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Chapter 17

Why and how market institutions create incentives for adopting sustainable agricultural practices

Allison Loconto and *Marcello Vicovaro*

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 innova-

tions – 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).[51] 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

[51] "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."[52]

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).

[52] 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*,[53] in order to slow down the onset of diabetes and lower cholesterol.

[53] 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

Source: authors' elaboration. 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.

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.

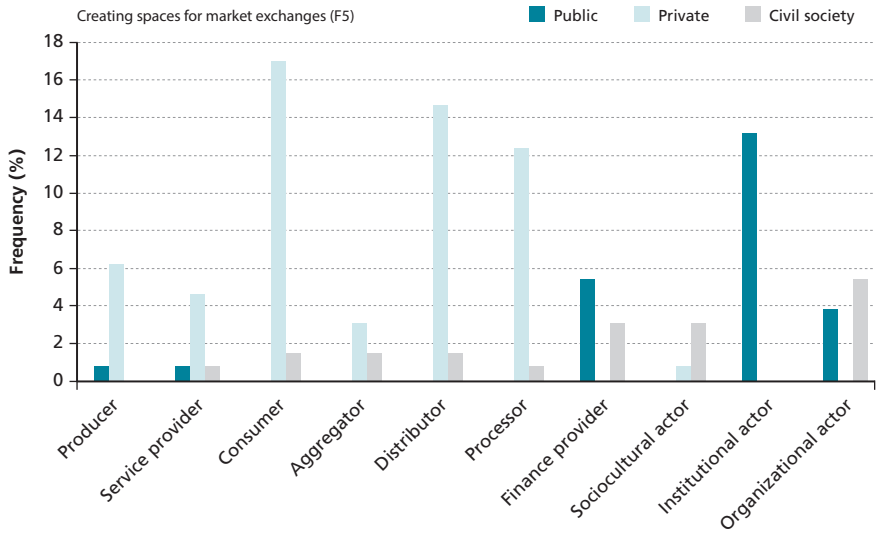
Creating spaces for market exchanges, and resources mobilization

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.

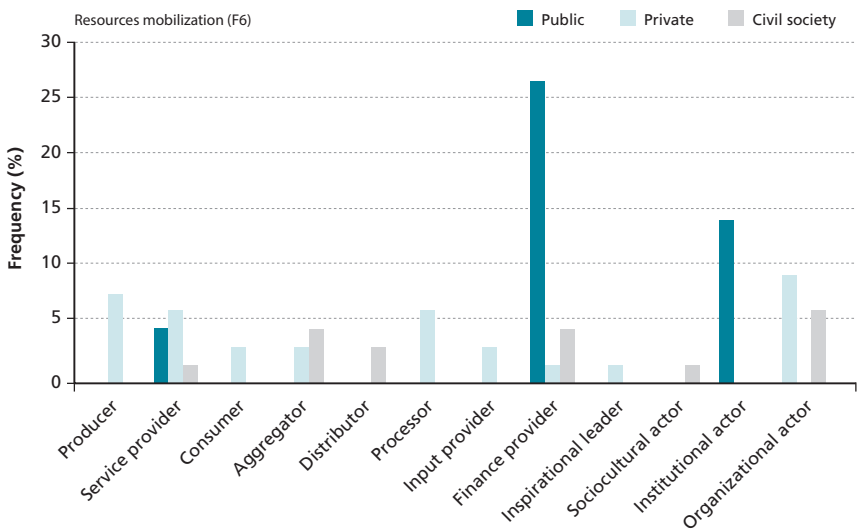
FIGURE 17.1
Who is creating the market for sustainable products?
(frequency of actors' participation in this function)



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),[54] 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.

[54] 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

Source: authors' elaboration. 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).

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).[55] 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

[55] 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.

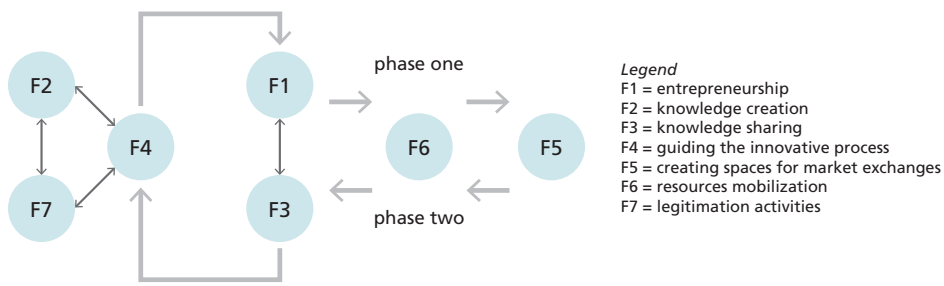
Multi-actor innovation platforms

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



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

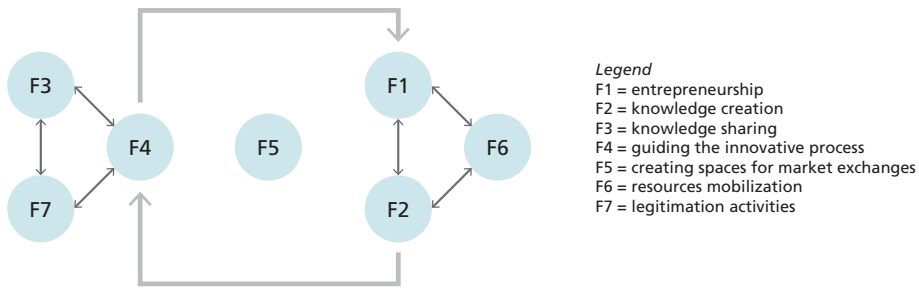
is beginning to turn again, where direct interaction between students and farmers is creating new knowledge by combining modern and traditional agricultural practices (F2); excitement about the programme by students and farmers is legitimizing the approach and sustainable practices at the university 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

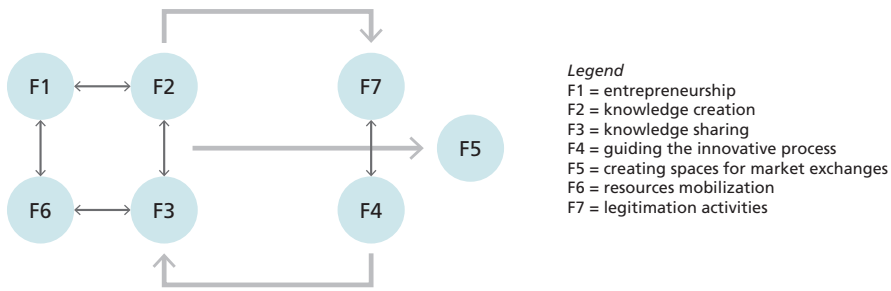
Community-supported agriculture (CSA) refers to those innovations that are tied to the specific agro-ecosystems and sociocultural contexts of their origin (Bair, 2008; Kloppenburg, Hendrickson and Stevenson, 1996). CSA mechanisms are embedded within local sociocultural contexts and represent initiatives 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 (Chapter14), 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"[56] 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-

[56] 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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