. In 2014, 54 percent of the value of finished products was internal to the network and 46 percent constituted product sales with a value of XOF4 185 694 831 (US$7 040 540), of which the off-farm sales of finished products accounted for XOF1 533 743 462 (US$2 579 830). We may conclude that the Songhai Centre has effectively created three levels of markets: (i) markets for sustainable inputs (seeds, bioproducts and machines) between the hub and each regional site and farmers; (ii) markets for sustainable products (both fresh and processed); and (iii) markets for food service and hospitality.

The Songhai model can be considered an institutional innovation, because the actors in the network have had an active role in defining "organic" in Benin through their use of labelling for consumers. As of 2015, Songhai began a partnership with the Ministry of Agriculture to manage national projects for youth training in agriculture (changing the rules), and with its efforts has created an organizational model that is being replicated in other countries (the actors who use and enforce the rules). In fact, in 2014, the largest revenue from a single source came from the corporate fees received from Nigerian operations.

14.5 CONCLUSIONS AND RECOMMENDATIONS

Agricultural development policies in Benin emphasize the need to promote sustainable agricultural practices in order to maintain the productive base of natural resources for future generations. This political will is nevertheless slow to take tangible form in the legislative and regulatory texts obliging the operators concerned to adopt best practices. A documentary review showed that several existing regulatory provisions concerning agriculture, food, the environment and trade contain allusions to sustainable agriculture. Furthermore, associative movements were observed that have redoubled their efforts to promote organic and ecological agriculture. These associations develop financial, technical and complementary partnerships with each other and with associations in the countries of the North.

The Songhai integrated agricultural production model, launched in Benin in 1985, is one such initiative promoting sustainable best practices in the agricultural sector. Through the perfect integration of crop production, livestock farming and fish farming, this model generates a synergy and complementarity among its different links, while ensuring zero waste. Similarly, it obeys the principle of autonomy, the cornerstone of sustainable agricultural systems (Vilain *et al.*, 2008).

The best practices put forward by the Songhai model concern:

- effective integration synergy between crop production, stock farming and fish farming;
- autonomy (and thus non-dependence) of the farm insofar as the main factors of production come from the farm itself;
- zero waste as nothing is thrown away on the farm – anything that can be considered a waste product in a given sector is reused as a factor of production in another sector;
- organic orientation given to farms that use no chemical inputs and only organic inputs (compost, manure, organic pesticides);
- promotion of produce on site through the development of different processing workshops enabling farms to acquire sufficient value added;
- promotion of marketing services, helping to create loyalty among customers who are attached to the centre's organic products;
- practical training given to young agricultural entrepreneurs wishing to set up business in the agricultural sector and to replicate the integrated agricultural production model promoted by the Songhai Centre.

To "spread the message", the Songhai initiative provides annual training – primarily practical in nature – for numerous young farmers (almost 7 500 trained since its creation) who are called on to replicate the model across the subregion.

According to all observers, the Songhai integrated development model has proved its worth in managing the complexity involved in meeting the following:

- increasing demand for training;
- creation of new activities (rural energy training centre, electricity power station with Electricité de France (EDF), where the role of EDF is to contribute to optimizing expertise in producing and distributing renewable energy through the implementation of energy production poles, development of bacterial culture, etc.); and
- requests from governments from all regions of Africa to install Songhai centres.

Without endangering its achievements, Songhai is faced with four challenges.

1. Need for new leaders capable of promoting new actions.
2. Management capacity building for current unit managers to ensure the continuity of the Songhai centres.

3. Training of people from other African countries or elsewhere promoting projects similar to the Songhai initiative.
4. Training of project managers in rural companies (in the energy sector, for example) within the subregion for development projects of NGOs or semi-private operators.

The other challenges of the Songhai production model primarily concern its large-scale reproduction and replication at small-scale producer level. These challenges are optimization of water, production of organic fertilizers, pest control with organic products and agricultural mechanization (Agossou, 2014).

Water and its permanent availability are essential for the system to work. As an increasingly scarce resource, water use requires highly economic irrigation measures such as the drip system, which is a best practice in terms of sustainability. The technique of plastic mulching recently introduced at the Songhai Centre increases this water-saving process by limiting direct evaporation from the soil and through soil moisture retention. While differing species allow organic fertilizers to be produced (compost, liquid effluents), the shift to a larger scale may raise the question of covering needs for organic fertilizers in light of the large quantities required by unit of surface area. Pest control through organic pesticides is also a challenge for large-scale replication of the model. For certain attacks deemed to be severe, the use of small additional quantities of chemical pesticides should not generate any major pollution pressure and therefore not compromise the sustainability of the system. Finally, on a large scale, mechanization is necessary, although this is a double-edged sword. It saves time and reduces the arduous nature of the work, but measures must be taken to protect the soil as a resource as sustainable agriculture endeavours to protect the food potential of the future.

Small-scale farmers find difficulties in replicating the model in terms of funding for their farms in order to procure agricultural equipment and construct the necessary infrastructures; the unavailability of organic factors of production; and the unavailability of agricultural land in the southern part of Benin.

The political authorities in Benin have taken action to prove their commitment to best practices designed to ensure the sustainability of agricultural systems in the country. They should nevertheless pursue their action by establishing specific legislative and regulatory texts obliging the actors in the sector to develop best practices with a view to protecting natural resources for future generations. The Promotion of Agricultural Entrepreneurship Programme (PPEA) sponsored by the United Nations Development Programme (UNDP), which is managed by Songhai in Benin for the Beninese Ministry of Agriculture, is a technical initiative that is worthy of support from other similar entities and could be expanded to reach more young agricultural entrepreneurs.

The Songhai model has demonstrated that it responds to the specific sustainability challenges in the country, is culturally and socially appropriate, technologically advanced and economically viable. Therefore, the process of replicating the Songhai centres should be pursued and it is desirable for each of the rural communes in Benin to create their own Songhai centre, that could be linked up to the national network, so that all farmers have the possibility of benefiting from this integrated agricultural production model. The difficulties for farmers to replicate the model at farm level lie in obtaining funding for their farms and the unavailability of livestock, fry and seeds. With more of these innovation hubs in rural areas, more support would be available for individual farmers.

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Chapter 15
Connecting producers and consumers through innovation mechanisms: short value chains and participatory guarantee systems
Plurinational State of Bolivia

Hugo Chambilla S. and *Eduardo López R.*

15.1 INTRODUCTION

In an increasingly globalized world, a product's intrinsic attributes, such as quality, appearance and organoleptic properties, are important when it comes to selling the product at end-markets. These attributes, together with the final price, are also deciding factors for consumers' decisions to purchase the product. To be more competitive in these markets, producers have innovated. One of the main ways to be competitive is to produce high-quality products in sufficient volumes at a competitive cost. Innovation is a way to become more competitive, which means making better products, making them efficiently and performing other activities, such as accessing new markets (Humphrey and Schmitz, 2000). Innovation means improving a product or production system in order to differentiate it from the competition (Dunn and Villeda, 2005; Giuliani, Pietrobelli and Rabellotti, 2005). The timely supply of a product different from rival products gives a competitive advantage, which can be leveraged to increase the incomes of actors in the chain, especially those in the first links (Kaplinsky, 2001).

Small farmers' groups can innovate in four ways, through: (i) product innovation; (ii) process innovation; (iii) functional innovation; or (iv) intersectoral innovation (Humphrey and Schmitz, 2000). Product innovation involves improving production and quality. Process innovation involves improving the production system, for example by using new equipment and machinery (technology) to transform inputs into value-added products more efficiently. Functional innovation involves performing new activities that help to increase the product's value, such as marketing (brand, logo, promotion). Intersectoral innovation is achieved by moving into new production sectors with new products and/or services. An innovation occurs when new ideas, new technical devices or new forms of organization meet their users (Joly, 2011). Innovations are therefore essentially collective and rely on a system or network of individuals or organizations.

This chapter presents short value chains and the participatory guarantee system (PGS) as integrated innovations. Short value chains are seen as a functional innovation that structures the supply chain more effectively by reducing the number of intermediate links and establishing more direct relationships between producers and consumers in local markets. PGS are seen as an innovation in horizontal and cooperative mechanisms of trust between producers and consumers, which calls for alternative guarantee systems to be created in local trading spaces. In the Plurinational State of Bolivia, PGS comply with established standards and a regulatory framework for processes, and they use social control to improve organic production processes and monitoring. Both these innovations are aimed at developing more direct relationships between the actors involved (producers and consumers) and at developing social control between producer and consumer groups, thereby reducing transaction and certification costs.

In Bolivia, these innovations have been supported by a number of private institutions, such as Non-governmental Organizations (NGOs) and, more recently, by public institutions, mainly to promote a more sustainable and agro-ecological form of farming,[41] as well as to add value by processing agricultural products. However, little importance has been given to marketing and/or linkages between producers and consumers in local markets, with the result that some sustainable products are sold in conventional markets without any of the extra production costs being reflected in the price. Not surprisingly, this poses a range of challenges to producers, the biggest being access to fair and just differentiated local markets.

Initiatives by producers, consumers, NGOs and, more recently, the involvement of public institutions and some municipal councils, have led to the emergence in different areas and regions of Bolivia of organic farmers' markets (*Bio Ferias* and *ECO Ferias*) as alternative spaces for the local promotion and marketing of agro-ecological products. These farmers' markets are also designed to improve agro-ecological farmers' access to and integration into alternative markets, as well as to give consumers access to safe and healthy food.

Bolivia and conventional versus organic production

Over the past three decades, Bolivia has undergone three historical periods that have impacted agricultural policies. The first was the military dictatorship period characterized by repression of the civilian population and state funding of industrial sugar mills in Bolivia's eastern region. The second was the democratic period characterized by the implementation of the Bretton Woods economic policy prescriptions (structural adjustment policies), including the privatization of state-owned corporations, free markets and the promotion of monocultures such as soybean and sugar cane. The third and current period is characterized by the renationalization of privatized corporations and an agricultural productivity revolution aimed at guaranteeing food security and sovereignty.

Bolivia has a total cultivated area of some 3 million ha. Currently, the most important agro-industrial cash crop is soybean, accounting for more than one-third of the total cultivated area (1.16 million ha), of which around 90 percent is planted with genetically modified soybean varieties. Not only is Bolivia's soybean yield

[41] In the early stages, the promotion of agro-ecological farming was geared towards specialized products and export markets and hardly ever towards the local market.

(2.2 tonnes/ha) the lowest in the region, but the crop's behaviour has also been somewhat erratic and variable. The introduction of genetically modified varieties has failed to reverse either of these trends as it has not significantly increased or stabilized yields (Castañón, 2014).

The structure of the agricultural sector in Bolivia's Andean high plateau and valleys (*Altiplano-valle*) region is quite different from that of its eastern lowlands. In the Altiplano-valle region, farming is done by smallholders who produce food mainly for household consumption or for sale and/or exchange in local and farmers' markets. By contrast, in the lowlands, agriculture tends to take the form of large-scale commercial crop farming and grazing for beef cattle. Land resources are therefore distributed unevenly among regions and among production systems in the eastern region.

The latest statistics show that more than one million ha are under genetically modified crops,[42] compared with a little over 117 000 ha under agro-ecological production. The one million ha under genetically modified crops accounts for 37 percent of Bolivia's total cultivated area of around three million ha, while the area under agro-ecological production accounts for only 4 percent of the total area (Figure 15.1).

Methodology

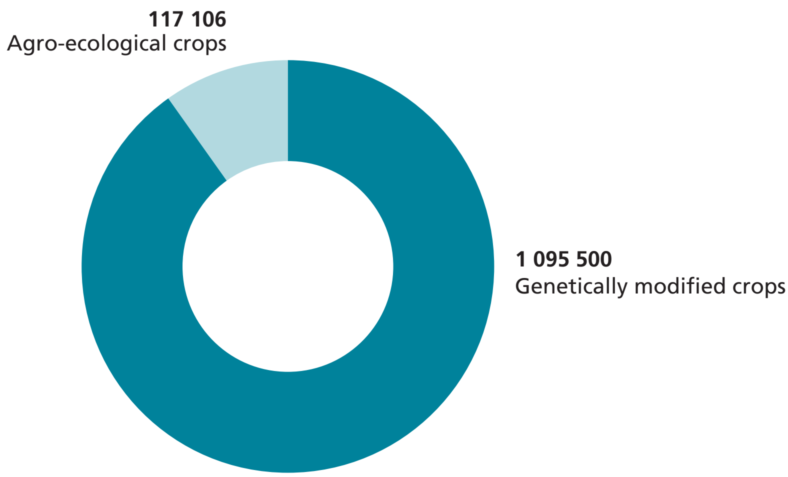
This study was exploratory, descriptive and conclusive. Three case studies were conducted to investigate PGS operations in the municipalities of Achocalla (La Paz), Batallas (La Paz) and Caracollo (Oruro).

- *Surveys* were conducted to study the operation and structure of local markets in short value chains in organic farmers' markets (Mayoux, 1998) in the departments of La Paz, Cochabamba and Tarija.
- *Direct observation* provided the authors with an up-to-date snapshot of case studies through off-site visits (Jones, 2010).
- *Review of secondary data* helped the authors to understand and systematize important issues in the case studies (Geilfus, 2000).

This chapter is divided into five parts: the first gives an introduction and background to the enabling environment in which the innovation is set; the second summarizes the methodology and methods used for collecting primary data; the third describes in detail the institutional innovation in the Bolivian context; the fourth reports the findings of selected case studies; and the final part draws conclusions and makes recommendations.

[42] The issue of genetically modified crops in Bolivia has yet to be resolved and, unless it is debated and solutions are implemented urgently, human health, sustainability, and food security and sovereignty will suffer. State policy contains serious inconsistencies, both direct and indirect, such as promoting the production of genetically modified crops such as soybean, as confirmed by data from the Santa Cruz Regional Seed Office and National Agriculture and Forestry Innovation Institute (INIAF). During the 2010 administrative period, 43 260 tonnes of seed were certified from 43 varieties of genetically modified soybean – enough to have covered at least 600 000 ha with new crops, with such direct and immediate effects as displacement of traditional crops, genetic pollution, environmental damage and infringement of the human right to adequate food. In a recent INIAF evaluation of 40 registered varieties, only one was identified as non-genetically modified (PROBIOMA, 2013, cited in Castañón, 2014). In this region of Bolivia, there is currently concern about "irregular" and "illegal" trial crops and the irresponsible spread of other genetically modified species, such as maize or cotton.

FIGURE 15.1
Area under conventional and agro-ecological crops (ha)



Source: Bolivian Association of Organic Farmers' Organizations (AOPEB) and Chamber of Agriculture of Eastern Bolivia (CAO), 2012.

TABLE 15.1
Sample and number of surveys conducted

Department	Organic farmers' market	Actors	Universe	Calculated sample	Number of surveys conducted
La Paz	**Bio Achocalla**	Producers	18	9.8	10
		Processors	6	3.3	3
		Consumers	45	24.6	15
Cochabamba	**ECO Feria**	Producers	15	8.2	9
		Processors	10	5.5	5
		Consumers	80	43.6	43
	Bio Tiquipaya	Producers	10	5.5	3
		Processors	3	1.6	0
		Consumers	25	13.6	8
Tarija	**Bio Tarija**	Producers	30	16.4	17
		Processors	9	4.9	7
		Consumers	70	38.2	33
Total			**321**	**175.1**	**153**

Source: authors' elaboration.

15.2 INSTITUTIONAL LANDSCAPE

Organic and/or agro-ecological farming[43]

In Bolivia, this form of agriculture dates back to the early pre-Hispanic civilizations, which cultivated maize and potatoes as their main crops. Evidence found in the ruins of Tiahuanaco, Isla del Sol (Altiplano), Samaipata and the Moxos plains suggests that farming was one of the main ways by which people ensured their food security.

In the 1970s, farmers' organizations flourished in the form of associations, cooperatives and smallholder agricultural corporations (CORACAs) that sold their products directly to domestic and international markets. In the 1990s, products such as coffee, quinoa, cocoa and chestnut began to be exported to agro-ecological and solidarity markets (such as the fairtrade market), with such exports requiring agro-ecological certification in line with the global standards of the International Federation of Organic Agriculture Movements (IFOAM). In 1991, the Bolivian Association of Organic Farmers' Organizations (AOPEB)[44] was established as a national body providing technical and business services.

In 1996, to ensure compliance with international standards, AOPEB promoted the establishment of Bolivia's international organic certification body, Bolicert,[45] which is currently accredited for international certification in international markets under ISO Guide 65.[46]

In 1998, AOPEB promoted the signing of agreements with the Ministry of Agriculture and Ministry of Sustainable Development (MDS) and, in 2002 and 2004, the agreements were renewed indefinitely. Within this framework, the Technical Coordination Committee (CCT) was set up to develop policies and standards for promoting agro-ecological production in Bolivia. CCT includes both public and private members: the Ministry of Rural and Agricultural Affairs (MACA), MDS, Bolivian Promotion Centre (CEPROBOL), National Service for Animal and Plant Health and Food Safety (SENASAG), Higher University of San Andrés (UMSA), Unidad Académica Campesina-Carmen Pampa (UAC-CP), AOPEB and the Federation of Coffee Exporting Producers of Bolivia (FECAFEB).

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[43] In Bolivia, as elsewhere, while there are some distinctions between the concepts of "ecological" and "organic", the common denominator of both production systems is always the agro-ecological production methods used. The study therefore considered the terms as equivalent, while complying with the implementing regulations for Law 3525 on the national technical standard for agro-ecological production in Bolivia.

[44] Since 1991, AOPEB has supported the development of a form of environmentally friendly farming and the sustainable use of biodiversity by complying with international standards and proposing national standards. AOPEB also promotes such production by respecting the age-old wisdom of the Andean and Amazonian cultures, contributed mainly by peasant and indigenous farmers' organizations. AOPEB is a non-profit grassroots social confederation that brings together and represents 85 members nationwide. Available at: http://www.aopeb.org

[45] Bolicert is an independent, non-profit certification body. It is a registered legal entity, subject to rights and obligations under Bolivian law (RAP 287/96). It is governed by an independent board composed of members with expertise in organic production, including persons involved with producers, processors, consumers and government entities. Its policies and quality objectives comply with standard ISO 17065 (EN 45011), ISO 1000011-1 and the criteria of IFOAM.

[46] Certification by a certification body is known as "accreditation". The reference standard in this case is ISO Guide 65 – 17065 (EN 45011). It is similar to standard ISO 9001 on quality management systems (FAO, 2002).

In 1999, AOPEB drew up a five-year strategic plan to boost the Agro-ecological Movement in Bolivia (MAEB) by involving public and private actors. In 2000, AOPEB started to implement its strategic plan by promoting farmer-to-farmer training; business and organizational management; use of information and communication technologies; public awareness; participation in national and international trade fairs; and institutional relations.

In 2003, a bill on the regulation and promotion of agro-ecological agricultural and non-timber forest production was submitted to the legislature and, late in the same year, AOPEB opened the *Súper Ecológico* chain of organic grocery stores to promote the domestic consumption of agro-ecological products.

Within the framework of CCT, Supreme Decree DS 28558 was enacted on 22 December 2005, with the aim of promoting agro-ecological production nationwide and implementing the national control system for agro-ecological production. SENASAG was designated as the national competent authority for overseeing agro-ecological production. Municipalities such as Caranavi, Achocalla and Yapacani have declared themselves free from genetically modified organisms (GMOs).

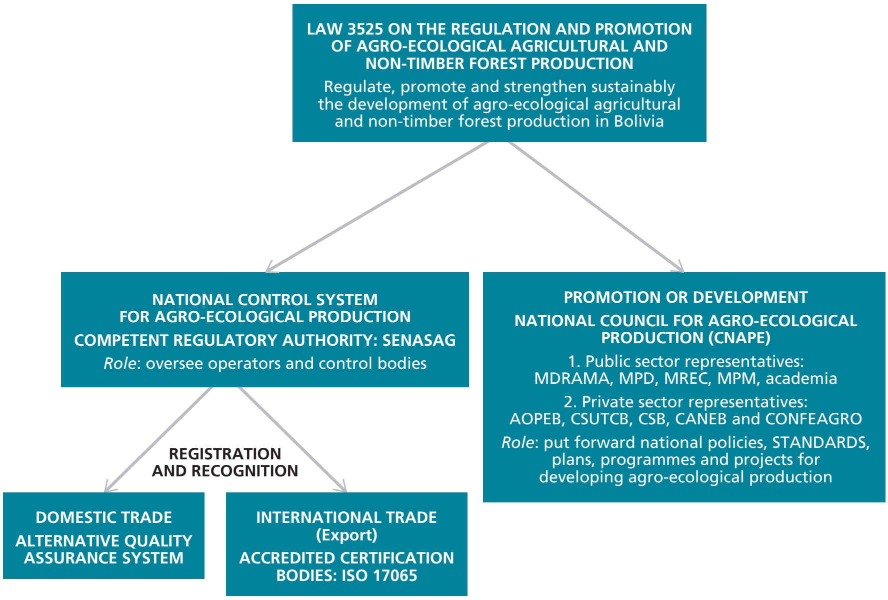
In January 2006, within the CCT framework, a policy for the development of agro-ecological production in Bolivia was approved under ministerial decision 017/2006. June 2006 saw the launch of the National Development Plan: a Dignified, Sovereign, Productive and Democratic Bolivia for Living Well (*Vivir Bien*). The national development plan for the period 2006–2010 acknowledges the importance of promoting agro-ecological production nationwide, which is described in various regulations in the plan, including Chapter 5 on productive Bolivia, subchapter 5.4 on the work- and knowledge-based revolution of diversified and integrated production, and Policy 5 on production for food sovereignty.

In October 2006, the bill on the regulation and promotion of agro-ecological agricultural and non-timber forest production was passed and, in November 2006, President Evo Morales Ayma presented it officially as Law 3525. The regulatory and institutional structure of Bolivia's agro-ecological production is currently as shown in Figure 15.2.

Today, particularly with respect to smallholder farming, this enabling environment has been widely recognized in the Constitution of Bolivia and in a range of laws, decrees and plans. These include the national development plan, the law on agro-ecological production, the law on a community-based agricultural productivity revolution, the law of Mother Earth and, most recently, the law on economic organizations for farmers and indigenous peoples (OECAs), to name but a few. All of these are intended to regulate, promote and strengthen sustainably the development of Bolivia's peasant agricultural and forestry production.

In particular, Law 3525 is based on the principle that, to reduce global poverty, it is not enough simply to produce more food but that this food should be high quality, safe for human health, biodiversity friendly and accessible and available to all, and that production, processing and marketing processes should not be detrimental to or damage the environment. The recently enacted law on OECAs raises such fundamental issues as the importance of family farming, collaboration, food sovereignty and the prioritization of locally sourced foods.

FIGURE 15.2
Regulatory and institutional structure of Bolivia's agro-ecological production



Source: AOPEB. Available at: www.aopeb.org/web_aopeb/politicas.php.

Practical action by the state

Under partnerships between the Bolivian Government and the United Nations (UN) system in Bolivia to build capacity at various levels (especially that of CNAPE, the lead agency for agro-ecological production), six UN agencies worked closely with specialized units of government (UC-CNAPE) and in coordination with the National Agriculture and Forestry Innovation Institute (INIAF), Rural Entrepreneurship Implementation Unit (EMPODERAR), Bolivian Development Agency (PRO-BOLIVIA), Food Security Support Programme (PASA) and AOPEB. The UN agencies were the United Nations Development Programme (UNDP), Food and Agriculture Organization of the United Nations (FAO), United Nations Industrial Development Organization (UNIDO), United Nations Children's Fund (UNICEF), World Food Programme (WFP) and International Labour Organization (ILO). In late 2010, they initiated a joint programme for the integration of indigenous Andean producers into new national and international value chains, which is being implemented in 18 municipalities across seven departments of Bolivia.[47] CNAPE promotes Law 3525 and assists by disseminating all aspects of agro-ecological farming. Almost simultaneously, in February 2012, a ministerial decision approved the national technical standard for PGS, which provides for an ecolabel in recognition of

[47] http://www.bo.undp.org/content/bolivia/es/home/operations/projects/poverty_reduction/integracion-de-productores-andinos-indigenas-a-nuevas-cadenas-de.html (accessed on 24 March 2016).

the work of smallholders. It has achieved the ultimate aim of improving these family farmers' chances of achieving differentiated access to local markets, as well as raising their profile as agro-ecological (i.e. not conventional) farmers.

Some of the major outcomes of this joint programme include: 7 000 producers trained in agro-ecology and 17 PGS consolidated, with 650 producers classed as agro-ecological farmers and 2 700 producers classed as in transition, totalling around 3 400 agro-ecological farmers in the highland, valley and tropical ecoregions. Support was also given to local marketing spaces such as farmers' markets, including the Raymi organic farmer's market in Sipe Sipe municipality (Cochabamba), Bio Tarija and Bio Achocalla.

Action by farmers' organizations and aid agencies

The most important organization is AOPEB, and, through it, a number of international and aid agencies. AOPEB has broad representation from organizations and peasant farmers. Its work revolves around the principles of sustainable agriculture, product processing, marketing in alternative spaces and the establishment of PGS, in addition to other areas of activity, such as organizational self-management, leadership training and advocacy.

AOPEB is important in public policy because its advocacy has achieved major outcomes, including the development and approval of key legislation, such as Law 3525 on agro-ecological production and its implementing regulations.

15.3 INSTITUTIONAL INNOVATION: SOCIAL CONTROL OR PEER REVIEW

Background and organizational structure

The innovative institutional approach in Bolivia is social control (peer review), which is a mechanism for participatory audits and monitoring at various levels and is enshrined in Bolivia's Constitution. Social control relates mainly to the quality of utilities (water, energy, telecommunications), as set out in Article 18 of the Constitution. Article 270 also links it to territorial organization and autonomous territorial entities (departmental and municipal governments and indigenous communities) and Article 345 links it to environmental management policies. This innovative public approach is therefore involved specifically in: (i) design of public policies (where organized civil society helps to shape the public agenda in which public policies are developed); (ii) control of public administration at all levels (where organized civil society is required to participate in public administration planning and control); and (iii) transparent information management.

The concept of organized civil society relates to two areas: (i) the exercise of citizens' political rights, as established in Article 26 of Bolivia's new Constitution (which states that all citizens have the right to participate freely in the formation, exercise and control of political power, either directly or through their representatives and either individually or collectively); and (ii) social control as practised by actors in specific contexts; however, the scientific literature does not link this agency to the actors, rather, it blurs it in the vague notion of the self-organizing civil society.

Even though an organized group had been developing this innovative approach since 2005, it was not until October 2008 that it was officially enshrined in Bolivia's new Constitution. While the innovative approach of social control has been associated with organizing the control and monitoring of basic services by the civilian population, further uses for social control are evolving in the area of natural resources. PGS have emerged as an alternative way to give agro-ecological farmers and farmers in transition to agro-ecological production access to a local certification scheme that is more solidarity based and in line with the reality of smallholders across a variety of contexts. From the technical standpoint, third-party certification is more geared towards specialized products for international markets (e.g. coffee, cocoa and bananas for the United States of America and Europe). For products to be exported to countries in the northern hemisphere, they must meet international standards assessed by certification agencies that have been accredited by a set of public and private actors. However, certification is far too expensive for most smallholders, especially in the early organizational stages, which has excluded them from value chains serving speciality markets such as organic and fairtrade products (Murray, Raynolds and Taylor, 2006; Soto, 2005). In response to this social and economic marginalization, NGOs, social movements, consumer networks and farmers' organizations have coordinated PGS as an alternative to third-party certification (Meirelles, 2005).

While PGS have appeared in the glossary of Law No. 3525 since its enactment, it was not until February 2012 that the technical regulations for PGS were published. In Bolivia, however, private PGS, such as *ECO Ferias* in the department of Cochabamba, have existed since 2003. PGS differ in geographic scope (national or municipal), composition (public or private), and social and cultural context (indigenous, peasant farmer or community).

Short value chains, as a functional innovation that is linked closely to the PGS concept, focus on restructuring the supply chain by reducing the number of intermediate links in favour of the first and last links in the chain (producer and consumer). All this has been in response to a situation where farming families are denied access to productive resources and to production and marketing chains. In recent years, it has led some producers and consumers to organize in order to improve the conditions for direct sale in local markets.

Bolivia's legislation views PGS and direct marketing in local markets as instruments for promoting agro-ecological farming based on participatory social control to verify and monitor local and national compliance with technical standards.

The main features of these systems are:

- recognition of agricultural and non-timber forest products;
- recognition of ancestral and traditional community practices (worldviews);
- no recognition for parallel production in space and time (agro-ecological and conventional), i.e. agro-ecological and conventional crops should not coexist in the same production unit (crops should be either agro-ecological or conventional, and obviously conventional crops cannot be included in PGS);
- a different transition period for each type of crop.

Although the cost of certification is still under debate, further cost studies are needed.

In Bolivia, there is a favourable regulatory and legal environment for the development of agro-ecological farming thanks to Law 3525/05 on the development and promotion of agro-ecological production, which includes non-timber forest products. CNAPE is responsible for legislating on agro-ecological production through such technical standards as Supreme Decision 20 of January 2012. SENASAG supervises compliance with Law 3525.

Organizations involved

The organizations involved in this innovative approach can be divided into two main groups. The first group includes technical service providers, such as AOPEB, the Coordination Unit of the National Council for Agro-ecological Production (UC-CNAPE) and SENASAG, which provide periodic training on organic farming issues and participatory certification. The second group includes the business service providers AOPEB and AGRECOL Andes Foundation, which have encouraged the development of organic markets (AOPEB's *Súper Ecológico* chain of organic grocery stores and *Bio Ferias*, and the AGRECOL Andes-sponsored *ECO Feria*), and the farmers' organizations of Bio Achocalla, Bio Caracollo, *ECO Feria* and Batallas PGS (Figure 15.3).

Sustainable practices

The most sustainable agricultural practice is organic farming, which is defined as a model of sustainable production that promotes holistic and integrated human development and that cares for, improves and recovers the agro-ecosystem, in particular biodiversity and soil biological activity, based on specific standards, values and principles. It operates across five agro-ecological dimensions: (i) technological or productive dimension; (ii) social or cultural dimension; (iii) environmental dimension; (iv) economic dimension; and (v) political dimension (Bolivia, Plurinational State of, 2011).

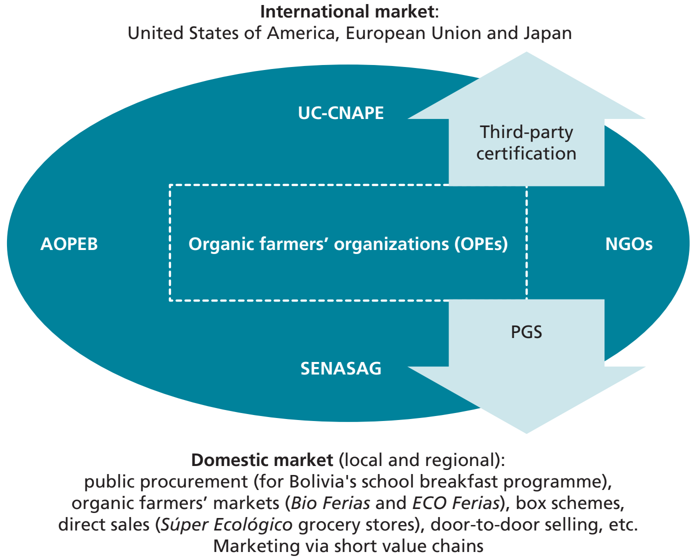
Sustainable practices are being promoted mainly by a group of technical and business service providers interested in providing training in organic farming, including AOPEB and UC-CNAPE. There is also a political interest in promoting such practices in light of the "Mother Earth" legal regulatory framework adopted by the Tiquipaya city council in 2010, which advocates more sustainable agricultural practices in response to global warming.

According to surveys of organic farmers, the transition from conventional to organic production can be difficult but the farmers feel it is worthwhile for the health benefits to their families and to potential consumers. Membership of farmers' organizations has increased their human and social capital, which is a requirement for any undertaking or activity. The most important input from producers has been worldviews and local knowledge about crop production systems.

Most agricultural production systems are sustainable but to differing degrees. In other words, there are traditional systems and systems that are agro-ecological or organic to some extent, but not totally, including systems using a handful of conventional practices (machinery, "improved" seed and some agrochemicals). They can therefore be described as systems with a degree of "traditionality" and "ecologicity" (Chambilla, 2014) and hence a higher degree of sustainability. As product diversity is another factor that determines a sustainable production system, the number of products for sale and for household consumption should never be less than about ten.

Some of the main reasons for farmers adopting sustainable agricultural production systems are to improve sales and income, provide a healthy diet for their families and care for their land. They have also been prompted by the recent dire global food context (the food crisis of 2007 and 2008 and the food scandals arising from conventionalization of the food system).

FIGURE 15.3
Institutional enabling environment for agro-ecological supply chains



Source: authors' elaboration.

Markets for sustainable products and services: local markets

A local market is one where goods are traded within the normal sphere of movement of the actors and stakeholders involved. It can also be defined as a unique geographic area with a solid set of common cultural references. It is a territorial concept that grows or shrinks physically in line with the different products traded or exchanged and the symbolism they embody, which also makes it a cultural concept. If the term sustainability is linked to the local market concept, it becomes a type of market with multiple social, economic, environmental, cultural and territorial development, and other implications.

The local market concept, in its various direct-sale forms (including public procurement,[48] organic farmers' markets, farmgate sales and box schemes[49]), is

[48] Public procurement is intended to be part of the state's support for social programmes and domestic food production. In recent years, it has become an important emerging programme to mobilize resources to invest more effectively in both public policy initiatives, which are covered by national food security policies, and the human right to food. Although public procurement has always been a good market opportunity for smallholders, they are unable to break into and remain in these markets because of their constraints and lack of certain capabilities. In 2011, this market was worth 332.18 million bolivianos nationwide and, in 2010 and 2011, a total of 22 farmers' organizations participated, with the number dropping to 14 in 2012. Among the ten companies with the highest sales, only BANABANI SRL represents smallholders, with 3.5 percent of companies' total sales (Prudencio and Elias, 2014).

[49] A type of door-to-door sales approach where members of a specific farmers' organization sell their ecological products in homes, offices and shops (as an added convenience to customers) in order to ensure sales and future repeated custom for their products.

linked closely with short value chains, with their emphasis on the importance and necessity of implementing PGS as systems for building trust, quality control and product recognition.

Of note in Bolivia's case are organic farmers' markets for direct sales, including Bio Achocalla in La Paz city, Bio Tiqui and *ECO Feria* in Cochabamba city, and Bio Tarija in Tarija city, which are held on a regular basis (every weekend or every fortnight).

Organic farmers' markets – case studies

These markets generate a great deal of social capital. For instance, the Bio Achocalla market involves 275 households in the municipality, grouped into 13 communities. The structure of PGS in Achocalla municipality includes a PGS legal representative who is the AOPEB president; the agro-ecological guarantee committee of Achocalla municipality (CGEMA), which has a board (president, vice-president, public relations secretary-treasurer and directors); assessors, most of whom are producers, service providers or consumers; and individual producers and/or farmers' organizations. They submit a compliance report to SENASAG, which carries out audits and checks before sending a report on the process to CNAPE, after which CNAPE authorizes certification. SENASAG conducts surprise inspections, which are intended to identify the current state of operation of PGS in different production systems selected at random, as specified in national legislation.

CGEMA in Achocalla is responsible for running PGS and includes actors from the various links in the agro-ecological supply chain at local level, including produc-

PHOTO 15.1
Organic farmers' markets

Bio Achocalla (La Paz)

ECO Feria (Cochabamba)

Bio Tarija (Tarija)

© Hugo Chambilla

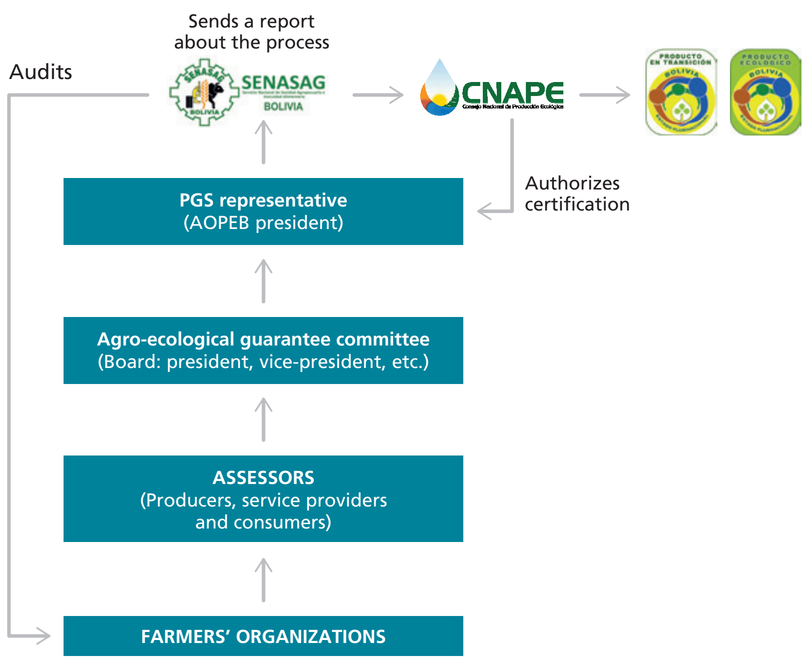
ers, processors, service providers and consumers. As a result, the social capital and organizational structure of PGS evolve in each region and area with some variations.

Actors in organic farmers' markets

Women producers/processors/traders. As it is mainly women who participate in organic farmers' markets (in production, processing, industrial upgrading and marketing), 84 percent of those surveyed were women with an average age of 44 years. Their families included five members. With respect to their level of formal education, most had received only primary schooling. The majority of farmers have a single residence, i.e. they live on the production unit. In the case of the Bio Tarija organic farmers' market, producers are rural, while those in the markets of Cochabamba and La Paz are suburban and urban, in that order. Their chief occupation is arable farming (63 percent), followed by arable farming and processing (20 percent) and livestock farming (9 percent). A few have a second job outside the production unit, in particular paid part-time work as cooks, teachers, etc.

As regards access to productive resources, producers have farmland of up to 2 ha, with 92 percent of their crops under irrigation. Most of the seed they use is purchased, followed by their own seed. This is not surprising because most farmers produce mainly fresh vegetables and have to buy seed, either because they have

FIGURE 15.4
Participatory guarantee system



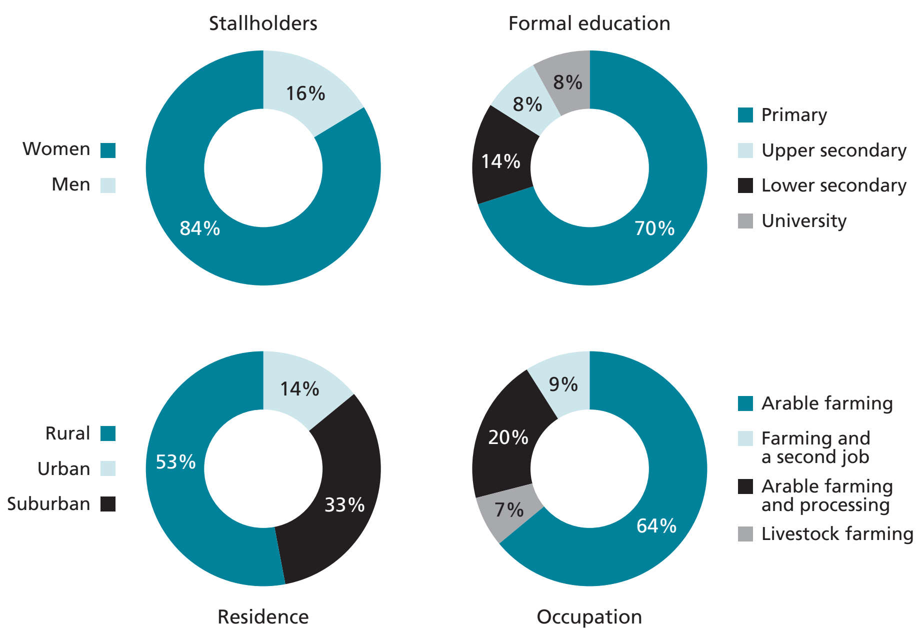
Source: adapted from AOPEB.

no culture of seed production or simply because seed is far cheaper to buy than to produce (as explained during interviews). Farmers' own seed is chiefly from crops such as maize and potato, where the seed is separated from a part of the production. Farmers use mainly family labour.

Female consumers. As in the case of farmers, women make up a large share of buyers and/or consumers (85 percent), with an average age of 46 years; 61 percent of female consumers have an undergraduate level of education and 16 percent have postgraduate education. Their families include four members and the monthly income of 48 percent of female consumers is 3 000–5 000 bolivianos;[50] for 25 percent it is 1 000–3 000; and for 19 percent it is 5 000–10 000.

Even though female consumers have purchasing power, their average expenditure at each farmers' market (weekly or fortnightly) is low: never more than 100 bolivianos. The reason, as reported by the consumers themselves, is that these markets do not sell the other (industrial) products that make up the family basket of goods, such as meat, oil, noodles, sugar and rice. Consumers' main reason for buying in farmers' markets is because the foodstuffs are healthy, natural and high quality, and they also wish to support smallholders.

FIGURE 15.5
Producers participating in organic farmers' markets



Source: authors' elaboration.

[50] One boliviano = US$0.1448 (US$1 = 6.90 bolivianos).

Farmers' market developers and/or managers. These farmers' markets were launched a decade ago with the assistance and/or supervision of institutions (through their technicians) and farmers' organizations. Within farmers' markets, boards and/or committees organize product supply and retail space and arrange future support.

AOPEB technicians and NGOs have helped to develop farmers' markets using different strategies for operating these spaces. Lately, the state (UC-CNAPE and local municipal councils) has been moving into the business of agro-ecological production and marketing in short value chains, better known as farmer-to-consumer markets *(ferias del productor al consumidor)* or farm-to-table markets *(ferias de la chacra a la olla).*

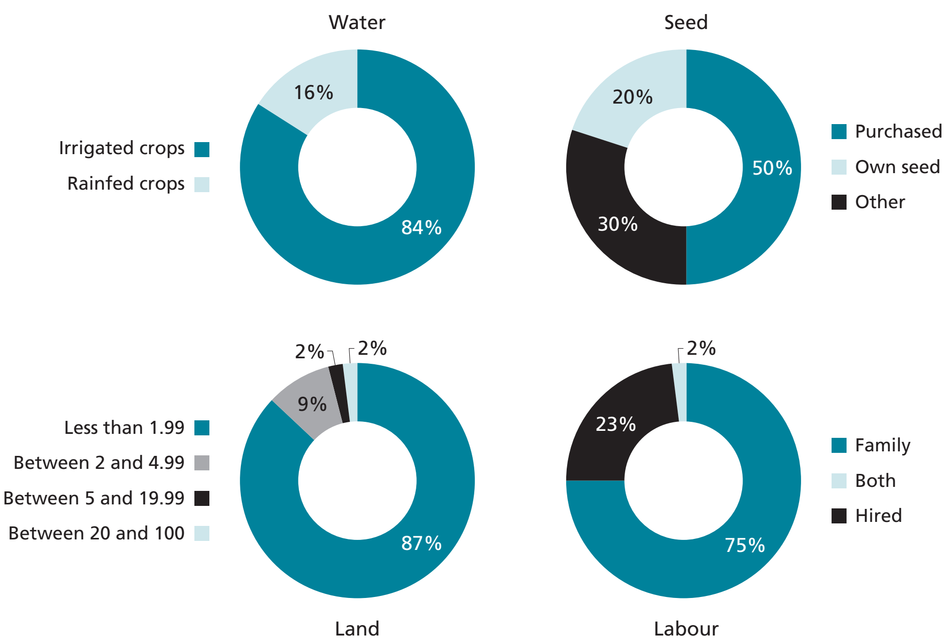
Products and their destinations, recognition and rating

A total of 72 different products are sold at these farmers' markets, chief of which are potatoes, vegetables and cereals, in that order, as illustrated in Figure 15.8. The figure also shows that a wide range of (local) products is available in these local markets, as indicated by the "other products" bar, which is the longest in the chart.

Figure 15.9 shows that the most typical product groups sold at these farmers' markets are vegetables, tubers and cereals.

An analysis by region and/or department shows that, compared with their counterparts in La Paz, the organic farmers' markets of Cochabamba and Tarija are

FIGURE 15.6
Access to productive resources



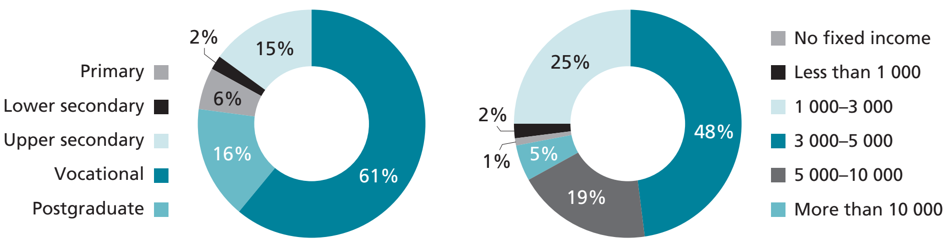
Source: authors' elaboration.

more diverse, mainly because they are both situated in the valley ecoregion where the climate and water resources are suited to growing a variety of agricultural products. A point of note is that the supply of these products varies according to the season, with only a small number and volume of products grown during the cold dry season.

Product destination. Although most products are intended for sale and/or exchange, a large portion is destined for household consumption and another portion is used to produce seed for the following crop year (mainly tubers, grains and cereals).

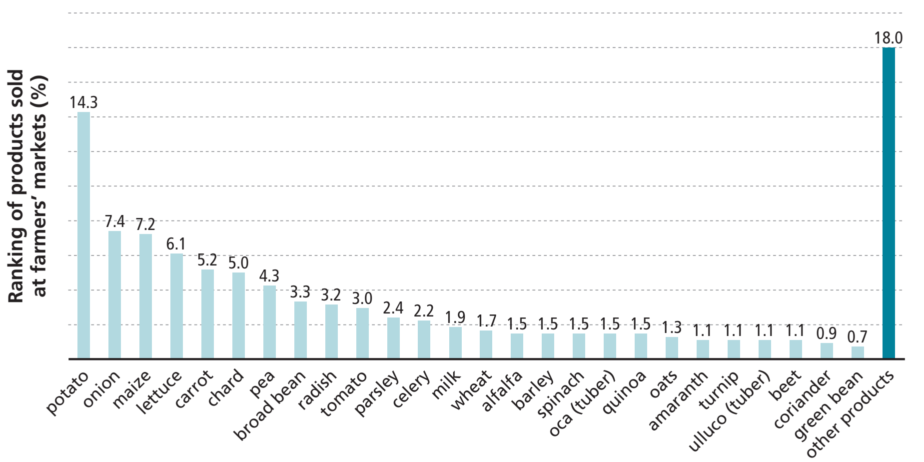
Product recognition and rating. As a rule, 65 percent of consumers are able to identify and recognize an agro-ecological product, while the remaining 35 percent have to trust the word of the producer. Consumers who claimed to recognize agro-

FIGURE 15.7
Consumers' education and income levels



Source: authors' elaboration.

FIGURE 15.8
Ranking of products sold at farmers' markets

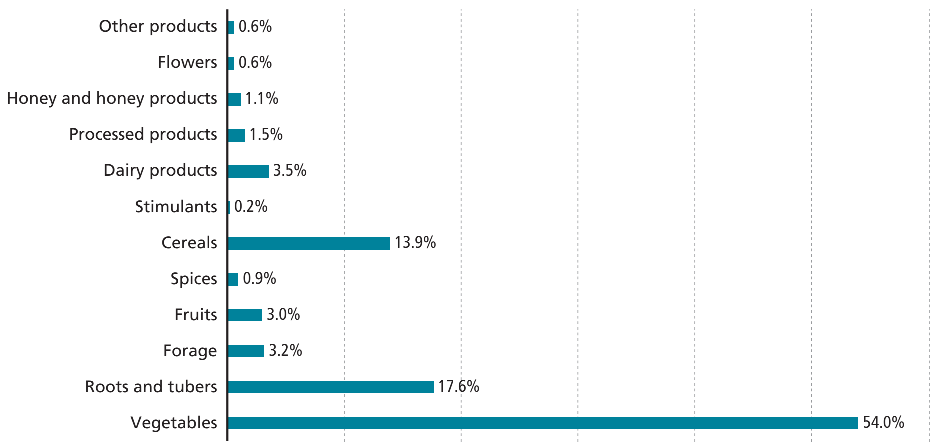


Source: authors' elaboration.

ecological products said that they were able to distinguish mainly by its organoleptic properties (such as freshness, uneven size and the presence of a few insects).

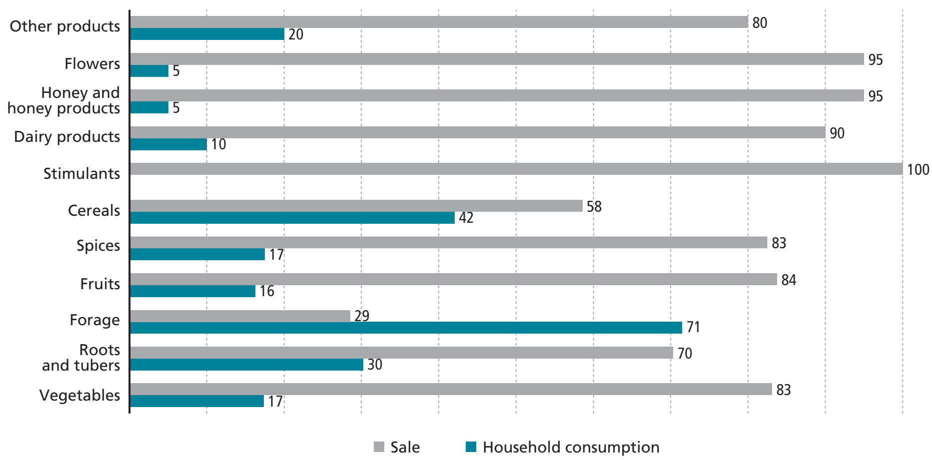
With regard to the rating or certification of agro-ecological products, 85 percent of producers are aware of a label or certification.

FIGURE 15.9
Groups of products sold at farmers' markets



Source: authors' elaboration.

FIGURE 15.10
Product destination



Source: authors' elaboration.

As regards ownership and usefulness of labels or certification, 61 percent of producers have some kind of label or certification. The most important, in order of importance, are third-party ecolabelling; PGS labelling; health and safety certification by SENASAG and the Departmental Health Service (SEDES); and other forms (seed certification by INIAF). At present, most producers cannot see the use of labels or certification, with the result that only 13 percent of women farmers reported that labels had helped them at some point during the marketing process. It is worth bearing in mind that, as PGS are still in the process of adoption and development, producers cannot determine their real implications.

Marketing channels and strategies

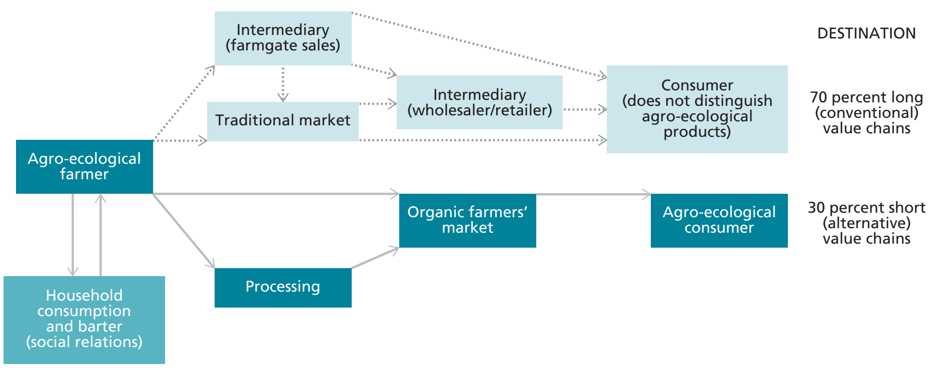
Marketing channels are: (i) the traditional marketing channel, where a number of wholesale and/or retail intermediaries stand between producer and consumer and where agro-ecological products are not differentiated or recognized as such; and (ii) the alternative short value chain where the emphasis is on household consumption and other ways of exchanging agro-ecological products (barter and gift). In spite of this, the conventional marketing channel is still the more important of the two for agro-ecological farmers (70 percent of sales).

Strategies to increase sales and prices tend to focus on market diversification and production using staggered planting schedules with different planting dates.

Prices, sales and economic turnover of farmers' markets

Most consumers find the prices of products sold at farmers' markets to be average, i.e. neither expensive nor cheap. With regard to the sales and economic turnover generated by farmers' markets, Table 15.2 shows that the farming families of Bio Tarija farmers' market receive a higher income than those of the Bio Achocalla and Bio Tiquipaya markets. This large gap stems basically from two factors: (i) apart from selling a wider variety of products, the Bio Tarija farmers' market is held in a

FIGURE 15.11
Marketing channels and strategies



Source: authors' elaboration.

TABLE 15.2
Sales and economic turnover of farmers' markets (in bolivianos)

Farmers' market	Frequency per month	Average number of participants		Average sales per producer/ processor per market	Economic turnover		Annual income per stallholder
		Producers/ processors	Consumers		Market	Year	
Bio Achocalla (La Paz)	2	12.5	125	282.5	3 531.25	84 750	6 780
Bio Tiquipaya (Cochabamba)	4	6	40	140	840	40 320	6 720
ECO Feria (Cochabamba)	4	12	145	215	2 580	89 500	7 458
Bio Tarija (Tarija)	2	20	175	800	16 000	384 000	19 200

Source: authors' elaboration.

street next to Fatima Market where consumers are able to shop for other products in the basket of goods that are not sold at Bio Tarija (such as meat, noodles, oil and sugar), which greatly influences consumer buying decisions; (ii) as all the products needed for their families are available in one place, consumers spend more money and show a preference for agro-ecological products when the cost is almost the same as in the nearby conventional market. These two factors explain why women farmers participating in the Bio Tarija farmers' market earn a higher income than farmers in other markets.

15.4 RESULTS AND BENEFITS

The benefits of this institutional innovation are evident among the actors in the short value chain and their local area. The innovation helps to improve the lives of farmers through sustainable production systems, better marketing, higher incomes, social relations established at farmers' markets, environmental awareness and other benefits.

For consumers, the combination of PGS and short value chains provides healthy, natural food at affordable prices; knowledge of where the food comes from; social relations with producers (sense of belonging, camaraderie and friendship); and an indirect opportunity to help care for the environment.

Benefits also extend to communities and their lands through greater economic growth, social control and advocacy to local governments. In addition, recognition for the place or area where such practices are adopted can lead to the development of geographic indications for fresh and processed products.

Finally, the benefits of this innovation include the creation of networks of communication and coordination with other producers involved in the same innovation, such as organic farming, as well as access to the technical and business services provided by other stakeholders in these value chains.

15.5 CONCLUSIONS AND RECOMMENDATIONS

The lessons to be learned (some that were created and others that were reinforced) were the importance of short value chains, PGS and peer review (social control).

The actors who are involved in short value chains communicate and coordinate with one another regularly to share experiences and innovations.

Short value chains allow for a more direct relationship between producers and consumers, reducing the involvement of intermediaries, increasing producers' incomes and lowering prices for consumers, although these value chains still need further development.

One of the main challenges that has not yet been fully addressed is ensuring a continuous supply of products to *Bio Ferias* to meet growing demand. Another challenge is the gradual involvement of rural and urban municipal councils as public policy-making bodies in organic farming programmes in order to ensure the food security and sovereignty of a growing population.

There are opportunities for disseminating these innovations via social networks such as Facebook or Twitter, as well as by creating and regularly updating blogs to publicize case studies in Bolivia. This would be a way of sharing experiences and innovations with others in order to build and consolidate stakeholder networks.

One long-term impact of such initiatives has been to strengthen legal instruments, such as PGS technical regulations, through a comparative study of cases that considers the dimensions and their respective standards. A further impact has been the creation of organic farming clusters that are linked through the activities of technical and business service providers. A potential avenue of development in the future might be appellations of origin to emphasize innovation, particularly product, process and functional upgrading.

Despite the favourable legal environment for organic farming, there is clearly a total lack of specialized financial services providers for organic enterprises.

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Chapter 16
Institutional collaboration for sustainable agriculture: learning from the tea sector in the Southern Highlands of the United Republic of Tanzania

Filbert Kavia, Allison Loconto and *Emmanuel Simbua*

16.1 INTRODUCTION

Agriculture is the mainstay of the Tanzanian economy, contributing about 25 percent of GDP and 30 percent of export earnings. It employs about 75 percent of the total labour force (URT, 2011b). The rate of growth in agriculture is higher than the average annual population growth rate of 2.6 percent implying growth in incomes (URT, 2011b). However, the average agricultural growth rate of 4.4 percent is insufficient to lead to significant wealth creation and alleviation of poverty, given the low level of agricultural development. Attaining poverty alleviation requires an annual agricultural growth rate of 6 to 8 percent (URT, 2012). The agricultural sector in the country comprises crops, livestock, fisheries, forestry and hunting. Crop production contributed 17.6 percent of GDP and grew by 4.7 percent; livestock production contributed 4.6 percent and grew by 3.1 percent; while forestry and hunting contributed 2.5 percent and grew by 2.4 percent and fisheries contributed 1.3 percent and grew by 1.8 (URT, 2011a).

Food crops include maize, sorghum, millet, rice, wheat, pulses (mainly beans), cassava, potatoes, bananas and plantains, accounting for about 65 percent of agricultural GDP. On the other hand, cash crops (coffee, cotton, cashew nuts, tobacco, tea, sisal, sugar cane and pyrethrum) account for about 10 percent of agricultural GDP. Tea ranks fifth among the leading foreign exchange earning export crops in the United Republic of Tanzania after cashew nuts, coffee, cotton and tobacco. In 2012, tea contributed a total of US$47 993 000 from exports of 26 133 tonnes. This is 7 percent of total cash crop export earnings. More recently, in 2013, the country exported 27 776 tonnes of made tea and earned about US$56 031 000 (TBT, 2013). In addition, the tea industry in Tanzania[51] contributes substantially to employment opportunities. It provides employment for about 50 000 families and total employment (direct and indirect) for about 2 000 000 people (TSHTDA, 2013).

[51] Refers throughout to the United Republic of Tanzania.

Agricultural export crops have been growing at about 6 percent with food crops growing at 4 percent. Food and cash crops account for about 70 percent of rural incomes. The development of crop commodities is hindered by low product quality caused by a weak regulatory framework and enforcement of standards for agricultural products; insufficient forward and backward linkages in production, processing and marketing activities; high transaction costs; over-reliance on peasant agriculture and low private sector investment; inadequate support for new/speciality products; and low returns on agricultural investments (URT, 2012). This case study examines the efforts taken within the tea sector to implement sustainable production practices that help to address these limitations in the industry.

Agriculture has changed dramatically since the end of the Second World War. Food crop productivity has risen as a result of new technologies, including mechanization; increased chemical use; production specialization; and government policies that favour maximizing production and reducing food prices. These changes have allowed fewer farmers to produce more food at lower prices. These developments have many positive significant effects for farming, but they also have high production costs and significant negative effects on the environment. Prominent among these effects are soil erosion, groundwater contamination, air pollution, greenhouse gas emissions, poor living and working conditions of farm labourers, and threats to human health and safety (Brodt *et al*., 2011).

Over the past four decades, a growing movement has emerged that questions the necessity of these high costs and negative environmental effects and proposes innovative alternatives of sustainable agriculture production. "Sustainability" has become one of the buzzwords of the twenty-first century. This can be seen by the increasing number of universities that offer courses or even programmes in "sustainability", and many large companies boast substantial departments devoted to the subject (Daily News, 2014). Moreover, sustainable agriculture can be defined in many ways, but ultimately it seeks to sustain farmers, resources and communities by promoting farming practices and methods that are profitable, environmentally sound and good for communities. Sustainable agriculture fits into and complements modern agriculture, which rewards the true values of producers and their products (Brodt *et al*., 2011).

Currently, various philosophies, policies and practices have contributed to Tanzania's sustainable agriculture goals, but a few common themes and principles weave through most definitions of sustainable agriculture, such as voluntary standards for certification of agricultural products and organic agriculture (URT, 2011c). According to ActionAid Tanzania (2011), sustainable agriculture in the country integrates several goals such as environmental issues, farm profitability and prosperous farming communities. It refers to the ability of farms to produce food indefinitely, without damaging soils and ecosystems, or human and social capital. Sustainable approaches aim to maintain healthy soils while reducing reliance on external inputs such as synthetic fertilizers, pesticides and herbicides.

Recently, Tanzanian agriculture and particularly crop production have been critically affected by changing weather patterns. These include unreliable and unevenly spread rainfall, longer dry periods, destructive rainfall (damage to crops, soil erosion and damage to infrastructure), higher temperatures and frost in some areas. Intensified climate change, resulting in pests and outbreaks leading to lower yields and the need to increase the use of pesticides, is causing major problems for producers.

According to the National Agriculture Policy (NAP, 2013), of 10.8 million ha under cultivation, only about 450 392 ha are currently irrigated. Other national sustainability concerns include the erosion of the natural resource base and environmental degradation through its unsustainable use. Other problems experienced in the country are land degradation, desertification, widespread pollution from improper handling, and inappropriate use of agrochemicals and fertilizers. The environment is further degraded by poor cultivation practices, bush fires, overexploitation of forests, and invasion by exotic organisms and climate change. This has affected agrobiodiversity, leading to declining land productivity.

The institutional innovation in this case study is the collaboration between public and private actors in the tea industry, which created an enabling environment for the adoption of private sustainability standards. Tea production in the Southern Highlands (Mufindi, Njombe and Rungwe districts) is divided between smallholder farms and large estates owned by tea companies that also own the processing facilities. Smallholders are organized in groups/associations through the Tanzania Smallholder Tea Development Agency (TSHTDA), and the Tea Research Institute of Tanzania (TRIT) provides new technologies and extension frameworks for the system.

Smallholders deliver their leaf to one of the nine tea processing factories certified by Rainforest Alliance (RA) standards, owned by three companies on a contract farming basis (Mufindi Tea Company [MTC], Unilever and Wakulima Tea Company [WATCO]). The mission of the companies is to provide effective management services to smallholder groups for efficient production, processing and marketing of high-quality teas through the RA/Sustainable Agriculture Network (SAN) standard. The standard aims to increase product quantity and quality and enhance market recognition of responsible farming (and thus RA-certified teas). This helps the companies to retain current markets and tap into new ones, and thus is one of the ways for them to maintain and improve their markets. The successful RA certification of smallholder tea farmers needed significant involvement of different actors in the value chain, in addressing bottlenecks that prevent tea smallholders from implementing RA criteria practices. This involvement ranges from changing the mindset of smallholders, through introductory training to achieve RA certification, to hands-on guidance and practical advice.

Data collection for this case study involved holding discussions and interviews with identified stakeholders and targeting tea growers' associations. Individual and focus group discussions and/or interviews were conducted, using an interview guide. Various documents/reports, including policies, studies and written briefs from various authorities or stakeholders were consulted. The team visited tea-growing areas of Mufindi, Njombe and Rungwe districts in the Southern Highlands.

This chapter is organized in five sections that present the institutional landscape, innovation and sustainable practices, markets for sustainable products and services, results and discussions, and conclusions and recommendations.

16.2 INSTITUTIONAL LANDSCAPE

The Government of Tanzania (GoT) has reformed policies, programmes and strategies aimed at creating an enabling environment for ensuring household food security, improving agricultural productivity, profitability and farm incomes, and alleviating rural poverty in a sustainable manner. It established the Agricultural Sector Development Programme (ASDP) in 2006 as an agricultural policy framework aimed at transforming predominantly subsistence agriculture into a commercially viable sector through increased productivity and profitability of production. ASDP serves as a tool of the Government and of stakeholders for coordinating and monitoring agricultural development (URT, 2006). At national level, there have been major changes in the National Policy Framework, resulting from the implementation of the Tanzania Development Vision (TDV, 2025), Poverty Reduction Strategy Paper (PRSP), National Strategy for Growth and Reduction of Poverty (NSGRP I and NSGRP II), Long-term Perspective Plan and Five Year Development Plan. In order to address stagnating growth and promote the modernization of the agriculture sector, a number of reforms such as the National Agriculture Policy (NAP); *Kilimo Kwanza* [Agriculture First] Resolution; Tanzania Food Security Investment Plan (TAFSIP); Southern Agricultural Growth Corridor of Tanzania (SAGCOT); Bread Basket initiative; and Feed the Future programme have all been initiated to complement the speedy implementation of ASDP (ACT, 2009, 2010).

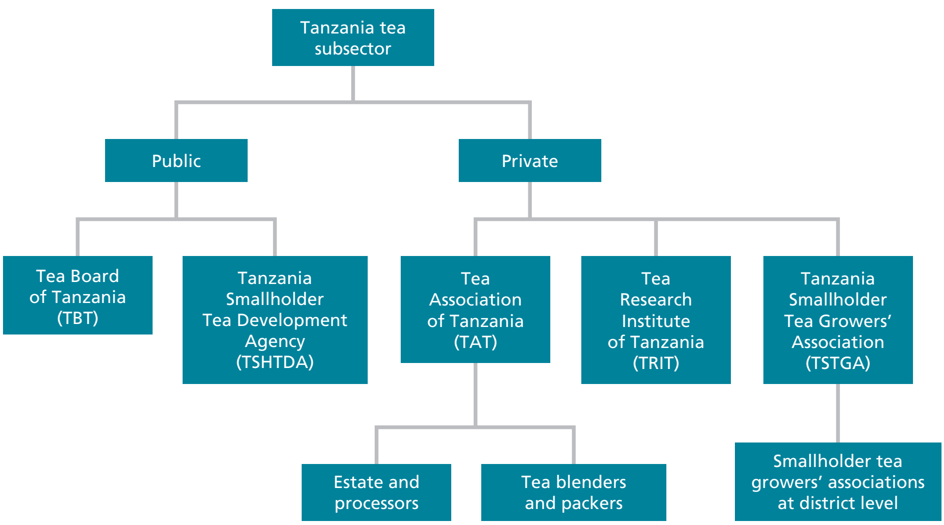
These reorientations have been made in order to take advantage of existing domestic, regional and international market opportunities. With the European Union (EU) the main trading partner, Tanzanian producers and exporters face an increasingly stringent set of official and private standards focused on good hygienic practices, safe use and storage of pesticides, environmental management practices, worker safety and other social standards (e.g. GlobalG.A.P. and RA). Depending on previously existing circumstances, obtaining and maintaining such certified compliance require growers and/or exporters to modify their facilities, alter their technologies, upgrade their management systems, undertake additional testing and increase record-keeping. Obtaining and maintaining compliance with private standards' protocols requires considerable investment that is considered worthwhile since it opens up new market opportunities and yields efficiency.

Since 2013, GoT has put in place an agricultural policy that emphasizes sustainable agriculture through sustainable, environmentally friendly crop husbandry practices. On the market side, NAP underlines public-private collaboration with other agricultural marketing actors in order to meet agricultural product quality, grades and standards for domestic, regional and international markets. There are currently several types of sustainable agriculture practices employed in different agriculture production systems including farming, which rely on techniques such as crop rotation, green manure, compost, and biological and cultural weed, pest and disease control. These techniques exclude or strictly limit the use of various methods including synthetic petrochemical fertilizers and pesticides; plant growth regulators; antibiotic use in livestock; genetically modified organisms (GMOs); and human sewage sludge. Agro-ecological systems, which are multisystem approaches for creating a truly sustainable food system, together with the more common environmental, human health, economic, and even social concerns involved in sustainability, also seek to include cultural and political systems in the search for a sustainable food system.

These policies are reflective of changes within the agriculture sector over the years. Sustainable agriculture in Tanzania started in the early 1990s, in cotton farming in the Shinyanga region, by introducing an integrated pest management (IPM) approach, which doubled cotton production with minimal use of agrochemicals (TCB, 2010). Loconto (2015) traced the beginning of sustainable tea production in Tanzania to tea estates that were certified organic and fairtrade during the early 1990s, with an increasing occurrence of multiple certifications. Currently, the standards in use are the Ethical Tea Partnership (ETP), Fairtrade Labelling Organizations International (FLO), European organic regulations (EC834/2007 and EC889/2008) and RA. Apart from these voluntary standards, GoT has taken deliberate measures to support sustainable crop production systems. These include the formulation and introduction of the Agriculture and Livestock Policy and National Environmental Policy (both of 1997), which integrate the aspects of sustainable production. In the same year, in line with these two policies, GoT enacted a Plant Protection Act through its regulation of 1999, and an umbrella framework legislation, the Environmental Management Act No. 20 of 2004. In 2009, in the tea subsector, GoT amended Tea Act No. 3 of 1997 and its regulations to encompass sustainable production through environmental protection and, in 2013, it formulated NAP with an emphasis on sustainable production and environmental conservation.

The agriculture sector is coordinated by relevant government bodies, local government authorities, non-state actors, NGOs, development partners and the private sector. There are several institutions that support the tea subsector to move towards sustainable production, specifically with regard to promotion of the adoption of RA standards and market linkages. TSHTDA mainly supports organizing farmers into groups and associations, providing extension services and training of farmers on good agriculture practices (GAPs). The Tea Research Institute of Tanzania (TRIT) provides new technologies and contracts mainly with private factories, to provide specific training on emerging standards and GAPs for smallholder groups, and make sure

FIGURE 16.1
Main tea stakeholder institutional structure



Source: authors' elaboration.

they comply with RA standards. Local government authorities (LGAs) are responsible for improved infrastructures, especially feeder roads within smallholders' farms.

The Tea Board of Tanzania (TBT) is a regulatory body that has a legal mandate to regulate and supervise the tea industry in the country. The Tanzania Smallholder Tea Growers' Association (TASTGA) is an umbrella association of 16 registered tea smallholder associations and advocates for smallholders' interest and welfare at national level with public regulators and private organizations. The Tea Association of Tanzania (TAT) caters for the interests of tea estate owners, processors, blenders and packers and has a crucial role in providing markets for smallholder green leaf exports. It engages in negotiations for labour and green leaf contracts with national-level regulators and smallholder organizations.

This set of organizations, and the way they collaborate to govern and promote the tea industry, links the sustainable production practices according to the RA standard to markets for these certified products. RA is a member of SAN, a coalition of independent non-profit conservation organizations that promote the social, economic and environmental sustainability of agricultural activities by developing standards and releasing authorization for certification.

Apart from the above-mentioned institutions and actors, there are other initiatives that are important. First, there is SAGCOT, an international public-private partnership (PPP), which was launched at the World Economic Forum on Africa in May 2010 in Dar-es-Salaam, and in January 2011 in Davos, Switzerland. The initiative is to implement a transformation of Tanzania's agriculture vision (*Kilimo Kwanza)*, mandated to mobilize private sector agribusiness investments, and link them with public sector commitments to achieve rapid and sustainable agricultural growth in the southern corridor of the country for both cash and food crops. On 16 April 2014, SAGCOT disclosed the requirement of an IPM plan as one of four due diligence instruments necessary to address and manage environmental and social impacts within proposed SAGCOT investment project development activities. The other three instruments are an environmental and social management framework (ESMF) disclosed in August 2013, resettlement policy framework (RPF) and a strategic regional environmental and social assessment (SRESA) both disclosed in October 2013 (Daily News, 2014a).

All these instruments aim to monitor and mitigate negative environmental impacts in the SAGCOT area by promoting biological and ecosystem-based pest management. Under this project, pesticide use and management will be guided by Tanzanian law, World Bank Policy Operational Policy (OP) 4.09 and experience with IPM in the agriculture sector in Tanzania. This helps to support innovation on institutional involvement in sustainable agriculture practices, which takes place within the SAGCOT area.

In August 2013, as a means to implement *Kilimo Kwanza*, GoT signed a memorandum of understanding (MoU) with Unilever through the SAGCOT initiative, with the vision of doubling the size of their business by involving smallholder tea farmers in Njombe, Mufindi and Kilolo districts. Unilever aligned its investment strategy with the Tanzanian tea industry development strategy and the transformation of the smallholder tea subsector as championed by TSHTDA. The opportunity will allow Unilever to achieve its objective of commercializing tea farming by smallholder growers through effective involvement in the tea value chain. Unilever works with GoT, which is represented by TBT and TSHTDA, to improve the supply chain, yield and quality of tea through support programmes for smallholder farmers to obtain an RA standards certificate, so that all related tea production is sustainable (data from interviews, April 2014).

In addition to the private and public sector, there is some involvement of a local NGO, the Tanzania Forest Conservation Group (TFCG), which is working in Mufindi district with Mkonge Tea Block Farm Cooperative Society in its forest conservation project in the Eastern Arc Mountains. In the district, TFCG promotes the conservation and restoration of forest biodiversity for the benefits of present and future generations. The group supports field-based projects by promoting participatory forest management, environmental education, community development and advocacy to foster participation, cooperation and partnership. The initiatives join hands on sustainable production by ensuring compliance with the RA standard on conservation issues in the geographic area of this case study (data from interviews, April 2014 and The vertebrate biodiversity and forest condition of Udzungwa mountain forests in Mufindi District TFCG Technical Paper 18 [Doggart *et al*., 2008]).

16.3 INSTITUTIONAL INNOVATION: CERTIFYING THE TEA SUBSECTOR BY RAINFOREST ALLIANCE AND SUSTAINABLE AGRICULTURE NETWORK STANDARDS

Background and organizational structure

In the Southern Highlands of Tanzania, the innovation was created by three large tea companies practising sustainable tea production through multiple certification standards (ETP, FLO, organic and RA), by taking advantage of being linked with more than one niche market. These three companies work separately and competitively with each other in the production of processed tea (and at times for the purchasing of green leaf from farmers), but on issues of sustainability they have worked in a pre-competitive way with the public sector actors mentioned in section 2, in order to organize smallholder farmers and encourage the adoption of sustainable agriculture practices. The companies have histories of engaging with local and international stakeholders in environmental and social sustainability projects (Loconto, 2015). Since 2007, they have been adopting the SAN standard with its production principles and criteria for implementing sustainable agriculture practices. RA certification of the SAN standard is expected by the Tanzanian tea industry in order to uphold strong market demand for certified products, better access to buyers, sale contract stability and, ultimately, higher incomes for farmers.

The direct overriding motivation factors for the companies in this case study area with these special markets include access to premium markets that require RA-certified products/suppliers, and the additional premium price paid to certified suppliers/products. The actors in the value chain teamed up to upscale and embed smallholder farmers in sustainable tea production through RA standards for export markets. The motivation is cemented by integrating sustainable tea production with the existing policies, strategies and regulations. These include the Tea Industry Strategy 2012/13–2022/23; transformation of the smallholder tea subsector (TSHTDA Strategic Plan 2013–2018); TBT Strategic Plan 2015/16–2019/20); the amended tea regulations of 2010; and National Environment Management Act No. 20 of 2004, under the National Environment Management Council (NEMC).

In 2009, the innovation rolled out to smallholder farmers in Rungwe district where the involvement of different actors in the value chain subsequently increased. In the district, home to half the smallholder tea farmers in Tanzania (15 000 out of 30 000 farmers), the smallholders joined together and formed an association known as the Rungwe Smallholder Tea Growers' Association (RSTGA), which owns a 30-percent share in the Wakulima Tea Company (WATCO). WATCO operates Katumba and Mwakaleli factories and the Kyimbila and Rungwe estates in Rungwe district. It is a joint venture between Tanzania Tea Packers (TATEPA) and smallholders represented by RSTGA. The company hired TRIT to provide commercial extension and technical support to enable them to attain optimal production potential and acceptable quality, facilitate logistics of green leaf collection, facilitate correct and timely payments for farmers, and coordinate field activities and the use of inputs.

The Mufindi Tea and Coffee Company, operating in Mufindi and Njombe districts, owns four factories in Itona, Luponde, Kibena and Ikanga. The Ikanga factory depends on smallholder green leaf for 100 percent of its production and has strong ties with smallholders organized in five schemes. It engages TSHTDA and TRIT for extension services. The remaining factories depend on their own estates and smallholders supply 20–30 percent of total production under the green leaf sale contract arrangement. All four factories are RA certified. The first external RA audit was conducted in April 2014, which resulted in achieving certification for 2 699 farms out of 3 500 (77 percent).

Unilever Tea Tanzania (UTT) owns three factories (Kilima, Lugoda and Kibwele) and five estates in Mufindi district. It purchases smallholder green leaf from medium-scale smallholder farmers on a contract-farming basis. UTT is the largest company in Tanzania and has a strong link with 200 medium-scale tea farmers (owning 20–200 ha). Of these, 169 are RA certified. UTT financed training and awareness creation, and provided individual farmers with personal protective equipment (PPE) in the form of a soft loan, to be repaid with the second payment (bonus) received from the sale of processed green leaf.

Currently, in three of the districts mentioned, 14 799 smallholder farmers, of which 35 percent are women, have engaged with RA standards under the facilitation of tea companies as group administrators. In Rungwe district, WATCO is the group administrator, with 11 900 RA-certified farmers (80 percent of all farmers), of which 4 502 are women and 7 398 are men. In Njombe district, Ikanga tea factory is the group administrator with 2 698 RA-certified smallholder farmers (50 percent of all smallholders) of which 2 024 are men and 674 are women. In Mufindi district, the programme for farmers to engage with RA standards is in its initial stages, and to date only 200 farms are RA certified (12 percent of all farmers), with Unilever as group administrator.

Sustainable practices

In collaboration with RA country coordinators, tea estates and factories train farmers to implement the 2010 SAN sustainable agriculture standard. As a result of training and application of RA principles and criteria, smallholder farms certified by SAN use the RA trademark seal for marketing their products. The standard has ten principles with 99 criteria, of which 15 are critical (Group certification Standard, 2011). These address environmental issues (social and environmental management system, ecosystem conservation, wildlife protection, water conservation); social principles (fair treatment and good working conditions for workers, occupational health and safety, community relations); and farm management principles (integrated crop management, soil management and conservation, integrated waste management). To implement standards compliance, the estate factories act as group administrator for those smallholder associations that supply them. Their work includes training and capacity building, leading risk assessment and managing the internal control system (ICS). Farmers are trained on both standard principles and criteria through training of trainers (TOT), where lead farmers are trained and are then responsible for training groups of farmers on both theories and specific practices (RA interview, 2014 and RA training manual).

Environmental principles

Practices that comply with environmental principles include those areas of production that have no negative effect on wildlife shelters and endangered species, buffer zone limits or living fences between production areas, human activity and natural vegetation. Farmers learn how to identify and prepare inventories of natural ecosystems, and protect and restore them through a conservation programme. They focus on understanding the challenges facing wildlife conservation – specifically on prohibiting hunting, capturing, extracting and trafficking of wild animals – and on how to control water waste and conservation of water catchment areas. In the context of the Southern Highlands, these challenges are particularly complex, given the local practices where farmers are used to hunting endangered spices, especially the small monkeys that destroy or eat their crops; traditional farmer practices also consist of cultivating gardens in valleys (*vinyungu* in Swahili), which violates the protection of buffer zones around waterbodies.

Environmental principles are exemplified by the activities of the Mufindi Tea Company (MTC) in Mufindi and Njombe districts. First, MTC has a programme of intensifying its Itona estates in Mufindi district to improve production through irrigation and improvement in water use. The programme involves the installation of underground PVC pipe mains and laterals that improve water-use efficiency. It seeks to do this by reducing water loss through leakage and decrease labour costs (17 work-

PHOTO 16.1
Training farmers on how to make and use fuelwood energy-saving stoves in Lupembe, Njombe district


days per scheme to three workdays per scheme). Currently, improvements in water use have increased yields from 3 200 to 3 800 kg of made tea/ha/year (interviews with MTC, April 2014). Second, through the extension contract with TRIT, farmers have been trained on how to make and use fuelwood energy-saving stoves in 86 households (56 percent of the total in Lupembe). Third, indigenous tree nurseries established in five villages provide planting materials with the environmentally friendly tree *Syzygium cordatum* (*mivengi* in Swahili) at the 800 water sources identified in the district. These trees help conserve water resources on tea farms and in the communities.

Social principles

These principles focus on employer-employee relationships by ensuring workers' rights according to International Labour Organization (ILO) Conventions 87 and 98 on fair treatment and good working conditions for workers. These include a respectful working environment, a necessary policy against physical, emotional or sexual harassment, and a formal mechanism on how to handle and process workers' complaints. Estates must provide safe houses, access to medical services, education for children and training for workers according to SAN standards. Employers must be aware of environmental conservation, health and hygiene, occupational health and safety risks assessment (e.g. protecting workers in extreme weather or events). They must also train their workers on how to handle agrochemicals (health, material safety data sheets [MSDS], transportation, toxicity levels, correct use of PPEs, emergency procedures) and provide medical examinations for workers who are in contact with agrochemical applicators and storage.

Ikanga factory not only supplies group applicators with PPEs but also has a basic health programme for 300 herbicide group applicators, and supports the health centre with 20 beds. In Rungwe, farmers are trained in the use of chemicals and learn their effects through package labels. During chemical applications, farmers are trained on how to identify hazardous areas by using signposts or flags. Yellow flags in front of farms mean that nobody is allowed to enter and red flags at harvest mean that nobody can harvest for a certain period. Other signs include those for buffer zones between farms and roads or household areas where living fences, road signs and disposal pits are used to demarcate the areas.

As company policy, WATCO started an early HIV/AIDS programme in the district, with the aim of creating awareness of the disease, enabling voluntary testing and counselling, and supporting affected farmers with home gardens for food and nutrition security and sometimes as a source of income. RSTGA is the implementer of the programme and obtains support from different donors such as the United States Agency for International Development (USAID), the German Agency for Technical Cooperation (GTZ) and Population Services International (PSI) in collaboration with WATCO. They ensure good working conditions for estate labourers with legal minimum wages and fair treatment. They also provide free housing, recently renovated and installed with solar power. Currently, they extend their arms to smallholder tea farmers by providing them with training on the use of agrochemicals and supporting them with PPE free of charge. They also have heath programmes that provide education on HIV/AIDS to both estate labourers and smallholder tea farmers, clinic services for voluntary HIV testing, counselling and provision of antiretrovirals (ARVs) free of charge.

Farm management issues

Good agricultural practices (GAPs) are the focus of farm management issues, with special attention on integrated crop management, soil conservation and integrated waste management. In implementing soil conservation, GAPs target soil analysis prior to fertilization and soil erosion prevention programmes; use vegetative cover crops to reduce soil erosion and improve soil fertility; promote the use of fallow areas; and prevent burning during land preparation. In integrated waste management, emphasis is put on introducing a programme; using open waste dumps instead of open-air burning; and educating workers on waste management and practices to diminish emissions of greenhouse gas and increase carbon dioxide sequestration.

IPM is promoted to help achieve these GAPs, where physical, cultural, mechanical and biological control is given priority in order to minimize the use of agrochemicals, and agrochemical inventories and records demonstrate rotation and reduction of agrochemical use (elimination of World Health Organization [WHO] Class Ia and b, and reduction of WHO Class II active ingredients). Agrochemical use was reduced effectively in Rungwe district where WATCO, as the group administrator, designated "pesticide application groups" at village level. These are composed of a few healthy male farmers between the ages of 18 and 60.[52] Their health is determined by a medical checkup paid for by the group administrator. Pesticide applicators are responsible for applying all the agrochemicals in their respective villages and are paid by individual farmers on a flexible rate according to the size of the farm. Each applicator is given PPE by the group administrator at a subsidized price (one kit for US$34). The storage of agrochemicals is also separate and done exclusively at village level where stores have been built on the premises of a farmer who was willing to allocate an area of land for the storage facility. The group administrator pays a token amount consisting of 12.5 percent of the total value of agrochemicals stored in one store. The number of stores varies according to the size of the villages and number of farmers. Stores generally range from one to five per village.

There is also a programme for the group administrator to train members (farmers) and internal management personnel on SAN standards and policy content according to the language (Kiswahili), education and culture of participants. The administrator is required to evaluate internal and external risks for the group's management system in terms of compliance with SAN standards and policies, group membership, chain of custody, costs and performance. The management system should be free from conflicts of interest and should assure annual follow-up of members' compliance with the administrator's rules. Accurate and complete records of group members and member farms are the basis for a successful certification process (Group Certification Standard 2011, version 2).

For example, in 2013, at the Ikanga tea factory in Njombe district, the MTC group administrator began to implement the programme of engaging smallholder farmers in RA standards, jointly with TSHTDA and TRIT. TSHTDA provided

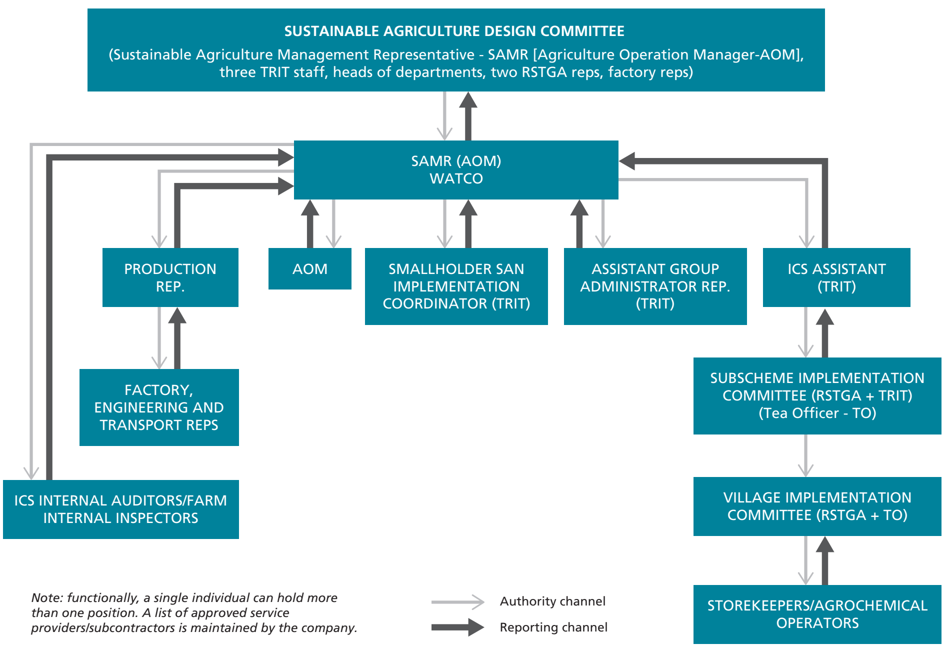
[52] SAN standards prohibit the use of pesticide applicators by women who are pregnant or suspected of being pregnant. Given the cultural sensitivity of requesting this type of information from female workers, the management decided to adopt a "male-only" approach to pesticide application (data from interviews with WATCO management).

extension services designed to deliver comprehensive and participatory training on GAPs, farmer empowerment issues and tea production techniques. Simultaneously, TRIT has a contract with the Ikanga tea factory on the provision of commercial extension services on GAPs, and training farmers and their association/group leaders on SAN sustainable standard criteria to achieve RA standards. These involve compliance at farm level, an internal management system at group level and internal auditing services. The SAN training programme on sustainable and group certification standards began by training a total of 3 500 farmers (80 percent), 21 extension staff from TSHTDA and TRIT, 23 village leaders, 50 lead farmers and 350 agrochemical applicators.

The certification process

To achieve RA certification, each company was required to set up an ICS for training and auditing of individual farms. ICS then receives an external audit every year. We explain how the system is set up in Rungwe, which is typical of the model adopted throughout the Southern Highlands. The programme started in 2009 in Rungwe district, with training for the WATCO Board of Directors, TRIT extension staff and lead farmers (farmers with above-average tea management capacities – see Figure 16.2). Lead farmers were assisted by TRIT extension staff to help train their

FIGURE 16.2
WATCO sustainable agriculture/chain of custody system management structure



Source: authors' elaboration.

fellow farmers and prepare for the RA external audit. They are compensated for the time they spend on training by a "lunch allowance" (US$3–5/day). The training model was set up to reach every single farmer and is limited to working on the practices promoted by the SAN standard. The group administrator is responsible for the implementation of the group's internal management system. WATCO created internal audits by using the lead farmers, known as "farm inspectors", under TRIT extension staff supervision. This is done three times a year before an external third-party audit. The first group was certified in 2011 after a third-party certification audit that certified 80 percent (11 900) of farmers.

ICS inspectors were selected based on the criteria established by WATCO. The call for inspectors was advertised through village tea committees and interested farmers applied. Since farmers are more comfortable with an inspection led by a fellow farmer, only farmers from the communities were selected. Therefore, peer review was agreed upon as the core method of control in ICS. One inspector can inspect from one to three villages depending on the size of the village. Inspectors are compensated for the time they spend by a local bus fare and lunch allowance, amounting to US$6.25/day (data from interviews with WATCO, April 2014). In Njombe district, 65 internal auditors were identified and trained, and are paid US$1.25 per farmer they inspect. Once the objectives of the programme had been met, costs were shared between the Ikanga factory and RA. A small amount was paid by the farmers. The cost of conventional tea production in smallholder tea farms in Rungwe district is set at US$496/acre [0.4 ha] (US$0.12/kg) at productivity averages of between 1 623 and 2 189 made tea/ha/year (TSHTDA, 2014). RA production costs are almost the same as conventional production plus the PPE cost and internal audit fees (data from interviews with WATCO, April 2014).

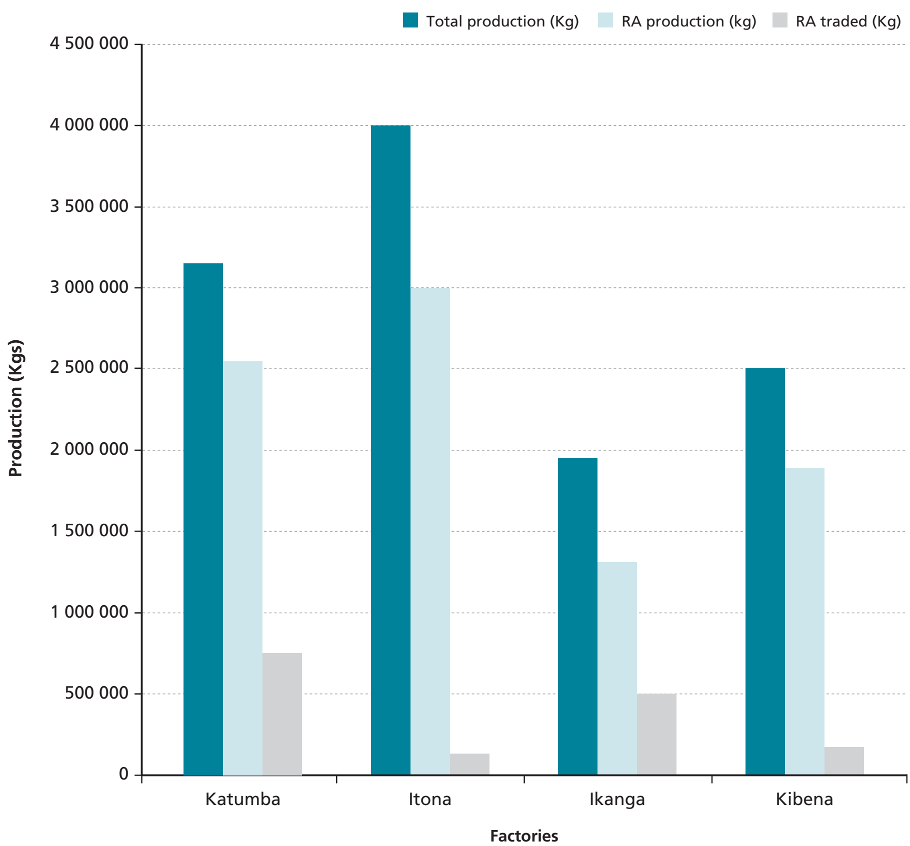
In addition to ICS, WATCO has established an interesting social control system based on peer review. A digital weighing system was set up in WATCO for separating RA and non-RA certified farmers from the village weighing centre. A coded program identifies RA and non-RA certified farmers with the prefixes 00 (non-RA) and 01 (RA). After weighing, the RA leaf is loaded into green (or other colour) bags, while non-RA is loaded into yellow bags. During transportation, non-RA leaf is loaded into the lower rack of the vehicle and RA leaf is loaded into the upper rack. Offloading at the factory starts with RA leaf (upper rack), followed by the non-RA leaf. Each are put on respectively labelled withering troughs. Processing starts with RA teas. Thorough cleaning then takes place and after 45 minutes the non-RA teas are processed. This distinction between certified and uncertified tea is fundamental to how the standard acts as an incentive for the adoption of sustainable practices.

Markets for sustainable products and services

Markets for certified tea are "captured" markets (Loconto, 2010). This means that farmers produce green leaf tea collected from tea bushes, which they must sell within 12–16 hours to a tea processing factory in order to produce a quality product. Therefore, tea processing companies are located close to farmers' fields and provide the only local market outlet for sustainable tea. Farmers are paid a first payment each month and a second payment (bonus) at the end of the financial year. The tea processing companies then market the tea on national and international markets, which demand tea that has been produced sustainably.

At the end of financial year 2014/13, a total of 3 153 810 kg of made tea was produced by WATCO, of which 2 546 937 kg was RA-certified production (80.75 percent). However, only 751 028 kg (30 percent) of RA tea was traded on RA markets. RA made teas are traded through the Mombasa auction or via direct sales to different destinations in Europe, mainly the United Kingdom and the Netherlands. At the Mombasa auction, markets depend on the quantity of tea offered at a particular auction sale, but RA tea generally fetches US$0.10 more per kg on top of the normal price (US$1.8–2.5/kg) of conventional tea at auction, in intermediary markets and direct sales. Tea companies in the Southern Highlands buy smallholder green leaf at US$0.15/kg above the green leaf price (first payment US$0.144 and second payment US$0.07). The second payment depends on market performance at the end of the year, and is always above the indicative price set by TBT annually, which is US$0.13/kg of green leaf. The main challenge in marketing non-RA certified teas is that the amount produced is too small to meet market demand. Sometimes tea companies are

FIGURE 16.3
RA and non-RA tea production in different factories



Source: authors' elaboration.

obliged to mix non-certified with RA certified tea and sell them together as non-RA certified tea in order to meet order requirements with short turnaround times. These volume and time constraints related to the market for non-RA certified tea means that the majority of certified tea is sold without the price premium, which does not cover the cost of complying with sustainable agriculture practices and obtaining RA certification (data from interviews with WATCO, April 2014).

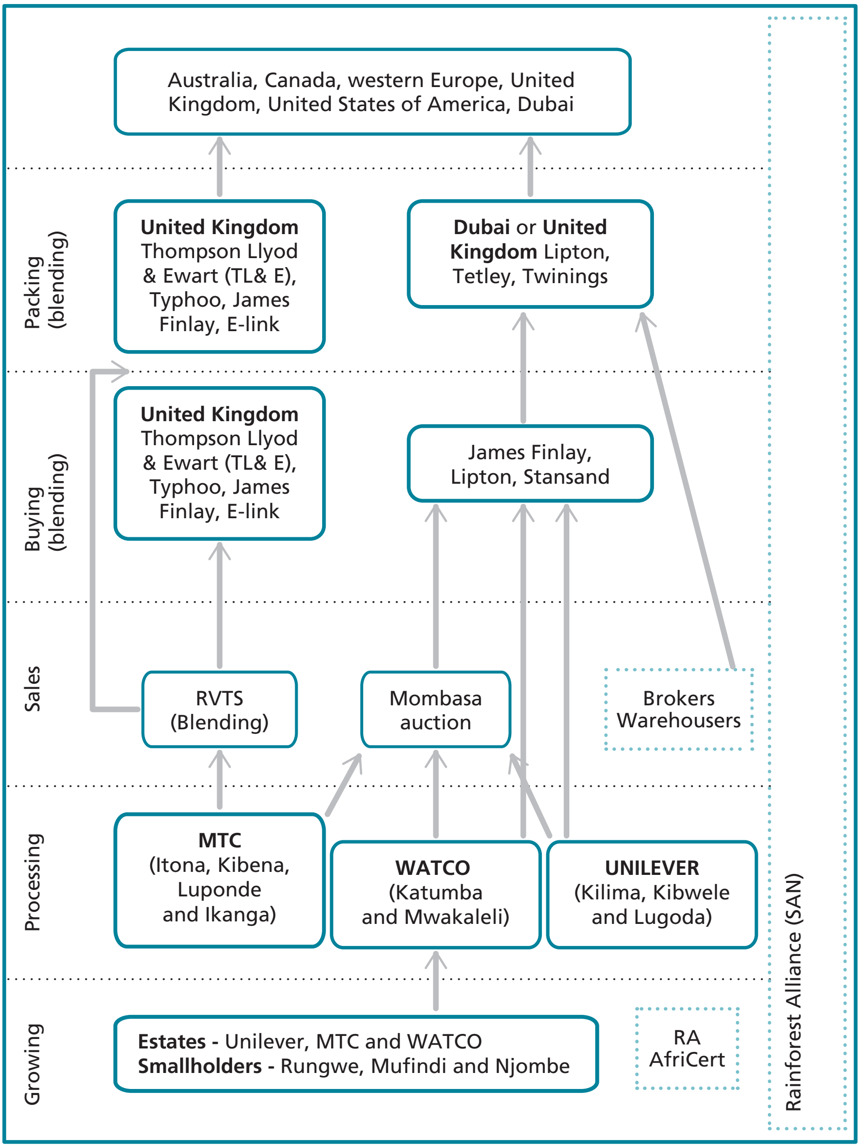
MTC's Ikanga factory has also established digital scales with new codes to separate RA and non-RA green leaf. It loads the leaf into separate coloured bags (white bags for RA and brown for non-RA) and transports them in separate racks. In processing and marketing, the factory has developed a time-gap technique of one hour to separate the processing of RA and non-RA tea. The packed bulk bags of made tea are marked with Ikanga RA and plain Ikanga labels. Only 1–5 percent of MTC's total production is marketed through the Mombasa auction; the remaining tea is sold directly to Dubai, the United States of America and European countries through E-link, Thompson Llyod & Ewart (TL& E), James Finlay and Typhoo. In 2013, MTC established Rift Valley Tea Solutions (RVTS), a blending facility where tea from all four factories are blended according to the quality required by specific buyers. RVTS prepares a master blend for the buyer according to consumer preferences, which cuts the cost of blending for buyers and enables MTC to bypass the Mombasa auction. The RVTS strategy is to increase direct sales in high-value consumer-driven markets and capture a greater portion of the value within the value chain. The price of RA-certified (made) tea ranges from US$2.2 to 3.0/kg for direct sales, which is 10–15 percent more than the price received for conventional tea.

At the end of the 2013/14 financial year, the Ikanga factory produced 1 961 826 kg of made tea, of which RA was 1 320 918 kg (67 percent), and only 499 280 kg (38 percent) of RA made tea was sold. Itona factory has a total production of 4 000 972 kg of made tea, of which 3 000 023 kg (75 percent) of made tea is RA-certified tea, and only 140 000 kg (3.4 percent) of total production was traded in RA market channels. At Kibena factory, where there is a total production of 2 503 984 kg, of which 1 890 415 kg (76 percent) are RA certified, only 176 000 kg (10 percent) was sold on the certified market.

Like WATCO, MTC paid smallholder leaf in two instalments, as first and second payments. It bought smallholder green leaf at US$0.17/kg (first payment US$0.156 and second US$0.07) (data from interviews with MTC, April 2014). At Unilever, where all teas are RA certified, a total of 11 406 890 kg of made tea was produced within the calendar year, of which 1 352 270 kg were sold in domestic markets as non-RA (for blending and packaging factories) worth 1 404 716 558 shillings (US$851 343 at the exchange rate of US$1 = 1 650 shillings) with a price ranging from US$1.2 to 1.5/kg. A total of 1 171 871 kg was sold through Mombasa auction as RA tea worth 2 755 996 212 shillings (US$1 670 300) with a price ranging from US$1.3 to 2.10/kg of made tea. The remaining teas were sold directly through market channels where a total of 11 084 901 kg was sold at a price ranging from US$1.9 to 2.5/kg, worth 20 406 143 943 shillings (US$12 367 359) (TBT, 2014).

Given that smallholder tea farmers are part of a two-tier value chain, we can describe the consumers of certified tea in two ways. The first tier consumers are the tea companies – the only market with which tea farmers have contact. These tea companies process green leaf into made tea that is consumed locally through purchases from the company stores and is shipped to national and international markets. These processors are looking for sustainably produced products for two reasons: (i) to improve the sustainability of their operations in terms of local environment, worker health and safety, and community relations; and (ii) because

FIGURE 16.4
Rainforest Alliance-certified tea value chain



Source: adapted and modified from Loconto, 2010.

they access the second tier market niche, which brings better access to buyers, good prices, contract stability, publicity and technical assistance from interested partners, and strong market demand for RA-certified products (data from interviews with WATCO, April 2014). The second tier consumers are those in developed countries. Most RA tea buyers are consumers who are concerned about environmental conservation, promoting social justice and building local economies. They believe that by

PHOTO 16.2
A tea farm in the protected natural forest of Mufindi district

PHOTO 16.3
Training on PPEs for smallholder farmer group agrochemical applicators in Lupembe, Njombe district

buying RA-certified tea they are promoting: (i) natural resource conservation and less environmental impact; (ii) farmer empowerment through improved productivity; (iii) greater efficiency by reducing costly inputs, creating employee motivation and loyalty for safe working conditions; and (iv) respect for workplace rights (data from interviews with WATCO, April 2014).

16.4 RESULTS

By implementing SAN standard principles and GAP criteria, the following changes in sustainable agriculture practices were observed.

- Environmental conservation in protecting endangered plants and wildlife shelters has increased. Evidence can be seen in the case study areas of Rungwe and Mufindi districts, where endangered species such as monkeys (*nyani* in Swahili), forest francolins (*kwale*), crowned hornbill (*hondohondo*) and little egret (*yangeyange*) have returned, after a long absence.
- There is minimal use of both agrochemicals and prohibited pesticides listed in WHO Class Ia and Ib. For example, gramoxone herbicide (WHO class II), formerly used by most farmers, is almost unused today in the case study areas. There is an increased use of IPM in controlling weeds, pests and diseases. We see this in farmer adoption of recommended pruning cycles as a means of controlling diseases; use of cover crops and mulch in controlling erosion in new farms; and good plucking practices for increasing yield through well-established plucking tables that also control weeds.
- There are changes in workers' welfare in estates, as evidenced by fair treatment, good working conditions, protection from adverse working conditions such as extreme weather, and the use of PPE during agrochemical application.
- Safe use, handling and application of agrochemicals have been adopted in the crop and livestock farming of tea farmers as a result of training, as well as posters, leaflets and brochures written in Swahili that are distributed and posted in every tea-producing village. It is important to note that the SAN standard is an overall farm standard, which means that farmers must implement GAP in all their farming activities, not just tea, in order to become certified.
- We have also observed a spillover effect on other farmers in the area, such as the use of PPE for spraying cattle.
- RA certification does not guarantee a minimum price alone (including the second payment for smallholder farmers) but improves tea production sustainability with a focus on improved farm management in order to achieve better crop quality and productivity, and control costs. In Rungwe district, we observed increased productivity and quality, which translated into a significantly higher net income for certified farmers.
- Tea companies have changed their marketing strategies for sustainably produced tea, since these markets offer more than just a price premium, but also stability, publicity and technical assistance. It is important to note that before the introduction of the RA standard, only Unilever consistently paid a second payment to farmers for their green leaf. With the more lucrative certified markets, MTC and WATCO also began to make second payments to farmers. This is a great difference in financial incentive for the adoption of sustainable practices.

Several challenges were faced as the new institutional arrangements were being set up, including delays in funds for informing and training farmers on sustainable agriculture practices and the creation of ICS. Local politics and cultural beliefs also played a role in initial resistance to the innovation. For example, in Njombe district, farmers had a negative attitude towards the new Ikanga factory because of the closure of their own factory as a result of contested ownership between smallholders, the private investor and public agencies. This contested ownership was a result of the denationalization process that was part of the 1997 Tea Act. Additionally, some farmers were not present during the internal audit, which hindered the smooth functioning of this mechanism. Moreover, some farmers opted out of the system because of a perceived similarity between the RA and Freemason logo, which brought with it the rumour that taking part in the innovative system was equivalent to registering with the Freemasons.

Despite these challenges, the involvement of different actors in the institutional innovation facilitated the communication of credible information between the private and public actors. Their collaboration functioned as a catalyst in drawing other actors' attention outside the tea subsector to the RA standard and therefore motivated them to evaluate its importance positively for both policy and institutional support. Farmers and the surrounding communities benefited from environment conservation and wildlife protection, which resulted in returning endangered species. Not only did farmers benefit from second payments, but tea processing companies benefited from better access to buyers, contract stability, publicity and technical assistance from buyers and interested donors. According to WATCO representatives: "Rainforest Alliance certification does not guarantee a minimum price; it focuses on improving farming. For us, certified farms are more productive than non-certified farms, that is, they produce more tea per acre". We feel that a farmer's success depends on crop quality, productivity and cost control, and our programme addresses all three. In this case study, increased productivity and quality translated into significantly higher net income for RA-certified farms.

16.5 CONCLUSIONS

The case study explored institutional collaboration for sustainable agriculture with a case study of RA certification. This initiative was spearheaded by three tea companies that owned tea factories and estates that were RA certified. The initiative brought together the public agencies in charge of research, smallholder extension and regulation to collaborate with private companies, smallholder cooperatives and an NGO (RA) to develop a sustainable programme of support to farmers in the adoption of sustainable practices. The RA standard defines and focuses sustainability in the principles and criteria of social, economic and environmental sustainability.

The level of collaboration between private and public institutions varies. At the crucial planning level, where costs and budgets for production are developed, public institutions were less involved, whereas they became more involved at the implementation level. This is probably because their own by-laws have mandates of enforcement and extension. At the outset of the innovation, there was no clear strategy for involving LGAs in planning or even implementation of standards in tea production. From past experience, involving national-level public institutes without LGAs always hinders the adoption of sustainable practices in tea production and in other crop farming systems. LGAs have mandates for conducting agricultural activities at district level and involving them eases farmers into being receptive to new sustainable agriculture practices because of the long-standing relationships between farmers' organizations and LGAs. Good collaboration involves all actors in sharing the costs of innovation (either in kind or in cash). This is difficult when the public sector is not involved at the initial planning stage. It is strongly recommended that public institutions be involved in cost sharing, especially for smallholder tea farmers where certification costs are high, since this will speed up the certification process.

The institutional innovation implemented by different actors has changed many traditional tea production practices. However, markets for sustainable products are restricted to special market channels. Nevertheless, the system has improved the price of smallholder green leaf, including the introduction of a second payment to farmers. It has also created more transparent and sustainable relationships between smallholders and companies in the production chain through the techniques of peer review and traceability. From this perspective, it is clear that while there is a market for sustainably produced products, it is not the market alone that has served as an incentive for the adoption of sustainable practices. Through these systems of training and certification, WATCO and the other tea companies in the Southern Highlands were able to ensure that sustainable practices were adopted by smallholder farmers. Thus, the standard acted as an incentive for the adoption of sustainable practices precisely because all the different actors collaborated around the goal of certification and changed their organizational practices to support this new goal.

Lessons learned

- A better relationship between the Government and private institutes has enhanced working conditions within the tea subsector. The stakeholder annual meeting organized by TBT is the major forum for stakeholders to discuss all matters pertaining to tea issues. The main agenda item is to negotiate and approve an annual green leaf price for smallholder farmers.
- Through this forum, and through the innovation, there is a consensus among all tea stakeholders on GAPs to ensure that tea farms do not replace all the biodiversity-rich forests with monoculture. This consensus is found in techniques to avoid soil erosion, competition for water, pollution from fertilizers and deforestation for firewood to fuel tea dryers.
- Collaboration among the range of involved actors in the subsector with a focus on achieving specific objectives of implementation of the new introduced technology was important for ensuring easy adoption and reducing costs and time. However, this requires significant investment in time and finance on the part of all stakeholders.
- The motivation for innovating was to link products with good markets (better access to buyers, buying contract stability, publicity and technical assistance) for better prices, although the amount of tea sold through RA market channels is relatively small compared with other markets. Costs of maintaining certification remain high, but not prohibitive.
- The opportunities provided by special niche markets acted as a motivation for scaling up and spreading the adoption of the innovation to other areas of the country.

- Changing the mindset of farmers is costly and time consuming, as a result of the type and level of education they have received to date. Many are averse to the risks of new technologies, which means that regular, intensive contact with extension officers and sensitization to sustainable agricultural practices are needed.
- Changing the farmers' mindset is only the first stage of the process. The crucial stage is determining how to supervise implementation of the practices outlined in the standard criteria. Close supervision and constant reminders to the farmers on how to implement the criteria are needed.
- Costs are high in the case study areas for training farmers, maintaining certification and implementing different programmes in the rehabilitation of destroyed waterbodies and the replacement of lost native trees (by the establishment and management of tree nurseries at village level). Donor funding is needed at least in the start-up phase.
- PPE kits (gumboots, aprons, gloves, plastic macs and heavy duty masks) are too expensive for farmers and costs are currently paid by group administrators. The same is true for maintaining agrochemical stores at village or household level and establishing PPE washing facilities. Long-term viability depends on the willingness of group administrators to carry the cost burden.

Promoting and adapting RA standards for smallholder tea farmers are not easy. There is a different level of understanding among most farmers, who are mainly illiterate, spread across large geographic areas and are farm managers at household level. Sustainable agriculture practices were easily adopted only when the group administrators (tea companies) were themselves ready to adopt the practices through the RA standard. In this way, the tea companies acted as key institutional entrepreneurs that championed the practices within their supply chain and effectively mobilized public support and civil society expertise to achieve their goal.

16.6 RECOMMENDATIONS

Based on the lessons learned from this institutional innovation, it is clear that changes need to be made at the level of individual farmers, farmers' organizations, tea companies, local government authorities, national regulatory bodies, competent agencies and in national laws and policies. For example, apart from sustainable production polices and regulation support, quality control of made tea is a key component for competitiveness on regional and international markets. Furthermore, quality depends on manufacturing practices that start on the farm, including agronomic practices and plucking schedules. Usually, the quality of tea can be assessed by a professional tea-tasting panel. However, the Tea Act does not clearly articulate what tea quality is and how it should be achieved through sustainable practices. Nevertheless, in order to ensure quality tea production at farm level, the participating LGA should institute sound by-laws to ensure that GAPs and required agricultural trade laws are enforced and upheld by all key tea stakeholders. Specific recommendations are made as follows.

- The direct role of the Government though LGAs is needed in planning and implementing standard principles. This can be done through the establishment and enforcement of by-laws.

- Public institutions should be involved in the planning of RA certification for smallholder tea farmers so they can plan for budget support for these activities, as set out in NAP, which insists on sustainable production.
- To promote this innovation to the next stage in other areas of the country, costs of training and implementation of some of the programmes need to be shared between smallholder farmers and other value chain actors, in addition to the support provided by RA and group administrators.
- Although sustainable agricultural practices are stressed in different policies and even in the recent NAP, there is a need to amend the tea regulations in order to incorporate issues of sustainable production in the tea subsector. This will help tea-producing companies to abide by different sustainable practices that will improve production and quality at reasonable costs.

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Chapter 17
Why and how market institutions create incentives for adopting sustainable agricultural practices

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This edited volume has gathered together a collection of selected case studies from around the world, documented by the innovators themselves. The preceding chapters detail how each case has innovated within its organizational and institutional environments to create markets for its sustainable products. All the case studies in this volume are considered "market-driven" innovations. We classify them as such because the innovators are relying upon innovative market instruments and institutions to sell products that are cultivated using sustainable agricultural practices. One of the selection criteria for the case studies was proof that the agricultural practices used by the innovators were in line with the categories documented in FAO's *Save and grow* publication (2011). We argue that the 15 cases presented in this book exemplify new ways of organizing farmers who practise sustainable agriculture. These new ways have changed the rules about how farmers and consumers can be linked through market exchanges. In this chapter, we explain how we arrived at this conclusion.

The chapter is organized as follows. First, we present our analytical framework of "institutional innovations", which is followed by three sections that explain why and how institutional innovations work. We conclude by explaining how it is through these institutional innovations that markets act as incentives for the local use of sustainable practices.

17.1 INSTITUTIONAL INNOVATION AS A FRAMEWORK FOR ANALYSIS

In the introduction, we explained how institutional arrangements play a structuring role in innovation processes by defining rules and roles for actors. We have developed an analytical framework that helps to characterize the 15 case studies as innovations, and determine the roles of different actors in providing the functions that make these institutional innovations work as incentives to transition to sustainable agriculture. By focusing on the actors and strategic realignments (Callon, 1986; Genus and Coles, 2008), institutional innovation is a process of designing and redesigning how actors see the problems of sustainability in their local contexts and the mechanisms they use to mobilize and guide their collective action in the market. In other words, *institutional innovations are when people and organizations (actors) strategically mobilize others through network relationships in order to redesign or replace institutions.*

Hargrave and Van de Ven (2006) identified a collective action model of analysis as a way to understand how new institutional arrangements – or institutional innovations – emerge and develop. This theoretical approach focuses on people's ability to change institutions. These actors play different roles in a network that emerges to support the development of a social, environmental, economic or technological vision. The actors are characterized as being "distributed, partisan and embedded" in both technological and institutional trajectories (Garud, Jain and Kumaraswamy, 2002). This means that many different actors play key roles and no one actor controls any one pathway of development (*distributed*); actors participate based on their own interests, and solutions emerge through political strategies of compromise (*partisan*); and actors become dependent on the paths they create and they learn as they move forward (*embedded*). Based on Hargrave and Van de Ven's 2006 model, we explain how the processes documented in the preceding chapters unfolded, and analyse them according to the four components of institutional innovation.

- *Problem framing* focuses on the creation and manipulation of the meaning of sustainable agriculture, including the institutions, technologies and markets most suited to this goal. Frames have a role both in building internal group cohesion and in establishing the innovation as something that is different from conventional approaches to agriculture.
- *Building networks* is the basis for both knowledge dissemination and the construction of market institutions. By building networks, actors transform their sustainability-related problems into actionable solutions by mobilizing actors and distancing themselves from conventional practices, thereby freeing themselves from some of the institutional constraints that constrict their growth.
- *Enacting institutional arrangements* indicate those infrastructures – both institutional and physical – that provide the political and market opportunities for sustainable practices and sustainably produced products (e.g. recognized standards, labels, certified laboratories, auctions, marketing outlets, roads, warehouses).
- *Collective action* is a way to describe the contested political process through which institutional innovations emerge. This means the strategic activities that people engage in to ensure that their vision of sustainability is accepted by people outside their local networks – eventually becoming institutionalized at national level. It is described in phases (emergence, development and convergence) that classify the institutional innovations according to how the dynamics of the other three components have changed and eventually stabilized over time, i.e. the ways in which solutions are framed, the way in which the network of actors is constructed and the political and market opportunities that exist at a particular time.

Analysing institutional innovations according to these four dynamic processes provides us with an account of why actors have innovated and how these innovations in market-related institutions have been able to incentivize the use of sustainable agriculture practices on the farm. In the next section, we explain why and how each of the case studies in this book has defined the meaning of sustainable agriculture in its context, the solutions it proposes for the problem of unsustainability and the mechanisms that it develops to resolve this problem. These mechanisms are what we call "institutional innovations".

17.2 WHY CREATE MARKETS FOR SUSTAINABLY FARMED PRODUCTS?

Based on qualitative textual analysis of the 15 case studies (Maxwell, 2005), supported by interview data, we found that all innovations in the book were problem driven. The exact terms used to frame the sustainability problem differ from case to case because they are highly dependent on the local contexts of each innovation (see Loconto, 2015). What this problem framing does is that it differentiates the innovation from conventional approaches by defining a set of concrete principles and practices (cf. Callon, 1998). In other words, the innovators forged ahead with these new market arrangements in order to resolve a social or environmental problem either in the agro-ecological conditions of production or to respond to concerns about the food they consumed. In this section, we discuss why markets for sustainable products are created, by explaining how these problems were framed (Benford and Snow, 2000) by the actors, what their sustainable practices are and where their markets for sustainable products are found.

What are sustainable agricultural practices, according to innovators?

In FAO's 2011 publication, *Save and grow*, an ecosystem approach to crop production was put forward as a new paradigm for sustainable crop production intensification. This approach aims to regenerate and sustain the health of agricultural land and natural resources, particularly the soil, water and biodiversity. All the case studies included in our publication detail the variety of ways in which this type of approach has been considered by farmers in developing countries.

The need to maintain a diversity of practices on farm was found across all the cases. The specific techniques employed by producers are broadly included in the following types of approaches: (i) farming system management; (ii) soil conservation; (iii) genetic diversity of planting materials; (iv) pest management; (v) water management; and (vi) environmental conservation (Table 17.1). These practices are in line with well-known and documented improvements for sustainable agriculture (FAO, 2011; Pretty, 1999).[53] While each innovation combined individual practices in its own unique way, we have grouped the case studies and their practices according to two main ways of organizing production practices that are explained in *Save and grow* (FAO, 2011): agro-ecological practices and good agricultural practices (GAPs). These two categories best describe how knowledge and techniques of sustainable agriculture intensification were bundled into portfolios of practices in the case studies.

Agro-ecological practices

The first and largest grouping of case studies consists of techniques and knowledge found in agro-ecological practices. Twelve of our 15 case study authors (Benin, the Plurinational State of Bolivia, Colombia, Ecuador, India, Namibia, Nigeria, the

[53] "Sustainable farming makes the best use of nature's goods and services while not damaging the environment. It does this by integrating natural processes such as nutrient cycling, nitrogen fixation, soil regeneration and natural enemies of pests into food production processes. It minimizes the use of non-renewable inputs (pesticides and fertilizers) that damage the environment or harm the health of farmers and consumers. And it makes better use of the knowledge and skills of farmers, so improving their self-reliance and capacities" (Pretty, 1999, p. 259).

TABLE 17.1

Sustainable agriculture practices (number of cases reported)

		Agro-ecological	GAPs
Farming system management	Farm planning and management	1	1
	Greenhouse production	1	0
	Animal welfare	1	0
	Staggered planting cycles and effective spacing	4	2
	Integrated crop-livestock systems	6	2
	Diversified cropping systems	6	0
	Closed production cycles (farm waste as inputs for crops/ livestock/aquaculture and biodynamic methods)	6	1
	Waste management/plastics recycling	2	1
Soil conservation	Crop rotation	6	1
	Intercropping (synergistic plants)	5	1
	Agroforestry (shade trees)	5	2
	Windbreaks, grass bands and barriers	4	1
	Green manure (cover crops)	3	1
	Organic fertilizers (manure, compost)	12	2
	Biofertilizers (effective micro-organisms [EMs] and azolla)	3	1
	Mulching (no-till techniques for weeding)	4	2
	Raised beds	2	0
	Contour cropping	2	0
	Traditional agriculture	2	0
	Vermiculture	2	0
	Precision fertilization based on soil analysis	0	2
Genetic diversity of planting materials	Biodiversity management (introducing new and locally adapted species and varieties to increase diversity)	3	2
	Seed saving (maintaining native seeds and varieties)	5	0
	Improved seeds and planting materials through selective breeding	1	2
	Organic seed treatment	1	0
Pest management	Mechanical control of pests/weeds	17	66
	Reduced/judicious use of agrochemicals	17	100
	Herbs and essential oils as pest control	50	100
	Habitat management for pest predators	17	100
Water management	Water conservation and harvesting	25	66
	Efficient irrigation (also for soil conservation)	8	33
Environmental conservation	Maintaining protected natural areas (including controlled hunting)	17	66

Note: values represent the percentage of cases that reported each individual practice. There are 15 cases, 12 for agro-ecological practices and three for GAPs.

Source: authors, based on case study evidence.

Philippines, Thailand, Trinidad and Tobago, and both Ugandan cases) described their sustainable practices as being in line with ecological agriculture and/or organic farming. We found overlaps between agro-ecology and organic farming in the descriptions of the types of agricultural practices used in the case studies. Organic agriculture has been defined by the Codex Alimentarius Commission (2007, p. 2) as a: "holistic production management system which promotes and enhances agro-ecosystem health, including biodiversity, biological cycles, and soil biological activity. It emphasizes the use of management practices in preference to the use of off-farm inputs, taking into account that regional conditions require locally adapted systems. This is accomplished by using, where possible, agronomic, biological, and mechanical methods, as opposed to using synthetic materials, to fulfil any specific function within the system".

Practices described as organic in the case studies are typically those that follow an official public or private standard and system of certification. In scientific literature, agro-ecological practices are typically used to describe a "set of principles" derived from the sciences of agronomy, ecology, sociology and economics as applied to agriculture (Altieri, 1987; Dalgaard, Hutchings and Porter, 2003; Francis *et al*., 2003). In the summary report of the International Symposium on Agroecology for Food Security and Nutrition, held by FAO in 2014, participants confirmed these sentiments by adding that agro-ecology is a practice and a social movement. "The ecological foundation of agro-ecology gives us an action-oriented approach for simultaneously developing alternative food systems while transforming our current industrial model, in order to move from a primary focus on production and profit, to food security, nutrition, and sustainability."[54]

Good agricultural practices

Here we refer to those cases where a specific technology or approach was promoted by the innovators, such as GAPs. Three of our cases made claims to using GAPs, specifically integrated pest management (IPM) as part of a technology package (Indonesia, the Islamic Republic of Iran and the United Republic of Tanzania). In its broadest definition, GAP "applies available knowledge to addressing environmental, economic and social sustainability for on-farm production and post-production processes resulting in safe and healthy food and non-food agricultural products". "Many farmers in developed and developing countries already apply GAP through sustainable agricultural methods such as integrated pest management, integrated nutrient management and conservation agriculture" (FAO, 2003b, p. 1). The practices most often found in the GAPs practised in our case studies are related to IPM, where FAO defines IPM as an ecosystem approach consisting of the "careful consideration of all available pest control techniques and subsequent integration of appropriate measures that discourage the development of pest populations and keep pesticides and other interventions to levels that are economically justified and reduce or minimize risks to human health and the environment. IPM emphasizes the growth of a healthy crop with the least possible disruption to agro-ecosystems and encourages natural pest control mechanisms" (FAO and WHO, 2014, p. 4).

[54] Presentation by Dr Stephen Gliessman: http://www.fao.org/webcast/home/en/item/3075/icode

Good versus ecological agricultural practices

Looking at the variety of individual techniques used in the case studies, we see that there are more individual practices included in the agro-ecological approaches than in GAPs. The agro-ecological practices are focused primarily on soil conservation with 100 percent of the case studies using organic fertilizers either from their own farm manure or composting, while GAPs are focused primarily on pest management. These differences in focus are partially linked to the types of crops and products grown on the farms (Table 17.2). While the whole range of crops is included in the agro-ecological approaches, those focusing on GAPs were limited to tropical export commodities (cocoa and tea) and fresh fruit and vegetables. Nevertheless, the GAP cases also apply organic fertilizers, mulching and integration of shade trees across more than one case. It is interesting to note that the GAP examples employed the entire range of practices for pest management that were also employed by the agro-ecological approaches (including a reduction of agrochemical use). Moreover, these practices were more consistently reported than those from the agro-ecology cases.

Farming systems management was highlighted as important for both approaches, but it is here that there are some differences. Whereas the agro-ecological

TABLE 17.2
Crops and products sustainably cultivated in the case studies

Cereals	Maize (white, yellow + 18 varieties); millet (minor, finger [ragi]); quinoa (two varieties); rice (brown jasmine, hand-milled, red jasmine, Wessuntra brown jasmine, white jasmine, hand-milled red jasmine, black jasmine, brown *gaba* jasmine, Wessuntra brown *gaba* jasmine, red *gaba* jasmine, black *gaba* jasmine, hand-milled red sticky, short-grained red sticky, paddy); wheat (two varieties)
Fresh fruit and vegetables	Chinese cabbage (*pechay*), cucumbers, aubergines (eggplant), french beans, garlic, gooseberries, kale, leeks, lemons, lettuce, onions, oranges, parsley, spinach, strawberries, squash (pumpkins, gourds, fluted pumpkins, *chayote*), sweet limes, tomatoes
Tropical fruit	Avocados, bananas (plantains, apple bananas), coconuts, guava, mangoes, papaya/pawpaw, passionfruit, pineapples, soursop (custard apple)
Roots and tubers	Beetroot, carrots, cassava, potatoes, sweet potatoes, *yacón*, yams (*camote*, elephant foot yam)
Pulses	Beans (39 Andean varieties), chickpeas, cowpeas, gram (Bengal, horse, black), groundnuts, lentils, pigeon peas
Spices	Ginger, green amaranth, mustard, pepper, red chilli, tamarind, turmeric
Oilseed plants	Castor oil plant, sesame, sunflowers
Flowers	Anthuriums, lilies, others
Herbs and medicinal plants	Amaranth, coca, jute, *moringa*
Tropical commodities	Cacao (cocoa), coffee, tea, sugar cane
Processed products	Fruit juice, honey, icecream, pastries, purified water, sausages, soap, soybean oil, yoghurt
Livestock products	Meat; fish (catfish, tilapia); poultry (chickens, turkeys, guinea fowl, geese, ducks, quail); eggs; pigs, sheep, rodents (rabbits, grasscutters); cattle (beef and dairy); dairy products

Source: authors, based on case study reports.

approaches focused on diversified cropping systems, particularly focusing on creating closed production cycles, this was not a priority for the GAP cases. This is easily explained by the cases themselves. In the United Republic of Tanzania and Indonesia, the focus is on tropical export crops (tea and cocoa) that are largely grown as perennial crops in plantation systems. The case of the Islamic Republic of Iran, which focused on (GAP) fresh fruit and vegetable production, did try to recycle farm waste within diversified cropping systems. These differences in practices also reflect current recommendations for GAPs in each of these production systems. In the United Republic of Tanzania (GAP) and Benin (agro-ecology), waste management and plastics recycling were additional components considered to be an essential part of their sustainable practices. It is strange to note that only one case in each category mentioned farm planning and management as important components in their sustainable practices. Third-party certified GAP and organic standards typically require significant amounts of farm management documentation, which shows that the vast majority of these systems are not engaged in third-party certified practices.

There are additional differences in how the case studies preserved the genetic diversity of planting materials and environmental conservation. Explicit mention was made of the use and promotion of native seeds and indigenous varieties of crops, as illustrated by the long list of rice varieties in Table 17.2. This was clearly a focus in the cases of Colombia, India and the Philippines, particularly through the use of on-farm seed saving and seed exchanges. For example, in Colombia, Familia de la Tierra has put in place a form of seed exchange whereby farmers can have access to the seeds they need in each planting season by promising to return a portion of seeds from their harvest back to the community bank. The GAP cases and some of the agro-ecological cases are more focused on selective breeding for improved varieties and quality of planting materials. Much of the research focus of

TABLE 17.3
Market channels for products recognized as being sustainably produced

Marketing strategy		No. of cases	Percentage of sales recognized as sustainable in the market
Short value chains	Farmgate sales, farmers' markets, cooperative shops, group sales	13 (87%)	Philippines (100%); Thailand (45%); Bolivia (100%); Ecuador (51.5%)
Domestic market	Supermarkets, wholesalers, other distributors	9 (60%)	Thailand (35%); Ecuador (33%); Colombia (20%)
Long value chains	Processors, exporters, other intermediaries	7 (47%)	Indonesia (100%); Tanzania (100%); Thailand (20%)
Reproduction	Own consumption, seed exchanges	3 (20%)	No data
Hospitality	Restaurants, lodges/hotels	3 (20%)	Colombia (80%)

Note: Total number of cases is 15. Case-specific data are based on authors' own reporting of data. These data refer to those products that are sold as "sustainable" and do not include the percentage of sustainably produced products that are sold through conventional channels without the identification of sustainability.
Source: authors' elaboration.

the case studies is on adapting these improved varieties to local ecological conditions, particularly in Benin, the United Republic of Tanzania and KACE in Uganda. The sustainable practices in Trinidad and Tobago, the United Republic of Tanzania and Indonesia were also specifically focused on environmental conservation, which is important for these production systems since they are agroforestry based and often close to nature reserves or integrated into tropical forests.

In short, there is a wide variety of sustainable practices across the case studies. Many of these are common in both subcategories of sustainable agriculture and are combined in a variety of ways, based on local agro-ecological conditions and crops grown. What is important about these practices is not so much that they are being implemented, but how farmers are engaging in them and managing to keep practising them. This is addressed in Section 3.

Where are sustainably farmed products exchanged?

Table 17.2 shows that there is a wide variety of products, mostly sold in local markets. One of the principal trends in our case studies was the diversification of market outlets. Table 17.3 shows the data collected with regard to the different market channels reported in each case study. A majority of the cases focused local and domestic marketing of their products on short value chains (87 percent), sales to national retailers (60 percent) and to the hospitality industry (20 percent). The specific types of markets in the short value chain group were farmgate sales and direct sales during periodic farmers' markets. In the Philippines, the local farmers' markets organized by the municipalities comprised 100 percent of sales in organic markets. The use of farmers' markets and farm stands were common for all the cases that focused on local markets. Another form of short value chain can be seen in the case of Trinidad and Tobago. With a focus on community-supported eco- and agritourism, the country effectively brought the market to the farmgate, by selling sustainably produced products and services to "distant" consumers who came to visit the communities.

The second most important markets were long value chains (47 percent of cases). In Indonesia and the United Republic of Tanzania, the dominance of long value chains is clear because these two cases focus on key tropical commodities (cocoa and tea, respectively). Therefore, while there are local markets for these products in the form of local-level processing and even consumption of tea in rural areas in Tanzania (purchased through the tea factory shops), the main focus and market drivers for these cases are clearly international export markets. In Thailand, the Dharma Temple has been able to market its Moral Rice in shopping malls and retail shops throughout Thailand and in the People's Republic of China, China Hong Kong SAR and Singapore, with an additional organic certification. Finally, although there are no exact numbers, the Plurinational State of Bolivia, Thailand and Benin recognized the important role that production for producers' own consumption and exchange (20 percent) played in the initiatives' marketing strategies. Based on the authors' fieldwork, the importance of personal consumption of sustainable products can also be documented for Colombia, Uganda Freshveggies (FV), Ecuador and Trinidad and Tobago. This is reflected in the principle of "food sovereignty" that is used by the innovators to justify their motivation for adopting participatory guarantee systems (PGS) and CSA models.

It is important to qualify the numbers presented in Table 17.3 since they represent only the sale of products that were recognized as being "sustainably produced". For example, in the case of the Philippines, only 50 percent of farmers' production was sold as "organic" and in Bolivia only 30 percent. The rest of the farmers' produce was sold through conventional channels at conventional prices and without recognition for their "sustainable" quality. The issue of sustainably farmed products also being sold through conventional channels is well documented in the literature and is a core reason why market demand alone is insufficient to serve as an incentive for the adoption of sustainable practices (FAO, 2014b). There are other values and institutions beyond price or profits that are driving the values of exchange, which will be explained later. For this reason, institutional arrangements must also change to accommodate the creation of markets for sustainable products.

Why are consumers interested in sustainably farmed products?

While systematic data on consumer demand for sustainably farmed products were not collected, each of the case studies does provide insights about why we are beginning to see the emergence of a group of consumers who are purchasing these products in local markets. From all the case studies, the dominant response to the question of "why consume sustainably produced food" is based on health and diet. Health refers to producers' health, both in terms of their health and safety in using agrochemicals as workers, but also as consumers, because in many of the experiences documented in this book, farmers are practising sustainable agriculture and consuming and exchanging among themselves what they grow. Additionally, in those cases where consumer preferences were reported, the authors noted that the initiatives have been able to gain markets for their products because there are consumers who are looking for products to improve their health and diet. These types of attributes of consumer perception are consistent with findings in the growing body of literature on organic consumer preferences (Goetzke, Nitzko and Spiller, 2014; Lee and Yun, 2015; Lockie *et al*., 2002).

For example, in Colombia (Chapter 5), there are a number of different ways in which health concerns act as a driver for institutional innovation. First, Familia de la Tierra linked up with a cooking school and a number of celebrity chefs in Bogotá to teach them about native crops and their health benefits. It seems that the chefs are quite interested in these crops, not only because of the health benefits, but also because of other quality attributes such as colour and taste, which enable them to create innovative (and traditional) dishes. Familia de la Tierra is able to provide this information to its buyers because it has been collaborating with the National University of Colombia and also with the Nazareth Hospital in Sumapaz to do clinical trials on the health benefits of some native plants. For example, the hospital has been doing trials and actually treating its patients with *yakón*,[55] in order to slow down the onset of diabetes and lower cholesterol.

[55] Yakón (*Smallanthus sonchifolius*) is a native Andean plant grown for its sweet, crispy, tuberous roots and for its leaves, which are used in infusions. The latter are purported to have probiotic and antioxidant properties and research is being carried out in Colombia on its use in preventive treatment for diabetes and high cholesterol. (See Valentová and Ulrichová, 2003.)

In Uganda (Chapter 12), there is an example of a PGS that is consumer-focused and operates a box scheme in Kampala. Its consumers are mostly women who know each other and have been following diet trends. Using Facebook, they have organized juicing clubs where they share information about which fruit and vegetables provide desired vitamins, minerals and other health benefits. They use the Internet and organize themselves to gain access to fruit and vegetables that are often hard to find. For farmers, the PGS has built upon an existing savings and credit cooperative (SACCO) consisting mostly of women, who all have small plots of land that they traditionally use for their kitchen gardens. They have been able to expand these by using agro-ecological methods in order to be able to produce extra fruit and vegetables, which they sell through box schemes, and also to supermarkets and other conventional buyers. Here, specifically, the PGS has established the rule that each farm must grow three traditional crops, which are medicinal plants and whose leaves are staples in the Ugandan diet. In this way, the farms look after the health of both farmers and consumers.

In all cases in this book, there is strong interest from dedicated groups of consumers of sustainable food that emerges from a basic concern for food safety. This is evident in the example from the Islamic Republic of Iran (Chapter 8) where the IPM Group customers do not trust "conventional" food to be safe from microbial and agrochemical toxicity. Such consumer awareness appears to arise from the increasing availability of information for urban consumers about current agricultural practices in rural areas and recent food scares that have been reported in the media. Indeed, FAO has noted that the basic food safety infrastructure in many countries needs improvement, particularly in terms of ability to conduct tests needed to determine food safety risks and to ensure that food safety standards are enforced (FAO, 2003a). These infrastructural changes at system level (Shove and Walker, 2010) and in the regulatory positioning of sustainable food (Hsu and Chen, 2014) are indeed fundamental to enabling individual consumer behaviour that can be further influenced by product advertising (Newson *et al*., 2013).

Problem framing: how do innovators differentiate their practices from others?

In previous sections, it has been seen that there is a wide spectrum of agricultural practices, market channels and consumer demand that explains why markets for sustainable products are created. Nevertheless, the problems of unsustainability in both the agricultural and market practices reported in the 15 chapters of this book can be grouped into three definitional frames: *ecological intensification*, *commodity system sustainability* and *moral economy*. These frames identify both the problem and its solution.

Ecological intensification was the dominant definitional frame for six cases (India, the Islamic Republic of Iran, Namibia, Nigeria, the Philippines and Uganda FV). The concept of ecological intensification is an umbrella term used to describe systems approaches to agriculture that are context specific and differ "especially in the way they regard the impact of the surrounding natural environment on agriculture, the impact of agriculture on the surrounding natural environment and the way natural elements are embedded in agricultural systems" (Tittonell, 2014, p. 55). Tittonell cites a range of sustainable agricultural models that can be considered under the umbrella of ecological intensification, including agro-ecology, organic agriculture, diversified farming systems, nature mimicry, some forms of conservation agriculture, agroforesty and permaculture. As a definitional frame, ecological intensification refers to a systemic problem linked to current agriculture production practices where the objectives and solutions are focused on specific agro-ecosystems.

The four cases of *commodity system sustainability* (cf. Appadurai, 1986; Friedland, 1984) focused on creating cohesion within a specific subsector of the agricultural landscape: cocoa in Indonesia, tea in the United Republic of Tanzania, ecotourism in Trinidad and Tobago and pineapples in Uganda (KACE). The justifications for these framings draw upon sectoral development and are attempts to shift the entire subsector towards sustainable practices. Cases that used this framing had the strongest integration of research in their systems and were able to focus more on specific technologies that could make their commodity systems more sustainable – such as creating interdependencies among different components of the system. Voluntary standards to communicate sustainable quality through labelling on packages were also used in all these cases.

A *moral economy* is an economy that allocates values that go beyond monetary value to the goods and services that are exchanged (cf. Scott, 1976). These values differ from case to case, but the underlying feature of a moral economy is the framing of what is considered fair, just and morally "right" for economic interactions and thus mediated by a set of social norms. It is the idea that economic transactions are carried out according to the rules of the communities within which they are created. Therefore, when trying to set standards for exchanges within a moral economy, the innovators in the cases are also defining the social norms that govern their economic transactions (Busch, 2000). The moral economy definitional frame in these cases forwards the values of community cohesion and social justice and collective conservation of the community's natural resources. This was the dominant frame identified in Benin, Colombia, Ecuador, the Islamic Republic of Iran and Thailand. The moral economies in these cases ranged from one based on Buddhist principles in Thailand to principles of youth empowerment in Benin, and from a "safety first" approach in Iran to a mutualist version of a "gift economy" in Colombia and Ecuador (cf. Mauss, 1990 [1954]) that is closely tied to integrating native seeds and community seed banks into their vision of the economy.

The previous sections have explored why new markets for sustainably farmed products were created. While each innovative initiative framed the sustainability problem in its own way, what is clear is that each of these innovative approaches relied upon market drivers to facilitate the application of sustainable agricultural practices. How they did this will be addressed in section 3.

17.3 HOW WERE MARKETS CREATED FOR SUSTAINABLY FARMED PRODUCTS?

In order to analyse how market-driven mechanisms were created, we have combined the descriptive analysis of Hargrave and Van de Ven (2006) with the analysis of Hekkert *et al.* (2007) of "*innovation system functions*" (see Table 17.4). This enables us to describe both how actors build *networks* and *enact institutional arrangements* by identifying actors and the roles they play in the functioning of these networks.

The main focus of the approach of Hekkert *et al*. (2007) is through the analysis of resource availability and mobilization. In this context, resources are not only

TABLE 17.4
Innovation system functions

F1 **Entrepreneurship**	The role of the entrepreneur is to turn the potential of new knowledge, networks and markets into concrete marketing activities to generate and take advantage of new business opportunities. Without entrepreneurial activities, an innovation remains as an idea or an invention and does not produce commercial products
F2 **Knowledge creation**	Mechanisms of learning are at the heart of any innovation process. In order to be able to innovate, new knowledge needs to be developed or old knowledge needs to be renovated to produce new applications. This is why we can say that innovations are the introduction of new technologies and new ways to organize relations.
F3 **Knowledge sharing**	The essential function of networks is the exchange of information. Through interaction between different actors in networks, new knowledge is shared, adapted, abandoned or adopted. This is how the innovation moves between actors and geopolitical spaces
F4 **Guiding the innovative process**	The direction in which actors invest/mobilize their resources. This function is about how the priorities for investment in innovation are managed. Whoever is guiding the search for new knowledge and applications is positioning the direction that the innovation will take. This function is not about who is paying or investing in the innovation, but about the ideas, values and discourses that guide action
F5 **Creating spaces for market exchanges**	New technology often has difficulty in competing with embedded technologies. Because of this, it is important to create protected space for innovations. Protected space means that the commercial products are not put into open competition with the dominant products on the market. In other words, niches are created to help these technologies to improve before they can compete on a level playing field with other technologies. This can be done in a number of ways, most commonly through patents and intellectual property protections, tax incentives, preferential buying arrangements and precompetitive collaboration
F6 **Resources mobilization**	Resources, financial, physical, natural and human capital, are necessary as a basic input for all activities. This function provides the material resources needed to move ideas into entrepreneurial activities and commercial products
F7 **Legitimation activities**	In order to develop well, a new technology has to become part of an incumbent regime, or even has to overthrow it. Parties with vested interests will often oppose this force of "creative destruction". In this case, advocacy coalition can function as a catalyst for putting the new technology on the agenda, lobbying for resources and favourable tax regimes and thus creating legitimacy for a new technological trajectory

Source: adapted from Hekkert *et al*., 2007.

financial, but also human, social, physical, political and natural. By identifying these functions, it can be seen how actors are mobilizing different strategies that effectively redefine the institutions.

If we look at what happens over time, we can identify how different combinations of functions in different orders can act as "motors" of system innovation, leading to virtuous cycles of process change (positive feedback loops) that strengthen each other and lead to the buildup of momentum to create a process of "creative destruction" within the incumbent system (Hekkert *et al*., 2007; cf. FAO, 2014a). This functions-based analysis, developed to describe technological innovation and systems development, might also be useful to understand how public, private and civil society actors are involved in institutional innovation in the context of market-based drivers of sustainable agriculture.

This analytical framework is heuristic, not functionalist. In other words, the usefulness of identifying functions is in its ability to help us to recognize, understand

and compare empirical cases and not as a way to reduce the complexity of these systems to a fixed set of objective components that can be mixed and matched to create systems. The reflexive approach that we adopt, in line with Hekkert *et al.* (2007), provides an analysis that can provide important insights into what worked, how it worked and who did the work in these institutional innovations. We develop these insights in the next sections.

Importance of the functions of knowledge creation and diffusion of knowledge through networks

Knowledge creation and sharing are fundamental to how these market-driven initiatives have been able to keep producers engaged in sustainable agriculture. What is innovative about these cases and separates them from classic understanding of knowledge creation and sharing (e.g. Rogers, 1983 [1962]), is that we can identify the importance of network arrangements in both processes, as well as a range of actors carrying out "non-conventional" roles in these systems.

The function of *knowledge creation* (F2) can be described as the development or adaptation of specific knowledge about sustainable practices, while *knowledge sharing* (F3) is the way in which knowledge moves across time and space. In other words, there are activities related to how new and old ideas are created and learned by individuals or communities (F2) and how they move from person to person, group to group and from one geographic region to another (F3) (Table 17.5). We found that knowledge creation was an activity led by public (38 percent) actors, with almost equal participation from private (32 percent) and civil society (30 percent) actors, who are active mostly at local (45 percent) and national (36 percent) levels. The public actors were most often international organizations (42 percent), which consisted mainly of finance and technical assistance providers, and competent agencies (regulators, 16 percent). Universities and extension agencies both represented only 10 percent of the public actors carrying out the function of knowledge creation. The private actors were mostly producers (31 percent), service providers (23 percent) and processors (19 percent). Finally, civil society actors are predominantly economic, social and community development organizations (36 percent) and civic advocacy organizations (24 percent). Professional associations/unions and education and training centres are also active in some cases (12 percent) and, to a lesser extent, environmental and religious organizations (8 percent) can be seen to produce knowledge.

Across the cases, there seem to be partnerships between producers, international organizations and economic, social and community development organizations in producing knowledge for these innovations. In these arrangements, there appears to be consistency in the role of international organizations providing best agricultural practices to producers with the help of local NGOs. The case from the Islamic Republic of Iran (Chapter 8) illustrates this particularly well with the experience of FAO promoting the IPM approach as part of farmer field schools (FFS).

In terms of knowledge sharing (F3), there is similar sharing among the three groups of actors, but with private actors leading (37 percent) and civil society (32 percent) and public (31 percent) actors following. Those actors working at national level (49 percent) are slightly more than local-level actors (45 percent), but what is striking is that knowledge sharing is almost exclusively carried out by actors who do not work internationally. This suggests that knowledge about sustainable practices in these cases circulates mostly within domestic institutional environments. Within the public actors, there are more roles for competent agencies (regulators) (33 percent), extension agencies (19 percent), universities (14 percent) and ministries (14 percent) in the diffusion of knowledge than in its creation. Producers remain

TABLE 17.5
Who is creating and sharing knowledge? (actors' participation as percentage)

	Knowledge creation (F2)	Knowledge sharing through networks (F3)
Public (% of total)	**38**	**31**
International organizations	42	8
Competent agencies	16	33
Universities	10	14
Extension agencies	10	19
Central public administration (Ministry)	6	14
District and municipal governing bodies	6	6
Other public	10	4
Private (% of total)	**32**	**37**
Producers	31	42
Service providers	23	13
Processors	19	9
Input providers	8	7
Consumers	4	16
Aggregators	8	7
Other private	7	6
Civil society (% of total)	**30**	**32**
Economic, social and community development organizations	36	32
Civic advocacy organizations	24	18
Professional associations/unions	12	24
Education and training centres	12	5
Environmental	8	8
Religious organizations	8	5
Cultural organizations	0	3
International NGOs	0	5

Total number of actors is 315 and total number of functions performed by all actors is 832.
Total number of actors performing the F2 function is 82 and those performing F3 is 117.
Source: authors' elaboration.

the most important private sector actors in the diffusion of knowledge (42 percent), but consumers are also growing in their influence (16 percent) because they are not usually included in the task of knowledge sharing. Finally, within civil society actors, the importance of professional associations (24 percent), civic advocacy organizations and economic, social and community development organizations (32 percent) in knowledge sharing suggests that these practices are becoming part of the default GAPs of the service providers, often professional associations and civic advocacy organizations.

The notable difference between the role of international organizations in knowledge creation versus knowledge sharing leads to two conclusions.

- Public sector knowledge about sustainable practices in these developing countries comes from internationally recognized knowledge sources and not from domestic investment in research and innovation.
- The low level of international public organizations or international NGOs, as compared with national public and civil society organizations, in knowledge sharing through networks points to the institutionalization of sustainable agriculture practices within the local and national institutional arrangements, which is typically the aim of international interventions.

The case studies suggest that there are four key concepts that can be used to describe how sustainable agricultural practices are being adopted but, more important, maintained over time.

- First, the way of producing knowledge has largely been an exercise in *farmer-led* experimentation in collaboration with international organizations and civil society. This concept is formalized in some cases through official FFS-style programmes (as in Benin, the Islamic Republic of Iran, Indonesia, Nigeria and the United Republic of Tanzania) or as an integral part of the institutional innovation itself as is the case with PGS and community-supported agriculture (CSA).
- Second, the predominant way in which knowledge is shared and produced is through a pedagogical approach called *learning by doing*. While popularized by the pragmatist philosopher John Dewey (1938), this approach to education is employed in a variety of settings and refers mostly to the idea that knowledge must be an applied activity because learning about sustainable agriculture comes from one's own experiences and practices. The best illustrations for this technique are found in the training method of the Songhai Centre in Benin (Chapter 14), community integration into student farms at the University of Abeokuta in Nigeria (Chapter 4), and the action-research approach of EkoRural in Ecuador (Chapter 6).
- Third, the case studies have detailed the importance of extending and sharing knowledge through *horizontal networks* within their countries and across national boundaries. Horizontal networks are ways to create alliances and mutual benefits among partners, who are not relying upon a hierarchic "diffusion of innovation" model of technology transfer. In these horizontal networks, there are greater roles for producers, but also for consumers, public research and extension staff and civil society and private sector service providers. The case studies explain that along their history, they had the opportunity to learn

from others in similar situations through joint training on agro-ecological and organic practices sponsored by IFOAM and other international organizations that are part of the broader organic or sustainability social movements. To these experiences belong the creation of the Freshveggies PGS in Uganda (Chapter 12) and the Familia de la Tierra seed-sharing system in Colombia (Chapter 5). All the case studies in this volume noted the importance of being linked to national and international social movements on these issues, particularly for gaining access to knowledge and for sharing it among like-minded groups.

- Finally, there appears to be a strong social component as to how agricultural practices are maintained.

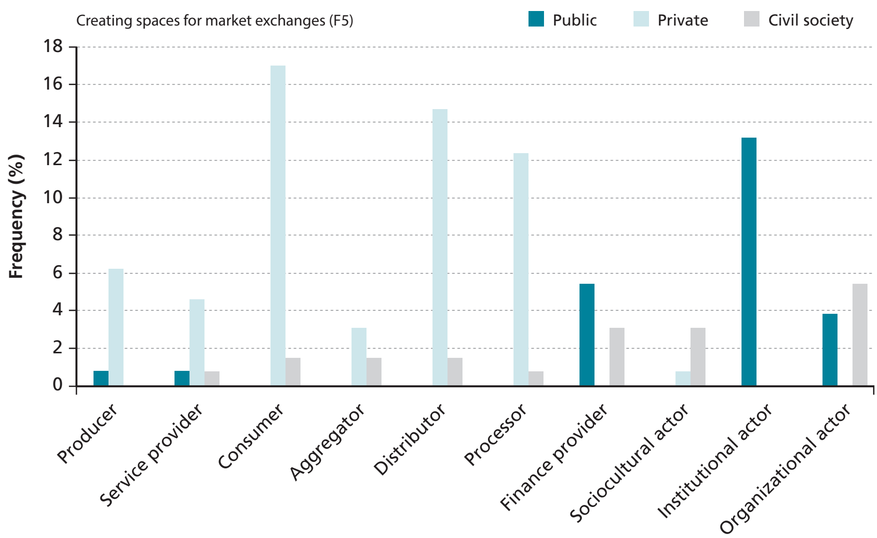
Social control is a core component in PGS, as it is through peer review of agricultural practices by other farmers that certificates of compliance with agro-ecological and organic standards are released. In these cases, the market driver of consumer demand for labelled products pushed actors to create more participatory systems that value farmer expertise, which in turn has contributed to the adaptation and use of sustainable practices. In the CSA cases, there is a strong influence of peer review and peer pressure from the communities involved, as these communities are the first consumers of sustainable products. In the innovation platform (IP) cases, peer pressure was not used so much in terms of a formal system of control, but rather this form of social control emerges from the focus on specific technologies that are shown to have an influence on agricultural practices. The Tanzanian case (Chapter 16) illustrates how extension agents were able to recruit farmers into the certification system. Farmers are each assigned an identification number and, when the trucks come to pick up the tea at the weighing station, they give their number and the digital scales used by the drivers tell them whether farmers are certified or not. Certified farmers receive yellow bags and non-certified farmers receive other coloured bags. The company reports that farmers want to have yellow bags, because of the visible differences seen in the yellow-bagged tea and the socio-economic influence of the farmers who supply this tea. These other farmers have been asking the yellow-bagged farmers what they have done to get access to yellow bags, and it is in this way that extension agents and companies have been able to identify farmers who are ready to be included in the certification system. These mechanisms of social control illustrate how peer review (or pressure) can work as a mechanism to enable groups of farmers to adopt sustainable practices. There are examples of highly standardized technologies in terms of sustainable agriculture practices in each of these cases, but possibilities for flexibility of interpretation in how to enforce them. Each technique relies upon farmer judgement and knowledge to ensure the adoption of sustainable technologies.

Creating spaces for market exchanges, and resources mobilization

Within the analysis of innovation system functions of Hekkert *et al.* (2007), *creating spaces for market exchanges* (F5) and *resources mobilization* (F6) provide key insights into what a market-driven approach means in the context of institutional innovations. This section focuses on explaining who has been fundamental in creating market spaces for sustainable products and the trends for resources mobilization in this book. In order to identify the key actors in these market-driven approaches, their roles are examined according to their principal positions within a value chain (FAO, 2014a) and public, private and civil society actors are differentiated (see Annex).

The function of creating spaces for market exchanges (F5) refers to the forging of relationships, or development of policies, that enable the exchange of sustainably produced products (Figure 17.1), while resources mobilization (F6) refers to the mobilization of the human and financial resources necessary for enabling these exchanges (Figure 17.2). Within theories of technological innovation, there is clear recognition that the creation of protected niches for new technologies is needed in order for innovators to commercialize them effectively. We accept this assumption in our analysis and indeed the volumes of sales described in the 15 case studies of this book illustrate that where markets for sustainable products are concerned, this is still a niche within the wider market for food and agriculture products. These niches are protected in the sense that the institutional arrangements in each case have promoted changes to the rules and regulatory requirements in order to recognize these initiatives as legitimate alternatives, but not always subject to some of the same legal requirements as others. For example, promotion of small enterprises by the public sector means that a factory producing 100 bottles of juice/day does not need to follow all the safety requirements for a factory that produces 100 000 bottles of juice/day. Protected spaces also refer to physical marketplaces where exchanges can take place in a non-proprietary setting. What is truly significant about this analysis is in identifying which actors are important for creating, financing and promoting these protected markets.

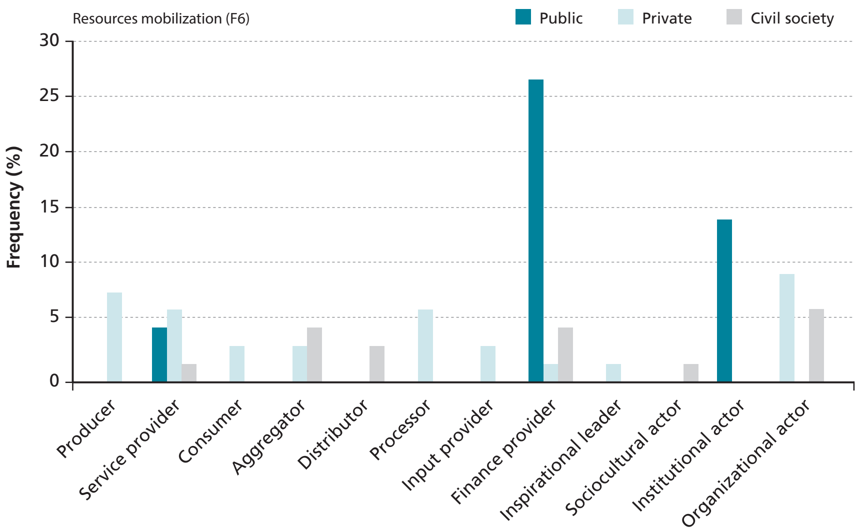
FIGURE 17.1
Who is creating the market for sustainable products?
(frequency of actors' participation in this function)



Note: total number of market creation functions across all cases is 130 (of 832 total functions performed by the 315 actors).
Source: authors' elaboration.

The creating of spaces for market exchanges is the third most frequently performed function in these institutional innovations (130 out of 832 total functions performed),[56] while resources mobilization is the least often performed (72 of 832). These two frequencies illustrate that the drivers of these mechanisms come from the creation of mostly local markets through the efforts of primarily private (58 percent), public (24 percent) and civil society (18 percent) actors, who are acting at local (54 percent), national (31 percent) and international (15 percent) levels. From Figure 17.1 it is clear that consumers, distributors (retailers and traders) and processors have a strong role in creating market spaces, which suggests that even the local markets for sustainable products are increasingly private sector driven as shown by the prominent percentage of private actors working at local level (67 percent). Moreover, the high percentage of consumers shows that they are considered to be active partners in the initiatives and are not merely interacting with producers via retailers and processors. The largest roles for public and civil society actors are found through the participation of finance providers and institutional actors in the form of municipal- or departmental-level governments. Whereas civil society actors are predominantly local (37 percent) and national (50 percent) organizations, public actors are mainly national (47 percent) and local (34 percent) bodies. This is

FIGURE 17.2
Who is promoting the market for sustainable products?
(frequency of actors' participation in this function)



Note: total number of functions across all cases is 72 (of 832 total functions performed by the 315 actors).
Source: authors' elaboration.

[56] The top two functions are "guiding the search" (164) and "legitimation" (182), which will be explained in the next section.

indicative of the role of national-level agencies that are working with private and civil society actors to establish physical market spaces and opportunities for labelling and sales of products through national purchasing and promotion programmes. It also points to the role of intergovernmental bodies that are actively promoting products, particularly organic. These are all activities that, according to Hekkert *et al*. (2007), are important in the early stages of innovation where the function of creating spaces for market exchanges is to provide a protected space where the innovation has room to grow.

The results related to resources mobilization are not surprising, with dedicated finance organizations providing 32 percent of funds. However, the role of public actors is quite strong, representing 51 percent of all the resources mobilized, followed by private (29 percent) and civil society (19 percent) resources. Within the group of public actors, international bodies mobilize the most resources (28 percent), followed by national-level regulatory bodies (competent agencies, 10 percent) and the centralized public administration with about 8 percent. This shows that these initiatives, driven mostly by private actors, are still relying heavily on external funds to keep the mechanisms working. Despite the high level of international resource mobilization, the majority of actors are operating at local (45 percent) and national (32 percent) level rather than at international level (23 percent). In other words, these initiatives are truly public-private partnerships (PPPs) where local-level private actors are mobilizing resources from local communities, particularly human and community resources, but also from national programmes and international projects.

Based on the qualitative analysis and field visits that were conducted as part of this study, we can qualify these descriptive results by highlighting some of the key themes that emerged as being fundamental in how the institutional innovations formed markets and mobilized resources. These themes are: (i) trust in market exchange; (ii) price-setting mechanisms; (iii) logistics; and (iv) certification and labels.

First, trust is fundamental in market functioning, particularly in situations of institutional change where new systems and relationships are put in place to coordinate activities between individuals and organizations in both horizontal and vertical networks (Adler, 2001; Bachmann and Inkpen, 2011; Hinrichs, 2000; McDermott, 2012; Prakash and Gugerty, 2010). The majority of institutional arrangements detailed in the 15 chapters in this book reflect Adler's (2001) notion of community/trust types of exchange (as compared with hierarchy/authority and market/price mechanisms). Adler claims that this type of market relationship is increasingly common in economies where knowledge is not concentrated in a single organization or group of individuals, but is distributed among more actors in network arrangements, as was explored in the previous section of this chapter. The importance of trust was evidenced strongly in the PGS and CSA case studies (Plurinational State of Bolivia, Colombia, Ecuador, India, Namibia, the Philippines, Thailand, Trinidad and Tobago, Uganda Freshveggies) than it did in the case studies that were considered to be multi-actor IPs (Benin, Indonesia, Islamic Republic of Iran, Nigeria, United Republic of Tanzania, Uganda KACE). The nature of the PGS and CSA mechanisms means that they rely greatly on the participants within these initiatives not only to conduct market transactions but also to take part in the governance of the mechanisms and play a variety of "non-typical" roles within them. Exceptionally, there are elements of this within IP cases as well, which was well explained in the example from the Islamic Republic of Iran, in the way that the IPM group was created (Chapter 8).

Second, all the case studies highlighted the need for establishing prices that reflected the costs of implementing sustainable agricultural practices. While not all cases reported higher costs or higher prices, there were a few cases that documented the types of political debates needed to establish a fair price. This is particularly evident in Ecuador (Chapter 6), where there was a concerted effort on the part of EkoRural to mediate a price negotiation among producer groups, consumer groups and wholesalers. In the Philippines (Chapter 9) and the United Republic of Tanzania (Chapter 16), these negotiations were conducted with public and private sector actors and were established in more formal mechanisms. The informal mechanisms and establishment of seed banks in India (Chapter 7) and Colombia (Chapter 5) provide examples of how non-monetary exchanges can be part of systems that eventually produce a product that is sold in mainstream market outlets at prices that reflect the social and economic costs of production.

Third, logistics emerged as an area for producers that has not yet been fully explored or resolved in many cases, but is clearly important in how markets are served. The best examples of managing logistics come from Benin, Ecuador and the United Republic of Tanzania. They determined that managing the logistics of getting products to markets made a clear difference in product quality. In Ecuador (Chapter 6), logistics were organized for a box scheme that required specified quantities of fresh produce, which is what consumers were specifically seeking. In Tanzania, the reorganization of pick-up schedules for transporting green leaf tea to the processing factory in a timely manner made a significant difference in the quality of processed tea. In Benin, the Songhai Centre purchased trucks to coordinate the arrival of raw products at their processing facilities and to deliver the processed products. This has enabled the centre to internalize some of the costs for participants in its network.

Finally, certification and labels play a role in how many of these market mechanisms work. They are part of a "standards system" (FAO, 2014c) and are used for two purposes: first, to check that sustainable practices are indeed being implemented and second, to communicate information about products to other actors in the system. While all the case studies in this book implement sustainable agriculture practices based on some form of internationally recognized standards that are adapted to their local situations, there is actually little use of traditional third-party certification mechanism in these systems. Third-party certification figured strongly in the United Republic of Tanzania, Indonesia and Uganda KACE, and only secondarily in India, Thailand and the Philippines. A clear distinction is made in the cases between the need for, and desirability of, external control. Within PGS, there is a clearly defined system for conducting a peer review of agricultural practices. The other systems that did not use external certification relied on an informal system of control organized by members of the group. The importance of trust surfaced again in questions of certification and labels, since many of the innovations in this book utilize labels to brand their products in order to deliver them to more distant consumers in retail outlets and thus are not directly part of horizontal networks.

New market institutions as incentives for collective action

The previous sections provided information about how knowledge is created and shared to form a network that transforms sustainability problems into actionable solutions and how spaces for market exchange and resources mobilization create enabling environments for institutional innovations. Within the concept of the "functions of innovation systems" there are three functions yet to be explored, which will help to explain how market mechanisms work as incentives for the local

TABLE 17.6
Entrepreneurial activities (F1)

	Entrepreneurial activities (F1)
Public	**18%**
International organizations	13%
Competent agencies	27%
Universities/Research Institutes	13%
Extension agencies	7%
Central public administration (ministry)	27%
District and municipal governing bodies	13%
Private	**56%**
Producers	29%
Service providers	23%
Processors	13%
Input Providers	4%
Consumers	10%
Aggregators	6%
Distributors	6%
Inspirational leaders	6%
Infrastructural	**2%**
Civil Society	26%
Economic, social and community development organizations	36%
Civic advocacy organizations	23%
Professional associations/unions	9%
Education and training centers	14%
Environmental	9%
Religious organizations	9%

Source: authors' elaboration.

adaptation (and use) of sustainable practices. These functions are those of entrepreneurship (F1), legitimation activities (F7) and guiding the innovative process (F4).

What we realized through our meta-analysis is that the innovations described in this book link the functions of knowledge creation and sharing with the creating of spaces for market exchange functions within single networks or systems. What we are describing is a particular form of entrepreneurship that goes beyond a classic definition of "turn[ing] the potential of new knowledge, networks and markets into concrete actions to generate – and take advantage of – new business opportunities" (Hekkert *et al.*, 2007, p. 421). We define the entrepreneurial activities in this book as the work involved in *developing, improving and expanding the influence of the institutional innovation*, an activity very close to institutional entrepreneurship (Garud, Hardy and Maguire, 2007; Levy and Scully, 2007; Peters, Hofstetter and Hoffmann, 2011), but we highlight that these are *activities conducted by individuals and organizations collaboratively through networked relationships*. Across the 15 cases, we find private actors as leaders in this work (56 percent), followed by civil society actors (26 percent) and public actors playing a relatively small role (18 percent) (Table 17.6). What this means effectively is that there has been strong collaboration at grassroots level in each of these initiatives among producers, service providers, NGOs, public sector institutions and processors to ensure that there is physical and institutional space for the emergence and growth of these market mechanisms.

However, while the entrepreneurship function is at the core of the institutional innovation process, it is not the full explanation of how these mechanisms work. Guiding the innovative process (F4) and legitimation activities (F7) were found to be fundamental to the success of initiatives and the majority of actors in all the initiatives dedicated at least part of their activities to these two functions. The latter describe the strategic management of the initiatives in terms of focusing investments and developing networks in line with the technologies that the actors are promoting, and the political or advocacy work that must be done to gain political support for the innovation, legitimize the ideas and create alliances to provide the space necessary for these initiatives to develop and mature over time. We found that public (44 percent) and private (43 percent) actors were the most active in providing strategic guidance for these initiatives, with civil society (13 percent) playing a minor role (Table 17.7). Sixty-seven percent of private actors are active at local level, while 71 percent of public actors are national-level administrative actors. This illustrates the synergies between local-level strategies and national policy priorities. The legislative recognition of and support provided by the regulatory agency for PGS in the Plurinational State of Bolivia (Chapter 15) is a strong example of how public actors can help private ones to focus their strategies for development (F4). A similar experience occurs in Trinidad and Tobago with the initial incentive by the Ministry of Tourism to provide an enabling environment for the establishment of community ecotourism councils, which are then used as a platform for the community to diversify its activities into agritourism.

Legitimation activities, which include advocacy, lobbying and collective action, are shown to be the most frequently performed activities by actors across the 15 case studies (Table 17.7). Since these innovations propose alternative solutions to existing and often publicly recognized problems, they must be positioned either as a viable solution within the current sociotechnical regime or as a credible pathway towards a different regime. For these reasons, innovations must be considered legitimate by stakeholders within the network (Cashore, 2002) and become accepted by actors outside the network through a process of legitimation (Loconto and Fouilleux, 2014). Across the 15 cases, these activities are most frequently car-

TABLE 17.7
Legitimation activities (actors' participation as percentage)

	Guiding the innovation (F4)	Legitimation (F7)
Public (% of total)	**44**	**56**
International organizations	14	23
Competent agencies	13	13
Universities/research institutes	3	4
Extension agencies	3	8
Central public administration (Ministry)	31	26
Central legislative bodies	9	6
District and municipal governing bodies	13	9
Executive branch of government	14	11
Private (% of total)	**43**	**16**
Producers	6	24
Service providers	7	10
Processors	23	17
Input providers	0	4
Consumers	31	21
Aggregators	6	10
Distributors	26	7
Inspirational leaders	0	7
Sociocultural actors	1	0
Civil society (% of total)	**13**	**28**
Economic, social and community development organizations	27	24
Civic advocacy organizations	32	24
Professional associations/unions	14	18
Education and training centres	9	2
Environmental	9	18
Religious organizations	5	8
International NGOs	5	6

Total number of actors is 315. Total number of actors performing the F4 function is 162 and those performing F7 is 182 (of 832 functions).
Source: authors' elaboration.

ried out by public actors (56 percent), of which national-level public authorities (56 percent) and international organizations (23 percent) are the largest percentage. Public actors have legitimated these initiatives by the provision of an enabling environment through official organic legislation and support programmes in the Plurinational State of Bolivia, Colombia, India, the Philippines and Thailand, or through the incorporation of principles such as food sovereignty or holistic environmental management in the constitution, as in Ecuador, Bolivia and Namibia. The influence of international organizations is found in the technical and policy support provided for innovations in GAPs, IPM and regional organic standards, as was illustrated in the Islamic Republic of Iran, the United Republic of Tanzania and Uganda. Civil society actors carry out 28 percent of legitimating activities, usually through lobbying and awareness raising by economic, social and environmental organizations and through civic advocacy groups, such as NOGAMU in Uganda. The role of private actors (16 percent) in legitimation processes pales by comparison with the other two groups of actors, but it is interesting to note the significant role played by farmers and consumers in legitimation. This is important since the majority of legitimation activities that take place at local level are carried out by private actors (47 percent).[57] It illustrates that these innovators are working at multiple levels to build the economic, social and political support needed to make institutional change.

17.4 INSTITUTIONAL INNOVATIONS AND HOW THEY WORK

As illustrated in the analysis of the functions of innovation systems, markets work to provide incentives for local adaptation (and use) of sustainable practices because they effectively create these systems that support the new rules and actor relationships. We have called these systems institutional innovations because the focus in all 15 cases has been to make changes to the rules, routines and networks of organizations involved in ensuring that sustainable farming practices are adopted and that products can be exchanged. In order to get a feeling for the dynamic nature of these innovations, we created timelines of key or important events for each of the case studies, with data collected from text analysis and qualitative interviews. Hence, we were able to identify how different combinations of functions in different orders can act as “motors” that set system innovation in motion.

The way in which different combinations of actors fulfil the seven functions can provide positive feedback loops within the system, which in turn strengthen relationships between the actors and can build momentum towards institutional change (Hekkert *et al*., 2007). This provides a means to see what the drivers were, both at the initial stages of the innovation and over time. While each of the initiatives described in this book details a unique combination of functions, for the purpose of analysis, we created a typology that groups the variety of innovative approaches into three discrete types of mechanisms in order to draw lessons about how these innovations create

[57] Percentages for F7 activities are national (56 percent of the total, of which actors are 64 percent public, 8 percent private, 31 percent civil society); local (27 percent of the total, of which actors are 31 percent public, 47 percent private, 22 percent civil society); and international (17 percent of the total, of which actors are 71 percent public, 7 percent private, 22 percent civil society).

incentives. These types are multi-actor IPs, PGS and CSA. How each of the seven functions interacts, follows and catalyses the others gives us the analytical boundaries within our typology and also explains *how* they provide the incentives for sustainable agricultural practices. Specifically, they are the means through which the innovators in the case studies have been able to make changes in practices and institutions.

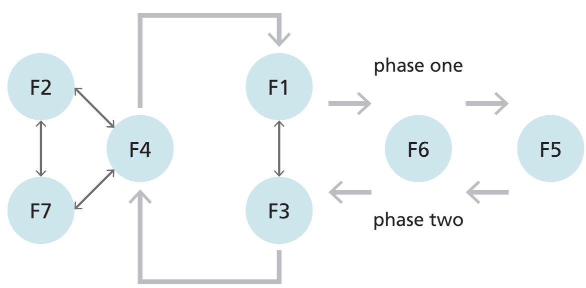
Multi-actor innovation platforms

An innovation platform (IP) is a "multi-actor configuration deliberately set up to facilitate and undertake various activities around identified agricultural innovation challenges and opportunities, at different levels in agricultural systems (e.g. village, country, sector or value chain)" (Kilelu, Klerkx and Leeuwis, 2013, p. 66). Put differently, stakeholders in IPs gather together to facilitate and plan activities connected with the adoption of a specific agricultural technology.

The IP motor of change (Figure 17.3) starts with the functions F2 (knowledge creation), F4 (guiding the innovative process) and F7 (legitimation activities). Then the motor runs through the function F1 (entrepreneurship) and F3 (knowledge sharing). In turn, these functions strengthen F2-F4-F7, and set in motion the functions F6 (resources mobilization) and F5 (creating spaces for market exchanges). What differentiates this model from the others is that function F2 (knowledge creation) is central in the IP motor of change and concerns formal and technical knowledge that comes from international and national public and private actors. Here, the creation of a market outlet for sustainable products is the end result of investment in legitimate knowledge creation and technology development, but then feeds back into the system to improve upon knowledge and technology.

There is no set configuration for an IP – it can be centralized or decentralized and focus on research and/or development activities. We see examples of this among the six IP case studies. The Songhai Centre in Benin, the *Partisipasi Inovasi Petani* (PIP) project in Indonesia, the community-based farming scheme in Nigeria and the Kangulumira Area Cooperative Enterprise (KACE) in Uganda are centralized models focused on research, extension services, training and development. In the United Republic of Tanzania, national-level government agencies collaborate

FIGURE 17.3
Innovation platform motor of change



Legend
F1 = entrepreneurship
F2 = knowledge creation
F3 = knowledge sharing
F4 = guiding the innovative process
F5 = creating spaces for market exchanges
F6 = resources mobilization
F7 = legitimation activities

Source: authors' elaboration.

with TRIT, private companies and NGOs to develop new technologies, exchange knowledge and provide services to smallholder farmers for RA-certified production practices, while the IPM Group in the Islamic Republic of Iran is an example of a loose network IP focused on FFS and training of trainers.

We use the case study from Nigeria (Chapter 4) to illustrate what the motor looks like in action. This particular IP was set in motion in 1988 when the Government of Nigeria established two specialized agriculture-based universities, the Federal University of Agriculture, Abeokuta (FUNAAB) and the Federal University of Agriculture, Makurdi, both with the triple mandate of teaching, research and extension. Functions occurring simultaneously are linked with the creation of the agricultural universities: F2 (knowledge creation) because of the role that universities play in creating new specialized knowledge; F4 (guiding the innovative process) because of the development of specialized research programmes within agricultural universities as part of policy response to the agricultural problems that affect Nigerian communities; and F7 (legitimation activities) because accreditation of these universities by the Government legitimated the agricultural sector as a driver for national development.

In 2008, taking advantage of the enabling environment created for sustainable agriculture issues that had developed before this date, FUNAAB, together with the Government of the United Kingdom and Coventry University (United Kingdom), conceived the Work, Earn, Learn Programme (WELP) to develop entrepreneurship in organic agriculture among agriculture graduates in Nigeria. The collaboration of FUNAAB with other institutions to create the programme is linked with F1 (entrepreneurship) because these institutions worked to develop, improve and expand the programmes for organic agriculture in the country; and F3 (knowledge sharing) because the collaboration and knowledge sharing among the three institutions enabled FUNAAB to develop the innovative programme. These two functions were followed closely by F6 (resources mobilization) where financial and human resources were mobilized by both FUNAAB and the United Kingdom institutions in order to begin offering the WELP programme in 2009. Implementing WELP was achieved through lectures, practical skills application and field trials with farmers. As part of the programme, an organic kiosk was set up to sell produce (e.g. organic vegetables, fruit, medicinal plants and poultry) and, as a result, F5 (creating spaces for market exchanges) was added to the technology-focused platform and was the end result of a first round of innovation at FUNAAB.

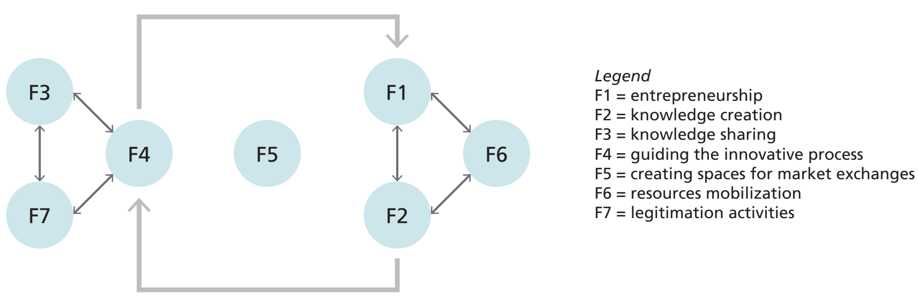
This phase started FUNAAB on a second iteration of the IP motor because the market success (F5) of the organic kiosk fed back into mobilizing more resources (F6) to engage in greater entrepreneurship activities (F1) within the university and within national dialogues on sustainable agriculture. Building on the learning experience of WELP, FUNAAB began to institutionalize the innovation in 2010 by establishing the Centre for Community-based Farming Scheme (COBFAS) as an official centre within the Agriculture Faculty. Since COBFAS coordinated the training of agricultural students, who spent one year alongside rural farmers in common fields in order to gain on-the-job experience, synergies between students and farmers were developed (F3) to find solutions for providing modern and innovative agricultural extension services, rural food security and nutrition in the local area. Now that COBFAS has been functioning for more than three years, the original motor is beginning to turn again, where direct interaction between students and farmers is creating new knowledge by combining modern and traditional agricultural practices (F2); excitement about the programme by students and farmers is legitimizing the approach and sustainable practices at the university and in the communities (F7); and finally, COBFAS is able to tighten the focus of its programme by further refinement of the curriculum, sustainable practices and markets to be pursued (F4).

Participatory guarantee systems

Participatory guarantee systems (PGS) are networks created within local communities and consist of farmers, researchers, public sector officials, food service providers and consumers. They are "locally focused quality assurance systems. They certify producers' [farming practices] based on active participation of stakeholders and are built on a foundation of trust, social networks and knowledge exchange". The role of this type of network is to create a local system of production and consumption whereby multiple stakeholders experiment with sustainable agriculture technologies (Rosegrant *et al*., 2014), but also collectively ensure that the techniques are adopted by setting standards and verifying their compliance (i.e. governance arrangements) (IFOAM, 2008). PGS therefore both ensure the diffusion of the innovation and are the means through which the innovation process is governed. PGS emerged as an experiment in organic agriculture in the 1970s in the United States of America, Japan and Brazil, but are now found in 26 countries around the world. In developing countries, they arose in response to protests against the dominant paradigm of standard setting by corporate and northern NGO actors using third-party certification systems, which were seen as too costly for many small-scale producers and not applicable to local agro-ecological and sociotechnical conditions. PGS serve to provide a direct guarantee, through the formation of a market, for sustainably produced food and agriculture products.

The PGS motor of change (Figure 17.4) starts with F3 (knowledge sharing), F4 (guiding the innovative process) and F7 (legitimation activities). The cycle among the three functions sets in motion a larger cycle where F1 (entrepreneurship), F2 (knowledge creation) and F6 (resources mobilization) are mobilized and in turn

FIGURE 17.4
Participatory guarantee system motor of change



Source: authors' elaboration.

strengthen F3-F4-F7. It is noteworthy that F5 (creating spaces for market exchanges) is not represented within the motor of change. This is because of the very nature of the PGS mechanism that extends beyond the classical supply chain links (e.g. researchers and public officials are not usually considered part of the supply chain) in order to create a unique link between producers and consumers. These work together in the maintenance of PGS, and thus the PGS mechanism itself becomes the market. In other words, the creation of a market is not the principal objective of PGS actors, but rather an outcome of their activities. Producers involved in PGS often sell their products through third-party certified organic markets or through conventional markets. With the involvement of consumers, researchers and public officials within PGS, these actors also begin to purchase products from farmer members of PGS. Thus, new markets emerge as an outcome of setting up a new means for producers, consumers and other interested parties to certify sustainable practices. There is also evidence in the case studies that market outlets go beyond the members of PGS (even to national-level markets). For this reason, F5 is featured as the background of the motor, while F3 (knowledge sharing) is the key driver of the mechanism. The knowledge that the PGS mechanism diffuses through the network is mostly traditional knowledge, or knowledge about organic agriculture that has been used within a third-party certification system. This work is done primarily by local private and civil society actors. Because the knowledge that starts this motor is knowledge that is already well established before the PGS is set up, it is through spreading this knowledge (F3) that new knowledge (F2) – particularly about new audit technologies and sustainable practices – is created, which sounds counter-intuitive.

There are case studies of six PGS implementing organic agriculture – in the Plurinational State of Bolivia, Colombia, India, Namibia, the Philippines and Uganda Freeveggies. These can be classified as publicly promoted and recognized PGS (Bolivia and the Philippines) and private sector PGS (Colombia, India, Namibia and Uganda). The case study on PGS in the Philippines (Chapter 9) explains how this happens.

In 1985, *Magsasaka at Siyentista para sa Pag-unlad ng Agrikultura* (MASIPAG) was created as a network of farmers, scientists and NGOs working towards sustainable use and management of biodiversity through the control of genetic and biological resources, agricultural production and associated knowledge. MASIPAG was the first organization to initiate and implement PGS in the Philippines. The creation of MASIPAG is linked to three functions: F3 (knowledge sharing) because MASIPAG is a network composed of different actors to promote sustainable agriculture; F4 (guiding the innovative process) because of the participation, within the network, of scientists who work and push for sustainable and organic agricultural practices within the Philippines; and F7 (legitimation activities) because the purpose of the organization is specifically to promote sustainable agriculture among small farmers. Thanks to the work of MASIPAG and other NGOs, organic agriculture became central in the political debate so that, in 2005, former President Arroyo instituted organic agriculture through an executive order with the creation of bodies to oversee and ensure its implementation. In 2010, Republic Act 10068, known as the Organic Agriculture Act of 2010, was enacted. These two events further strengthened F4 (guiding the innovative process) and F7 (legitimation activities).

In February 2011, taking advantage of the enabling environment concerning organic agriculture, the Quezon Participatory Guarantee System (QPGS) was established through the initiative of Quezon province in cooperation with the University of the Philippines Los Baños (UPLB) and MASIPAG. QPGS was conceived as a multiparty certification body composed of organic practitioners, members of civil society organizations and representatives from government line agencies in the province of Quezon. It was the first PGS implemented by a local public body in the Philippines. The creation of QPGS was linked to three functions: F1 (entrepreneurship) because QPGS was created to develop, improve and expand sustainable agriculture in the province; F2 (knowledge creation) because QPGS was the first participatory certification system implemented by a public body in the Philippines, thus creating new knowledge on how local public bodies can promote sustainable agriculture (the provincial government was invited in 2013 to share its experiences in Viet Nam); and finally F6 (mobilization of resources) because this initiative received substantial support via direct engagement with local government.

QPGS was established to assure consumers that all organic products sold at the weekly organic market held on the public land of the Quezon Provincial Capitol are guaranteed organic. It was also promoted by the various actors as a concrete and sustainable response to the need for an affordable certification system for smallholder organic producers in the province. The creation of direct relationships between producers and consumers was part of the mechanism itself, which is why F5 (creating spaces for market exchanges) is considered to be the background of the motor – not the only driver, but definitely part of the system that drives the development of PGS. The constant work needed to maintain QPGS by its members (F1), reinforced by the weekly market activities (F5) keep the motor turning between the two groups of functions. In QPGS we see how F7 (legitimation activities) is important for the stability of the PGS mechanism. Yet F7 has significant influence in this motor, not only because QPGS was created by a local public body, but because the legitimacy actually comes from the inclusion of consumers, researchers, farmers and public officials in the day-to-day functioning of the system.

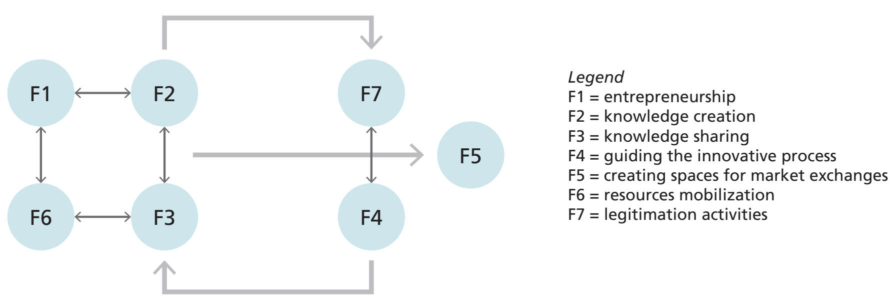
Community-supported agriculture

Community-supported agriculture (CSA) refers to those innovations that are tied to the specific agro-ecosystems and sociocultural contexts of their origin (Bair, 2008; Kloppenburg, Hendrickson and Stevenson, 1996). CSA mechanisms are embedded within local sociocultural contexts and represent initiatives where there is investment by community members in both the production and consumption components of the system. Therefore, the CSA motor of change (Figure 17.5) usually starts with grassroots entrepreneurship (F1), knowledge creation (F2), knowledge sharing (F3) and resources mobilization (F6). This group of functions sets in motion F4 (guiding the innovative process) and F7 (legitimation activities) that in turn strengthen the first group of functions. At the end, an official F5 (creating spaces for market exchanges) function is carried out as a result of the preceding cycles. As with the PGS motor, F2 knowledge creation refers, at least in the initial phase, to the recuperation of traditional knowledge mostly by civil society actors. In this mechanism, F4 (guiding the innovative process) and F7 (legitimation activities) are set in motion later than the IP and PGS motors. In these mechanisms, it appears more important to embed entrepreneurship, knowledge and resources within the local context before external legitimacy and strategic positioning of the innovation are sought.

The CSA mechanism creates a protected space to market its products within the local communities. In Ecuador, La Canasta Utopía is a CSA model where the core interactions are market based but support wider community mobilization around healthy food and rural development. The markets and rural-urban exchanges take place in close proximity to the farms and focus on ensuring rural food sovereignty. In Thailand, the Dharma Garden Temple is greatly embedded in its community since it serves as the community religious centre and relies upon community volunteers for much of its training and outreach. The creation of a local radio station as a means to spread its message helps to embed CSA further in the community. Markets for rice are created first for the community and then for export. Finally, the Brasso Seco Paria Community demonstrates how an agritourism effort builds on existing community structures to introduce sustainable technologies and markets that are necessarily located in their unique agro-ecosystem. In all three cases, markets are constructed within a geographically bound community and move outwards to bring others into the community-based market. The Dharma Garden Temple (Chapter 10) is a good example to help explain this mechanism.

In 1975, the Thai-based Santi Asoke group created an organization based around Buddhist teachings, natural agriculture methods and a vegan diet. The spiritual leader of Asoke called upon the Five Buddhist Precepts as a roadmap for the "right way of life" and Asoke members shared their knowledge to provide spiritual guidance and training on natural agriculture methods. The Santi Asoke group was one of the first organizations to promote sustainable agriculture in Thailand. Learning from the Asoke movement, in 1987, Monk Khammak and his followers established the Dharma Garden Temple, an organization guided by the Five Precepts and aiming to promote natural agriculture according to the teachings of the Buddhist scriptures. Creation of the Dharma Garden Temple fulfilled four functions, setting off the CSA motor of innovation. F1 (entrepreneurship) is a key driver in this initiative because of the entrepreneurial work of both the Santi Asoke and Dharma Garden Temple members who were mission driven in their approach to adopting and disseminating

FIGURE 17.5
Community-supported agriculture motor of change



Source: authors' elaboration.

Buddhist values and sustainable agricultural practices. This entrepreneurial activity included F2 (knowledge creation) because new knowledge on how to link Buddhist values and organic agricultural practices was created and spread (F3) from the Santi Asoke organization to other community-based organizations such as the Dharma Garden Temple. This work was accompanied by F6 (resources mobilization) through member donations and donor funds to build all the necessary facilities.

In this innovative mechanism, legitimation activities (F7) and guiding the innovative process (F4) often occur outside the community and in parallel to the innovation, but are taken up subsequently and integrated into the mechanism to reinforce the first set of functions. For example, both the Thai Government and local public bodies have taken note of the growth in the international market for organic products and, from 1997, they have developed programmes to support and implement sustainable agriculture and organic certification throughout the country. This interest guided public funds towards investment in organic agriculture (F4) and legitimized the adaptation of such practices (F7) by a wide range of farmers. These political programmes were taken up in 2000 by the Bank for Agriculture and Agricultural Cooperatives (BAAC), the principal lending institution under the Ministry of Finance, which developed special financial instruments to support organic agriculture. Concerned about rising debts, BAAC initiated debt restructuring programmes that included the conditionality of farmer training in sustainable agriculture practices. These programmes fed back into strengthening CSA through the mobilization of resources (F6) and knowledge sharing (F3) about sustainable agriculture practices.

Through participation in the BAAC programme, Dharma Garden Temple launched the Moral Rice organic farmer school where participants learned the principles of organic agriculture along with Buddhist teachings. During training, Dharma Garden Temple experts taught participants how to make and use organic fertilizers on their farms, detoxification and ways to raise soil fertility through natural methods. Members also learned leadership and team-building skills. In 2005, capitalizing on the enabling environment and knowledge of organic agriculture, Dharma Garden Temple members created the Moral Rice organic standard (F1 [entrepreneurship]). The standard was aligned with Buddhist values and its overall objectives were to impart Buddhist teachings, expand organic agriculture, reduce farmer debts and encourage a shift to a vegan diet (F3 [knowledge sharing]).

To extend the network beyond the confines of the community to reach urban-based consumers (F5), the Moral Rice managing committee called upon TV Burapha and other commercial entities to help the community create a brand for its produce. Together they developed different marketing channels such as a farm-to-table scheme, supply to large retail outlets, special events and fairs. These external alliances clearly show how in a CSA motor of change, F5 (creating spaces for market exchanges) is the last step of the process and emerges only when entrepreneurship, knowledge and resources have been well embedded in the local context, and external legitimacy and strategic guidance provide an enabling environment for the community to extend beyond its borders.

Institutionalization phases of innovations

Through the descriptions of how each of these institutional innovations work, we can finally evaluate the institutionalization phase of the different innovations detailed in the 15 case studies of this book. Hargrave and Van de Ven (2006) argue that institutional innovations do not emerge all at once – they are long processes that are constantly developing, evolving, being contested and being institutionalized in a variety of ways. As shown in the motor figures above, there are a number of feedback loops between the different functions. Over time, each of these loops creates a new loop, thus stabilizing the relationships in the previous loop and forging new ones. This provided an insight into the phases of institutionalization of our case studies, where we identified one, two and three cycles of loops.

As explained in the introduction, the case studies in this book have been grouped accordingly. Cases that are still at the first stage of *emergence,* where sustainable practices are in the process of being introduced and network linkages are weak, are Indonesia (Chapter 2), Namibia (Chapter 3) and Nigeria (Chapter 4). Those in a *developmental* process where innovations have been in existence for 10–15 years, that have a small (compared with conventional markets) but growing local market and where there has been public policy debate around the innovation are Colombia (Chapter 5), Ecuador (Chapter 6), India (Chapter 7), the Islamic Republic of Iran (Chapter 8), the Philippines (Chapter 9), Thailand (Chapter 10), Trinidad and Tobago (Chapter 11), Uganda Freshveggies (Chapter 12) and Uganda KACE (Chapter 13). Finally, innovations that have reached a level of *convergence*, where they have been in existence for over 20 years, agricultural methods are well established, marketing practices are strong and there have been changes in national-level institutions that help promote the innovations are Benin (Chapter 14), the Plurinational State of Bolivia (Chapter 15) and the United Republic of Tanzania (Chapter 16). These networks are effectively stabilized and are expanding in both scale and institutional complexity.

It is from these last three cases that lessons may be drawn about the possibilities for scaling up and out through networking of these initiatives. Intermediaries play an important role in the process of changing scale. In line with Klerkx and Leeuwis (2009), we find innovation intermediaries carrying out the functions of knowledge sharing (F3), guiding the innovative process (F4), resources mobilization (F6) and legitimation activities (F7). These functions are those that serve as catalysts in linking entrepreneurial activities (F1) with creating spaces for market exchanges (F5). Specifically, we found that an important intermediary role has been played by "inspirational leaders", "back-to-the-land farmers"[58] and traditional farmers who can move between sociotechnical, political and cultural spaces to link, ensure synergies between these functions and finally succeed in creating markets for new sustainable products. These functions are often performed simultaneously by the core intermediary in each case: the Songhai Centre leadership in Benin, the competent national authority for PGS (UC-CNAPE) in the Plurinational State of Bolivia and TRIT in the United Republic of Tanzania. As observed by Hermans *et al*. (2013), there is close interaction between the knowledge and lobbying functions, which are carried out by the same actors, not necessarily specialized in these func-

[58] This term refers to those farmers who come from urban areas and choose to return to the land to create a livelihood from farming. Typically, these farmers have a university education in a subject other than agriculture.

tions. Indeed, it is quite clear that the original mission and competencies of these core intermediaries are not necessarily in line with the intermediary role that they play. In other words, we can observe that one of the key elements of the success of these initiatives was the ability of these intermediary actors to perform more than one innovation function over a long period of time. It was precisely this flexibility in the mandates of the key intermediaries that enabled them to help move the whole initiative from a local level to national-level recognition.

17.5 CONCLUSIONS

We have presented institutional innovations that link sustainable agricultural practices with markets. This chapter has analysed how these mechanisms work to provide incentives for the adoption of sustainable practices. The first conclusion to be drawn is that institutional innovations are long-term processes. As the case studies in this book show, the newest innovation is little over five years old and still clearly in a state of emergence, while the oldest is nearing 30 years and only now has reached the convergence stage. The long-term nature of these innovations shows first that institutional change takes time and second that incentives are not single policy instruments, but rather a confluence of policy support and actor organization that can be strategically mobilized over time in line with parallel and competing initiatives.

In this concluding chapter, we began our analysis with the problem framing that each of the cases has used to establish its sustainability problem and propose a feasible solution. These framings were then explored via the mechanisms put in place by a variety of actors to perform functions that explain the construction of their horizontal and vertical networks and the enactment of institutional arrangements. We found that the most prominent objectives of these innovations relate to *health and safety*, specifically in terms of *safe food*, *consumer health and nutrition*, and *producer/worker health and safety*. In India and the Islamic Republic of Iran, there are nationwide concerns over the excessive use of pesticides in conventional agriculture. Therefore, the concept of “safe food” carries a great deal of traction with consumers who are looking for food that poses minimal risks to their health. In the Plurinational State of Bolivia, Ecuador and Uganda, safety was expressed in terms of safe food but also in terms of the safety of farmers who have to handle synthetic inputs. In these three countries, concerns for farmers’ health were linked with consumer interest in nutrition. Here, consumers also seek organic food because organic farmers are growing varieties of fruit and vegetables that are difficult to find and yet are known to have nutritional benefits. In Namibia, there were three motivations: consumer health and nutrition concerns were used for mobilizing an elite consumer base that was also concerned about the local environment and animal welfare.

Livelihood promotion emerged as the second most salient objective of these initiatives. We saw a split between an individualistic notion of farmer livelihoods on the one hand (the United Republic of Tanzania and Indonesia) and community livelihoods on the other (Thailand, Trinidad and Tobago, and the Philippines). In the Tanzanian and Indonesian cases, there is a strong presence of international standards and donors that are promoting sustainable agricultural practices in top-down, diffusion of innovation-style projects – albeit with innovative techniques. Therefore, we believe that the focus on individual farmers emerges from this broader context.

In the case of community livelihoods, each of these is a community-initiated project that is focused primarily on community-based market development.

The Songhai Centre in Benin is also focused on building local communities in the form of "green rural villages", but it has a more ambitious plan for integrated rural development that is based in communities but linked to national, regional and international market networks. Finally, the Bolivian and Colombian cases have the objective of food sovereignty for producers. Food sovereignty is part of the public debate in both countries where it is enshrined in the Bolivian Constitution, and thus the innovation works to provide a means to achieve official policy. In Colombia, food sovereignty is hotly contested since it is not prioritized by official policy and thus, until fairly recently, the innovation plays an oppositional role in public debates around sustainability by promoting food sovereignty.

Each case offers a different solution to the problem of unsustainable agriculture. We can categorize the solutions more broadly into knowledge (youth training in Benin and Nigeria, FFS in the Islamic Republic of Iran and farmer-driven experimentation in Indonesia); market outlets (local economies in the Plurinational State of Bolivia, Ecuador, Namibia, Trinidad and Tobago, and Uganda FV and value chain management in Uganda KACE and the United Republic of Tanzania); and access to and reproduction of biological resources (native seeds in Colombia and India, yield increases in India, and farmer control over genetic resources in the Philippines).

However, we do find trends in the linkages between the sociotechnical controversies that spurred the innovation and the form of the institutional innovation. In the PGS cases, there is a reaction to controversies about food sovereignty and external expert control over practices. In the CSA cases, there are responses based on a moral economy that attempt to re-embed market transactions in the community. In the multi-actor IP cases, there are collaborative efforts to respond to crises related to agricultural technologies, particularly pesticide intensive farming, by encouraging collaborative learning.

These key lessons can be summarized as follows. On the one hand, sustainable practices require innovative approaches to experimentation on farms and training through learning by doing. External technology requires more training than that built on traditional techniques and there is an important role for the local research community in these initiatives. Markets, on the other hand, become sustainable because of direct communication and collaboration by producers and consumers in institutional activities, i.e. developing technologies and conducting certification, and not only in the sale of goods through market transactions.

The role of public actors in these innovations also became clear through this analysis. While private and civil society actors are dominant in many functions, there is a clear role for public actors in the legitimation process and in setting the agenda for the direction of the innovation. These insights lead us to draw the following final lessons.

1. Multilevel policy support is an important approach for public and private actors alike.
    - There are clearly different roles for different levels of government within each country. These roles need to be recognized and public support for municipal authorities is needed for them to be able to engage with local actors in these systems.

- Local and national governments can promote these types of approaches within domestic markets, i.e. sponsoring activities, publicizing quality food or supporting local market outlets. Policy-makers can also look to neighbouring countries to build regional alliances on these issues and solutions, which provide support to the debate on sustainable agriculture and international trade.

2. Regulatory instruments should incorporate room for flexibility in their implementation.
   - For these innovations to work, the basic legal and regulatory frameworks for supporting sustainable agriculture need to be in place. These frameworks should enhance the possibilities for small and medium-sized farmers to engage in – and particularly to contribute to – research and innovation activities and should be flexible enough to support diverse approaches in each local context.
   - Legitimacy is the most important role for public actors in these systems. Public actors can provide political opportunities for the institutionalization of innovations by recognizing ongoing grassroots initiatives in their countries as they develop their public policies and programmes.
3. Incentives come through market relationships, but are not only favourable market prices.
   - Access to markets was an important component in these systems, but the incentive that these innovations provide is not only a favourable market price.
   - These initiatives were able to build a reputation for quality (e.g. safe, healthy food) in their local markets because of many different direct engagements and communication work.
   - There is a strong social component in how these innovations incentivize sustainable practices. Actors attached a great deal of importance to “belonging” to the collective and developing relationships around areas of interest for the members of each innovation.
   - The use of peer review and participatory research are clearly ways that can help producers and consumers to value their own knowledge and encourage their participation in these initiatives.

These innovations provided space for dialogue about technologies and ways to commercialize products. As noted in the Plurinational State of Bolivia, these technological spaces also “provide political platforms for future debate on agroecology”. All the innovations discussed in this book have benefited from the creation of horizontal and vertical networks and platforms that provide the knowledge (creation and training), markets, resources and policy support for local actors to engage with national and international organizations. These initiatives need public, private and civil society support and recognition in order for them to act effectively as incentives for the local adaptation (and use) of sustainable practices.

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INNOVATION
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INSTITUTIONS
DYNAMIC MARKETS
DEVELOPING COUNTRIES

INNOVATIVE MARKETS FOR SUSTAINABLE AGRICULTURE

How innovations in market institutions encourage sustainable agriculture in developing countries

Between 2013 and 2015, the Food and Agriculture Organization of the United Nations (FAO) and the French National Institute for Agricultural Research (INRA) undertook a survey of innovative approaches that enable markets to act as incentives in the transition towards sustainable agriculture in developing countries. Through a competitive selection process, 15 cases from around the world provide insights into how small-scale initiatives that use sustainable production practices are supported by market demand, and create innovations in the institutions that govern sustainable practices and market exchanges. These cases respond to both local and distant consumers' concerns about the quality of the food that they eat. The book evidences that the initiatives rely upon social values (e.g. trustworthiness, health [nutrition and food safety], food sovereignty, promotion of youth and rural development, farmer and community livelihoods) to adapt sustainable practices to local contexts, while creating new market outlets for food products.

Specifically, private sector and civil society actors are leading partnerships with the public sector to build market infrastructure, integrate sustainable agriculture into private and public education and extension programmes, and ensure the exchange of transparent information about market opportunities. The results are: (i) system innovations that allow new rules for marketing and assuring the sustainable qualities of products; (ii) new forms of organization that permit actors to play multiple roles in the food system (e.g. farmer and auditor, farmer and researcher, consumer and auditor, consumer and intermediary); (iii) new forms of market exchange, such as box schemes, university kiosks, public procurement or systems of seed exchanges; and (iv) new technologies for sustainable agriculture (e.g. effective micro-organisms, biopesticides and soil analysis techniques). The public sector plays a key role in providing legitimate political and physical spaces for multiple actors to jointly create and share sustainable agricultural knowledge, practices and products.

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This publication has been produced with the assistance of the European Union through the "Improved Global Governance for Hunger Reduction Programme" (GCP/INT/130/EC). The contents of this publication are the sole responsibility of FAO and can in no way be taken to reflect the views of the European Union.

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Institut Francilien Recherche Innovation Société

ISBN 978-92-5-109327-6

9 789251 093276

I5907E/1/07.16