Can organic and resource-conserving agriculture improve livelihoods?

A meta-analysis and conceptual framework for site-specific evaluation

Mica Bennett
Steven Franzel

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TRANSFORMING LIVES AND LANDSCAPES

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NOTE

"$" refers to United States dollars.

Executive summary

This paper assesses the capacity of organic and resource-conserving agriculture (ORCA) to improve the livelihoods of poor smallholders in Africa. Distinguishing among the different practices related to ORCA is sometimes difficult because 'certified organic' is the only term with a precise definition. While organic agriculture and resource-conserving agriculture have some differences, which are described in the paper, they both aim for the long-term sustainability of livelihoods through practices that enhance agricultural productivity with an emphasis on using resources that are locally available. Certified organic, on the other hand, refers to produce from farms that comply with schemes defined by specific operational standards that are often part of national statutes. Certification requires independent verification of compliance. Although certified organic products are always organic, not all organically grown products qualify as certified. The ORCA umbrella covers both certified and uncertified.

The benefits that ORCA offers smallholders depend on the farming system from which farmers convert as well as the degree to which they are integrated into markets. Farming systems may range along a continuum from 'organic-by-default' systems at one extreme, to 'conventional agriculture' at the other. Organic-by-default systems prevail in areas where external inputs are unavailable, unaffordable or unprofitable. Conventional systems are based on Green Revolution technologies that incorporate synthetic fertilizers and other agrochemicals. While ORCA and organic-by-default farmers both use relatively low amounts of synthetic chemicals, they differ from each other because ORCA farmers employ more practices explicitly intended to maintain fertility, proactively manage pests and conserve natural resources.

The degrees of market integration discussed in this paper range from subsistence scenarios in which farmers hardly participate in markets at all, through transitional scenarios in which farmers sell some of their produce, generally in informal, local markets, to cash-cropping scenarios in which farmers sell nearly their entire crop, generally through formal markets, and purchase food with the income they obtain. Neither ORCA nor conventional farming systems inherently exclude any of the market scenarios and vice versa.

Effects on food security and livelihoods

A primary problem facing Africa is that since the 1960s its agricultural systems have not produced yield increases even as population has grown. And as yields have stagnated, so has the proportion of people in Africa living on a dollar a day stayed frustratingly around 50%. During this same time, other regions of the world have seen steady yield improvements, with increases in East Asia and the Pacific nearly tripling.

ORCA projects have been active in Africa for over 2 decades, and studies of cases in Asia, South America and Africa show that in many cases they have improved livelihoods for smallholder farmers. In some settings, the improvement is simply increased food availability. In others, ORCA has improved cash incomes. These positive impacts arise from three sources: increased yields, decreased costs and higher product prices. The potential of each source to drive livelihood improvements in specific sites has depended on two factors: (1) the initial farming system and (2) farmers' degrees of market integration. Specifically,

(1) organic-by-default farmers increased food security or produced marketable surpluses that raised incomes no matter what degree of integration with markets they had;

(2) conventional farmers sometimes realized cost savings, which increased cash incomes, also independently of their degree of integration with markets; and

(3) cash croppers received higher product prices if they obtained organic certification and exported their produce to countries where consumers pay more for certified organic products, and this was true especially for those converting from organic-by-default systems.

While these results are tantalizing, surprisingly few studies have looked at whether ORCA practices improve livelihoods for smallholders. The studies reviewed in this paper indicate that ORCA can help smallholders in certain circumstances, but the results cannot be generalized. The studies represent only a small number of cases and are not randomly selected. Some may have been selected because they were known to be successful, and most were selected from operating projects. The cases could therefore give a biased impression of the likelihood that farmers adopting an ORCA initiative will improve their livelihoods. The patterns that emerged from the analysis of the studies thus do not lend themselves to statistical extrapolation. However, the cases show that some farmers in developing countries have benefitted from ORCA, and they indicate some factors that may be associated with this success. These results indicate the value in conducting further and more systematic research on ORCA's potential for African smallholders.

Effects on yields

The findings from the studies suggest that converting from organic-by-default systems to ORCA is more positive for crop yields than is converting from conventional systems. We found 19 cases of conversions from organic-by-default to ORCA in which changes in crop yields were documented. Yields increased in 12 cases (63%) and decreased in only 1 case (5%). Yields stayed the same after conversion in 3 cases (16%), and in another 3 cases (16%) the new practices allowed farmers to grow additional types of crops. In addition to allowing farmers to fulfil previously unmet food needs, conversion to ORCA also sometimes produced surpluses that subsistence farmers could sell in local markets. ORCA practices adopted in the cases studied included

(1) soil replenishment using locally available organic fertilizers, cover crops and other crop rotations, agroforestry techniques, and mulches;

(2) improved water management in areas with deficient or highly variable rainfall;

(3) integrated pest management excluding chemical pesticides; and

(4) crop diversification that reduced risks that pests or unpredictable weather would cause total crop failure.

In conversions from conventional systems to ORCA, yields increased in only 1 case out of 7 for which yield data were reported (14%) and decreased in 6 cases (86%).

Effects on costs

Case studies of ORCA show mixed impacts on costs, suggesting that

(1) cost impacts are specific to sites and crops;

(2) impacts may not always be predictable; and

(3) the initial farming system can provide some indication of the expected direction of cost changes.

In general, studies found that conventional farmers see total variable costs decline upon conversion to ORCA because lower costs for material inputs more than offset higher labour costs. Still, at least one study reported cases in Latin America in which total costs rose for conventional farmers who adopted certified organic practices. Studies showed that, for organic-by-default farmers converting to ORCA, material costs generally remained unchanged, but labour requirements increased. However, even with increases, farmers sometimes found returns on labour to be high. Some researchers noted that the increased labour use and high labour productivity produced a win-win situation for marginal farming areas because under-used labour resources became more productive. Recent structural changes causing what appears to be a permanent increase in the cost of fertilizers—by 200% for nitrogen fertilizers in 2007 (IFDC 2008)—suggest that future conversions from conventional to ORCA practices could more consistently generate cost savings. Also, higher prices for fertilizers constrain the role that they can play in helping poor, organic-by-default farmers escape poverty.

Effects of organic certification on incomes

Farmers received price premiums in 14 of 20 cases that reported on them. In all 14 cases, farmers had converted to certified organic production, and in all but one case they exported their products. Organic-by-default farmers have the highest likelihood of improving incomes by conversion to certified organic agriculture because organic practices often bring both higher yields and higher prices. For conventional farmers, conversion can be more problematic because yields often fall initially. And certification schemes usually impose a 2- to 3-year transition period following conversion before farmers can market produce as certified. This means farmers must weather a period of lower yields without enjoying higher certified prices.

A livelihood improvement strategy that includes certification generally makes sense only if farmers can access export markets. This requires physical resources such as transport infrastructure that likely exist only in agricultural communities already participating in export markets. Unless certified organic projects can help farming communities use marketing infrastructure already present in their locality, such projects would generally be poor choices for farmers not already integrated into formal markets.

Certified organic markets

The global market for certified organic products has grown by over 10% per year for more than a decade but still comprises less than 2% of the food market. Analysts expect that growth will continue, though the rate may slow. They also expect that price premiums for producers will persist, though perhaps at declining percentages. North Americans and Europeans purchase more than 95% of certified organic products.

Although the extent of African participation in ORCA markets is most likely underreported, the data that are available indicate that African smallholders do participate. Uganda, Tanzania and Kenya are the African countries with the most certified farmers, each with over 30,000. While Africa's certified organic area is only 3% of the worldwide total, Africa accounts for 20% of certified organic farms, suggesting the participation of many smallholders. Certified organic crops exported from Africa include coffee, cocoa, fruits, vegetables, nuts and herbs.

Several emerging trends will affect certified organic markets. The entry of large food retailers with global retail clout could affect the prices producers receive for their products, but the direction of the effect is unknown. While big retailers probably stimulate demand, economic analysis has also shown that, in markets dominated by a few buyers and many sellers, the buyers can exercise significant power to appropriate economic rents. Also, development agencies promote organic initiatives in Africa, Asia and Latin America. China expects to bring one-third of its productive agricultural land under organic management by 2010. This means supplies will undoubtedly increase. Finally, some European Union (EU) organizations seek to ban certification for air-freighted foods, which would harm African export agriculture. In Africa's favour is that many of its products cannot be produced in northern countries.

Organic agriculture's 'enablers'

While case studies suggest that farmers can often improve their livelihoods through ORCA initiatives, part 2 of this paper explains that these farmers need to have a variety of capabilities to succeed. A strength of organic initiatives is that they often use an integrated approach to build these capabilities, which in turn adds to the five types of capital—natural, social, human, physical and financial—recognized by the United Kingdom's Department for International Development (DFID 1999a) as imperative for generating sustainable livelihood improvements. Certified organic initiatives in particular often explicitly address the formation of the five types of capital because they frequently start with a marketing orientation that requires integrating a variety of asset-building activities to successfully meet buyers' needs and sell to formal markets. This contrasts with many conventional agricultural initiatives that focus only on production and prescribe predetermined solutions rather than help farmers to acquire knowledge to devise their own solutions.

This paper presents a framework for assessing ORCA's potential benefits for specific sites by analyzing the enablers it offers for building capital. The framework helps assess the strengths and weaknesses of farmer communities in terms of the elements needed for success in ORCA projects. With this information, initiatives can identify the interventions needed to achieve livelihood goals at a site and the benefits from doing so. The framework can also facilitate planning an intervention and quantifying costs and benefits. Case studies of ORCA initiatives point to a set of enablers that can help smallholders build their assets and make organic agriculture a pathway out of poverty. The enablers are as follows:

(1) **Adaptive farm management.** Organic agriculture is a knowledge-intensive approach that can imbue farmers with the capacity to acquire knowledge, learn and experiment with ways to improve their farming practices.

(2) **Farmer groups.** Farmer groups serve smallholders by helping to share knowledge, access external resources, reduce transaction costs, enhance product quality, market collectively, organize experimentation, learn useful farming techniques, and acquire and

manage postharvest processing equipment for adding value and meeting market standards.

(3) **Business strategy development and entrepreneurship.** Smallholders need an understanding of the economic and commercial factors that affect their position in supply chains. They also need entrepreneurship skills to become active participants in market agriculture.

(4) **Strengthening knowledge processes and capacity to innovate.** To stay competitive as market outlets consolidate, smallholders must cultivate the capacity to innovate. Knowledge acquisition, dissemination and maintenance are key components of this capacity. Smallholder communities need explicit processes in place to maintain these components and keep alive access to knowledge sources.

(5) **Postharvest processing.** Acquiring and managing postharvest processing facilities to meet threshold market-entry requirements can help ensure access to markets and increase farmer incomes.

(6) **Boundary spanning.** Sustainable development requires more than improved technologies that increase productivity. Smallholders must acquire and coordinate a variety of resources and institutional innovations for ORCA to sustainably improve their livelihoods. These resources and innovations include such diverse elements as obtaining and using agronomic information, collectively marketing to reduce transaction costs, and creating ways to influence government policies. The boundary-spanning role requires bringing together resources and institutions, ensuring that smallholders have access to them, and identifying suppliers of skills who are not normally part of agricultural development projects and gaining their participation. The role highlights the need for helping farmers to develop strong groups and cultivating partnerships with a range of different actors.

These enablers build capacity and supply knowledge critical to farmers' improving their livelihoods, whether or not certified production or other ORCA practices are viable options for them. The enablers can help farmers who are already fully integrated into formal markets retain competitiveness in the face of food retailer consolidation that may squeeze out small suppliers. Farmers in Argentina and El Salvador have used these capabilities to build inroads into local informal markets for new and diversified crops.

As farmers build the asset bases required for sustainable development, they move beyond meeting immediate needs for food security to new levels of market integration that offer higher income potential.

Research priorities

Surprisingly little is known about the performance of ORCA initiatives and the determinants of their success or failure, particularly in developing countries. Research is needed in the following areas:

(1) **Assessing costs, benefits and impacts on livelihoods.** More information is needed on the profitability of ORCA initiatives, using uniform methods so that results can be compared across sites. Studies should focus on whether the poor and women benefit and how these groups can gain greater access to ORCA initiatives. It is important to compare the returns from helping farmers invest in conventional agriculture to helping them invest in ORCA. Such cross-site analyses could greatly improve our understanding of the scope of ORCA's impact, what influences the success or failure of ORCA

initiatives, and how farmers can gain greater access to such initiatives. Key audiences for such research are farmer groups, policy makers, and facilitating organizations such as nongovernmental organizations, private companies and donor agencies.

(2) **Building natural capital and agronomic assets.** Experience is needed in conducting participatory research and working with smallholders to deliver science-based research that can best meet their needs. Key questions are how to increase or maintain productivity under ORCA processes with particular focus on how to efficiently recycle nitrogen and other soil nutrients in farming systems and how to manage pests using local, non-synthetic resources.

(3) **Building social capital assets.** Research is needed to assess the factors that affect the success of farmer groups in implementing organic projects. How can outside agents best facilitate African farmer groups' effective implementation of organic agriculture projects?

(4) **Contract farming.** Some evidence suggests that creating synergies between contract farming and farmer groups has strong benefits for smallholders. Research is needed to determine the methods by which farmers can best negotiate favourable terms with contracting companies.

(5) **Building human and knowledge assets.** How can farmer groups embed systems of knowledge acquisition and dissemination into their groups and communities?

(6) **Maintaining competitiveness in rapidly consolidating markets.** How can smallholders gain access to lucrative formal markets in which a few buyers who handle nearly the entire retail food market begin to consolidate suppliers to cut costs?

Finally, the framework presented in this paper uses selected parameters to assess the potential for ORCA to benefit smallholders. Research is needed on how such indicators can be meaningfully measured within likely timelines and budgets.

1. Introduction

Sub-Saharan Africa has not enjoyed the success conventional agriculture has achieved in other regions of the world. During the last 25 years, South Asia has seen average cereal yields increase by 50% and poverty decline by 30% (World Bank 2007). Conventional agriculture relies heavily on Green Revolution inputs such as improved crop varieties, irrigation, and purchased synthetic fertilizers and pesticides (Giovannucci 2005). These technologies have not produced the same increases in productivity in sub-Saharan Africa with its combination of degraded soils, poor productivity, high input costs and poor product prices. Figure 1.1 from the World Bank's *World Development Report 2008* shows that, while all other regions have experienced cereal yield increases per hectare since 1960, sub-Saharan African yields have stayed nearly flat. Figure 1.2 shows that per capita yields have fared even worse. As agricultural productivity has lagged, poverty has remained prevalent. The proportion of people in rural sub-Saharan Africa living on less than $1.08 per day stayed around 50% between 1993 and 2002.

In addition to experiencing flat yields while all other regions saw rises, sub-Saharan farmers have had to cope with falling world prices for agricultural products, at least until very recently. Gioe (2006) reports that from 1980 to 2002 real international prices fell by an average of

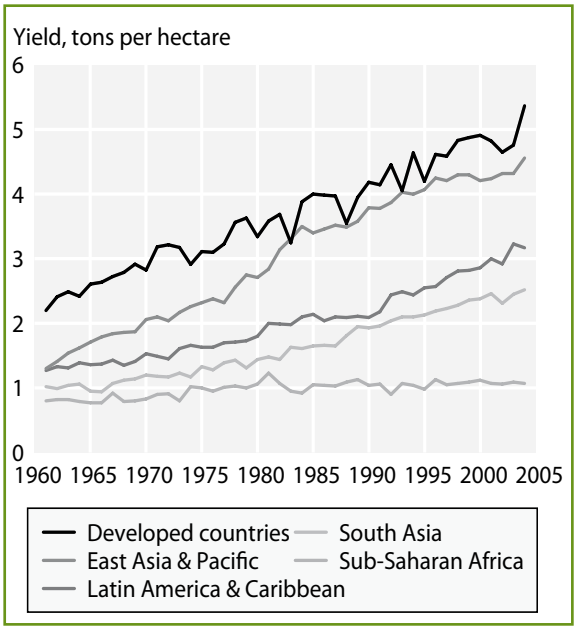

Figure 1.1. Cereal yields in developing regions, 1960–2005 (World Bank 2007).

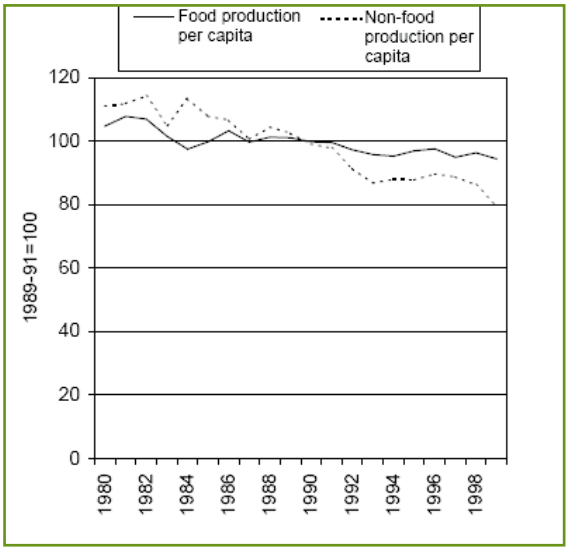

Figure 1.2. Per capita food and non-food production for sub-Saharan Africa, 1980 to 1998 (Heerink 2005).

86% for major tropical products. While facing these dramatically lower prices, African farmers found themselves squeezed by dramatically rising costs for synthetic fertilizers and other imported inputs. These trends have lowered incomes for farmers (Evenson and Gollin 2000).

The trends have also contributed to further reducing the productive capacity of African land. Many poor smallholders relied in the past on agricultural practices developed before the introduction of synthetic fertilizers and pesticides. These practices share organic agriculture's dependency on ecological processes. However, population pressure has caused many farmers to curtail practices such as long fallow periods and other ways of harnessing ecological processes to restore nutrients depleted from the soil by continuing harvest cycles. At the same time, high prices and lack of cash have prevented farmers from using enough fertilizer to make up for the lapsed traditional practices of maintaining fertility. Although African farmers expanded their use of fertilizers from about 2 kilograms (kg) per hectare to about 13 kg from 1962 to 1982, low product prices and high fertilizer costs have made fertilizer an uneconomic investment in many places (Heerink 2005). Current rates of fertilizer use have fallen to an average of around 8 kg per hectare (IFDC 2008). Continuous cropping without attending to soil fertility has degraded African soils on a massive scale (Sanchez and Swaminathan 2005).

In this setting, organic and resource conserving agriculture (ORCA) and its reliance on locally available inputs to maintain and improve crop productivity, control pests and raise water-use efficiency offer a potentially viable complement or alternative to conventional agriculture approaches that require expensive external inputs that most poor African farmers cannot afford. ORCA combines organic agriculture and resource-conserving agriculture under a single concept, treating organic as a subset of resource-conserving agriculture. Organic and resource-conserving agriculture are based on similar foundation principles that encompass not simply productivity but also goals regarding health, environmental sustainability and social equity, as table 1.1 shows. They both emphasize systems built on various combinations of technologies or practices appropriate to specific settings. As figure 1.3 shows, both organic and resource-conserving agriculture overlap with traditional agricultural systems while contrasting with conventional and organic-by-default systems.

The distinguishing features of the farming systems referenced in this report are described below. Figure 1.3 graphically depicts the interrelationships among them.

(1) Resource-conserving agriculture focuses on food production that makes the best use of natural goods and services without compromising their future use. To accomplish this, it uses various technologies including integrated pest management, integrated nutrient management, conservation tillage, agroforestry, aquaculture, water harvesting and livestock integration. These technologies facilitate soil replenishment using locally available organic fertilizers, cover crops and other crop rotations, and mulches; improved water management; and crop diversification to reduce the risk of crop failure from pests or unpredictable weather. Resource-conserving agriculture does not exclude the use of synthetics as long as they improve productivity without harming the environment. Also, as table 1.1 shows, organic and resource-conserving agriculture have defining principles that include social, environmental and health goals as well as productivity goals (Pretty et al. 2006).

(2) Organic agriculture uses many of the same technologies as resource-conserving agriculture (Pretty et al. 2006). However, as figure 1.3 depicts, organic agriculture allows no use of synthetic chemicals (IFOAM undated). Organic agriculture advocates believe that any use of synthetics damages soil microecology and insect balances, thus putting producers on an unsustainable chemical treadmill (Parrott and van Elzakker 2003).

(3) Certified organic is primarily a legal distinction meaning that the certified products are verified to have been produced according to specified standards often codified in national law. Deciding to pursue certification is largely a marketing strategy with agronomic implications.[1] The decision to obtain certification depends on the potential for increased prices and market access compared with costs and possible agronomic complications. All certification standards adhere to the general concepts of organic agriculture but differ in their specific requirements and prohibitions of particular practices and inputs. The European Union (EU) has adopted what it calls a common standard for member countries that actually allows each country to set its own requirements for imported organic products. The United States (US) and Japan also have unique elements to their standards (Barrett et al. 2002, Kilcher et al. 2006).

(4) Traditional agriculture has evolved as many systems that take advantage of local ecological processes for enhancing productivity while conserving the natural resource base. However, not all traditional systems include such elements. Those traditional systems that explicitly manage and conserve the natural resource base fit under ORCA. These systems may include practices that should be investigated for more widespread incorporation into ORCA systems.

Table 1.1. Principles of organic compared with those of resource-conserving agriculture

IFOAM organic principles (IFOAM)	**Key principles of resource-conserving (sustainable) agriculture** (Hine and Pretty)
Principle of health. Organic agriculture should sustain and enhance the health of soil, plants, animals, humans and the planet as one and indivisible.	Minimize the use of those non-renewable inputs that harm the environment or the health of farmers and consumers.
Principle of ecology. Organic agriculture should be based on living ecological systems and cycles, work with them, emulate them and help sustain them.	Integrate biological and ecological processes such as nutrient cycling, nitrogen fixation, soil regeneration, allelopathy, competition, predation and parasitism into food production. Sustainability incorporates concepts of both resilience and persistence.
Principle of fairness. Organic agriculture should build on relationships that ensure fairness with regard to the common environmental and life opportunities.	Agricultural systems with high levels of social and human assets are better able to adapt to change and innovate in the face of uncertainty.
Principle of care. Organic agriculture should be managed in a precautionary and responsible manner to protect the health and well-being of current and future generations and the environment.	Make productive use of people's collective capacity to work together regarding common agricultural and natural resource concerns such as managing pests, watersheds, irrigation, forests and credit. Make productive use of the knowledge and skills of farmers to improve their self reliance and substitute human capital for costly external inputs.

IFOAM = International Federation of Organic Agricultural Movements.
Sources: IFOAM (undated), Hine and Pretty (2006).

[1] As an example, United States national statutes set out the broad legal framework that governs the National Organic Program. The Code of Federal Regulations translates the framework into a list of specific practices that farmers must follow to label products as certified organic. These regulations include a national list of substances prohibited and allowed. Examples of allowed synthetic substances include algaecides, disinfectants and sanitizers; certain herbicides, weed barriers, animal repellants and insecticides such as those based on soap, traps, naturally occurring minerals, and pheromones; and products that can be used in organic processed human food and animal feeds (US Code of Federal Regulation)

(5) Organic by default is a 'system' farmers follow when they do not use synthetic chemicals or ecological practices to replace soil nutrients, control pests and diseases, or otherwise enhance productivity. This system has come into practice with growing frequency in Africa as population pressure reduces the time farmers can allow for fallowing while synthetic external inputs for maintaining soil fertility remain beyond their reach.

1.1 Purpose, paper overview and data limitations

While some researchers assert that sub-Saharan Africa's way out of poverty lies with wider use of Green Revolution technologies (Evenson and Gollin 2000), others suggest that ORCA also has potential (Crucefix 1998, Sanchez 2002, Parrott and van Elzakker 2003, Hine and Pretty 2006). The reasons for undertaking this analysis of ORCA's potential for improving livelihoods in Africa include the following:

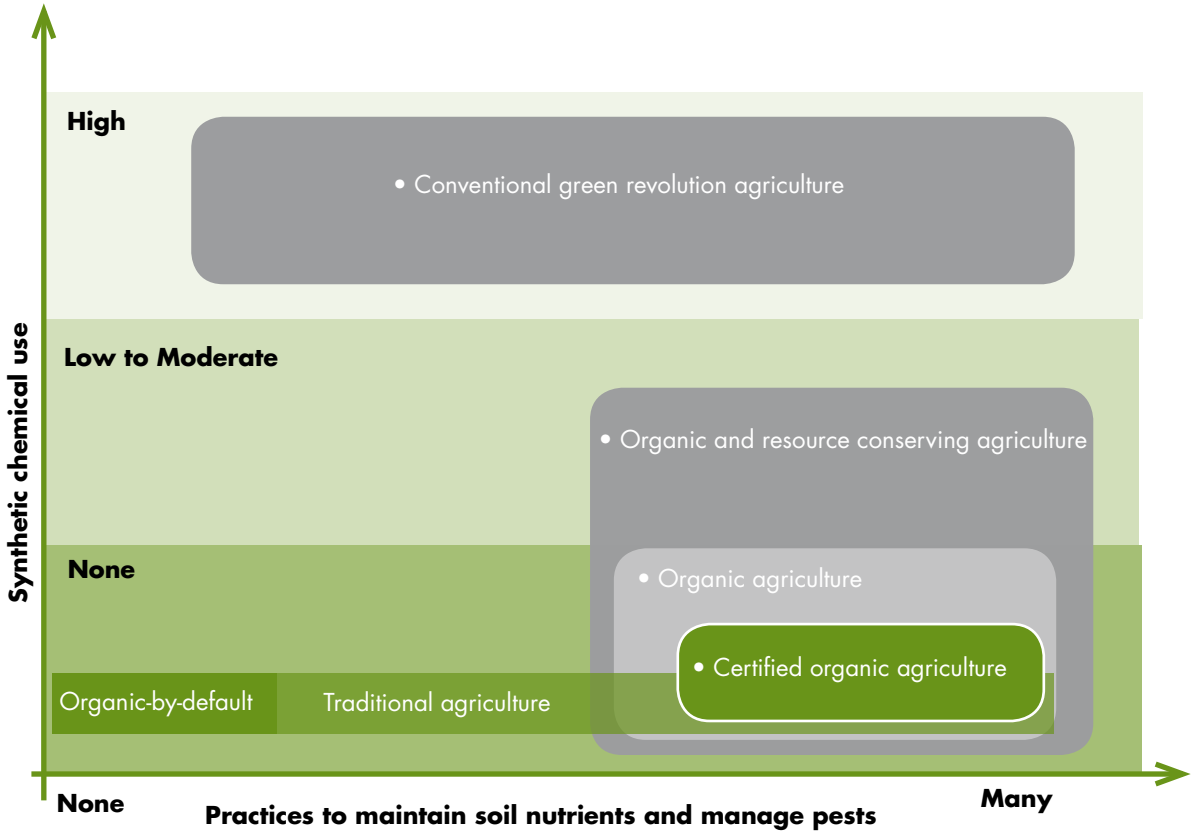

Figure 1.3. Various farming systems and their interrelationships in terms of practices and inputs.

(1) ORCA's emphasis on the prudent use of primarily local resources to increase yields suggests it may be effective in areas not visited by Green Revolution improvements.

(2) Agroforestry research has developed a range of practices that stress making the most of natural resources as well as learning what makes them work for smallholders.

(3) The record of strong and persistent demand in developed countries as well as high prices for certified organic products suggests this could help farmers increase incomes.

(4) Reports indicate that the need to meet standards is becoming a pervasive and permanent feature of smallholders' landscape. In this setting, certified organic agriculture appears to have potential for helping farmers build the capacity needed to meet standards and thus stay competitive in formal markets, while the price premiums can potentially be leveraged to pay for the investment.

This paper investigates in six sections the results from ORCA initiatives in developing countries and their implications for improving the livelihoods of poor smallholders, particularly in sub-Saharan Africa.

The methodology for this report was to identify, using Internet search engines including Web of Science, Google and Google Scholar, plus following leads from and other sources, studies about the livelihood effects of ORCA systems on smallholders in developing countries. We then analyzed sources to understand the factors contributing to the likelihood that smallholder farmers adopting ORCA systems could sustainably improve their livelihoods. While there are many studies on yield and other effects from implementing individual technologies such as specific agroforestry practices, reporting on the efficacy of such technologies or the best mix of them is not a focus of this review. Adequately covering the literature on these practices would be its own major initiative.

The data available on ORCA as practised by poor farmers are not extensive. We found only a few studies in Africa—primarily in Kenya, Tanzania and Uganda—and mostly grey literature that often does not give sources for assertions or describe the methods used to reach conclusions. We therefore caution readers about conclusions that did not appear to be substantiated. Also, much of the price and demand data for organic products in the public domain is at least 5 years old. When dealing with dynamic, rapidly changing parameters like prices and demand for internationally traded products, these lags could easily render conclusions outdated. We therefore warn readers when data appear to be old.

1.2 ORCA's potential for smallholders

The potential for ORCA to improve farmer livelihoods depends heavily on two factors: farmers' initial farming system and their degree of integration into markets. ORCA has potential to deliver benefits through three primary mechanisms: increasing production, reducing costs or increasing prices (figure 1.4). The benefits can accrue singly or in combination, though, as the figure shows, particular benefits tend to be associated with the initial farming system (organic-by-default or conventional) or market scenarios (for example, subsistence versus cash cropping; figure 3.2 explains the scenarios in more detail). Improving product prices through price premiums usually requires obtaining certified organic status.

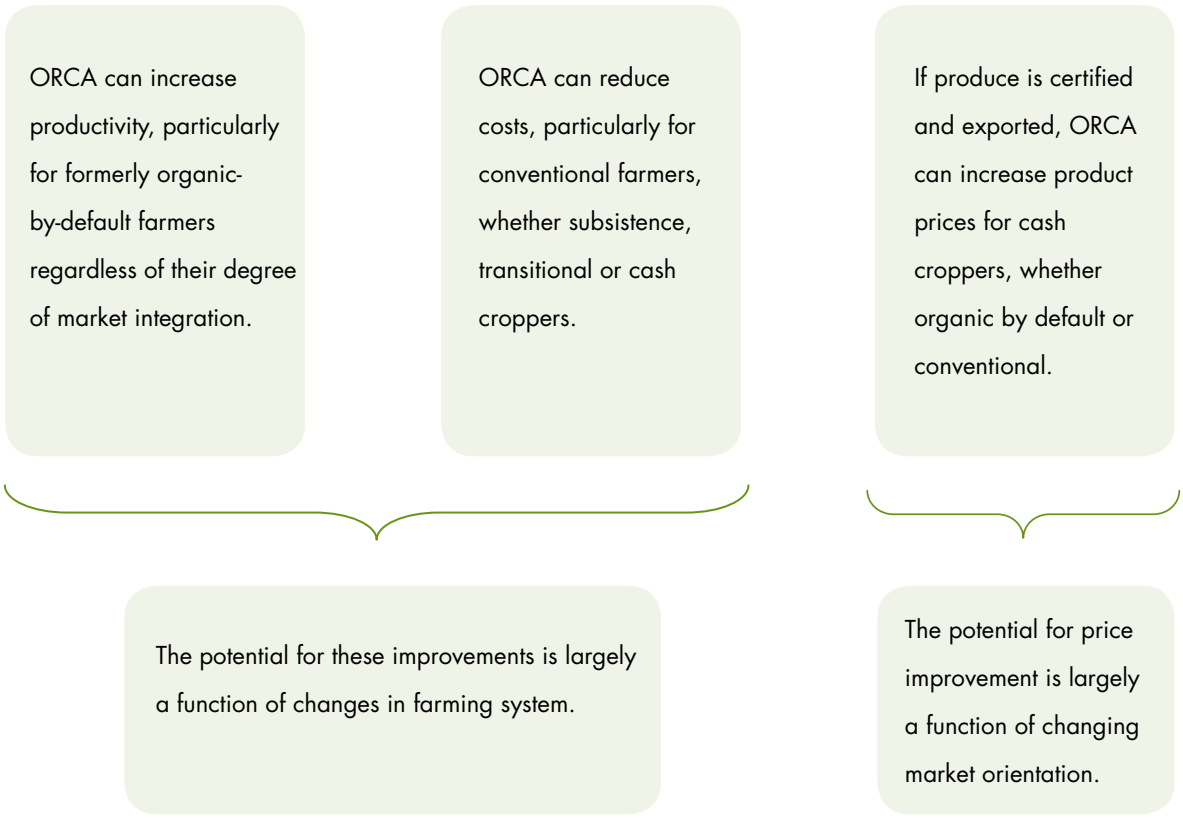

Figure 1.4. Ways in which organic and resource-conserving agriculture (ORCA) can improve livelihoods.

Certification communicates to consumers that products meet a defined set of standards. With this assurance, consumers who value these standards will pay higher prices than they will for conventionally produced products. Uncertified organic or other ORCA products are not usually distinguished in the market, and thus little data is available about their production, sales volumes or prices. Farmers undertaking certification can benefit only if they earn prices high enough to sustain profitability. Therefore, information about prices and premiums is important for making decisions about pursuing certification. Certified organic products have exhibited strong growth in demand, production volume and area for at least 20 years. The total value of certified organic purchases worldwide reached $27.8 billion in 2004 (Sahota 2006) and by 2006 accounted for around 1.5–2.5% of total food sales in North American and Europe (Gibbon and Bolwig 2007b). Approximately 97% of these certified organic sales occurred on these two continents (Knudsen et al. 2005). Africa has contributed to the growth of certified organic production in terms of area and number of certified farms. While Africa accounts for only 3% of global certified organic production area, it accounts for 20% of all certified farms. The relatively low area but high number of farms means that African smallholders indeed participate in organic production.

Certified organic products continue to command substantial price premiums in European and North American retail markets. Studies report premiums ranging from less than 10% to as

great as 150% (IFAD 2003, Gibbon and Bolwig 2007b). Several researchers forecast that demand for organic products will continue to grow (ITC 1999, Giovannucci 2005, Setboonsarng 2006). The International Fund for Agricultural Development (IFAD 2003) notes that some scepticism exists as to whether demand for organic produce will remain strong enough to maintain price premiums. However, it also points out that organic products have displayed a rate of growth unusual for food and predicts that this trend is likely to continue in the medium term. According to IFAD, the demand for organic products in most industrialized nations has outpaced domestic supply, providing an opening for imports.[2] Also, producers in sub-Saharan countries supply crops that Europe and North America cannot grow, such as coffee, tea, cocoa, spices, and tropical fruits and vegetables. These factors have the potential to widen export channels for tropical smallholders. Nonetheless, while organic agriculture appears to have continuing strong potential, limitations in the data on the extent of organic agriculture as well as changing world food trends raise some questions.

1.3 Sustainability considerations

This paper uses the sustainable livelihoods framework to assess the effects of organic initiatives on farmer livelihoods. The description of the framework below draws heavily on reviews of it by the Department for International Development (DFID 1999a).

The sustainable livelihoods framework depicted in figure 1.5 arose in response to the limited scope of concepts like income and wealth for dealing with the complex problem of assessing the impact of interventions on peoples' well-being. A livelihood is made up of the capabilities, material and social assets, and activities needed to earn a living. The framework is characterized by several core concepts. First, it is people-centred in that its use depends on poor people themselves being involved in assessing causes and proposing solutions to poverty. Second, it is holistic and recognizes that interventions need to take place within the context of a livelihood system rather than affecting a single sector or component. Third, the framework is dynamic and iterative as changes over time are likely.

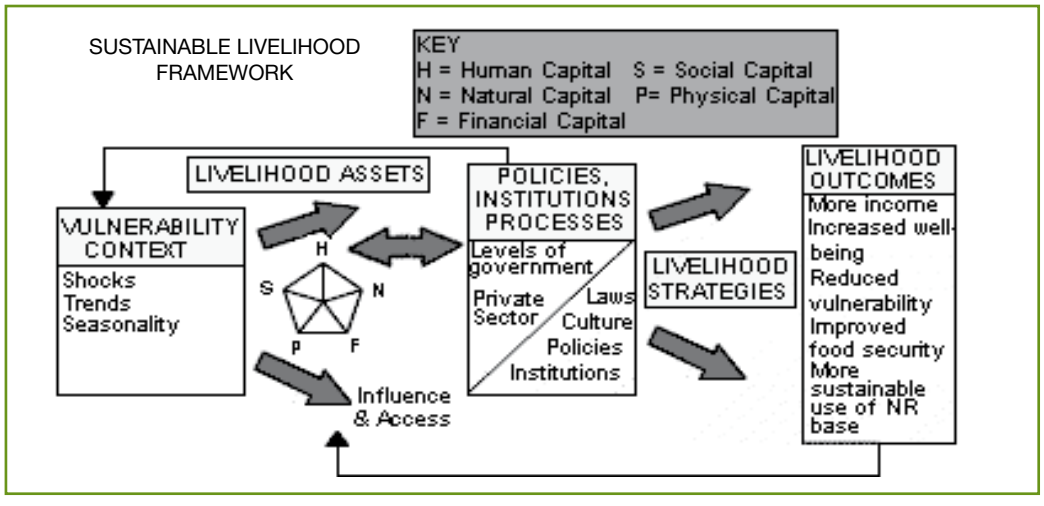

Figure 1.5. Sustainable livelihoods framework.

Note: The arrows in the framework are shorthand denoting a variety of types of relationships, all of which are highly dynamic. None of the arrows implies direct causality, though all imply some influence (DFID, 1999a).

[2] IFAD (2003) cites a 1999 report by the International Trade Centre (ITC 1999) as the source for these forecasts.

Fourth, it assesses strengths as well as needs. Finally, it involves several different types of sustainability: environmental, economic, social and institutional (DFID 1999a).

The term 'sustainable' in the framework indicates the ability to cope with shocks and stress and to maintain and enhance capabilities and assets without undermining the natural resource base. To maintain this coping ability, individuals and their communities must possess capital in the five types of assets illustrated in figure 1.5. Definitions of the asset types are as follows:

(1) Natural capital is formed from natural resource stocks, which give rise to resource flows and services (e.g., nutrient cycling and erosion protection) that are useful for livelihoods. Examples of natural capital include land, trees, water, the atmosphere and biodiversity.

(2) Social capital encompasses the social resources people draw upon in pursuit of their livelihood objectives. These are developed through networks and groups (which may be informal or formal), relationships of trust, and modes of reciprocity and exchange.

(3) Human capital is made up of skills, knowledge, good health and ability to work, which together enable people to pursue livelihoods.

(4) Physical capital comprises the infrastructure, tools and equipment needed to support livelihoods, including transport, shelter, adequate water supply and sanitation, energy, and communications.

(5) Financial capital is composed of the financial resources that people use to achieve their livelihood objectives, including savings and incomes.

The order in which we discuss the assets does not imply any priority or causation. The assets interact with one another in complex ways to affect livelihoods. Change in one asset often affects the other assets. A key question for those doing research on the framework is to determine suitable entry points and sequencing of asset building in specific situations. People generally need access to all five types of capital to escape from poverty (DFID 1999b).

2. Capital needed and created by ORCA initiatives

Case studies of successful ORCA initiatives suggest that they demand of farmers a variety of capacities. This means that ORCA interventions with poor smallholders who have few of these capacities may require extensive effort and be riskier than ventures with better-endowed farmers. Initiatives that invest in building the needed capital simultaneously contribute to the skills and knowledge that smallholders need to face livelihood challenges such as changes in their market or production environment. These skills help smallholders improve their livelihoods even if specific ORCA components prove to be inappropriate for a site or if organic markets decline.

This section explains the specific assets needed for ORCA initiatives in each of the five types of capital in the sustainable livelihoods framework. It points out how the needed assets help improve livelihoods in target communities. Demonstrating these two sides of ORCA initiatives—the needs they address and the strengths they engender—helps illuminate the rationale for the assessment framework. This section also shows how the framework can be used to estimate the costs, risks and benefits that an ORCA initiative may bring to a specific site.

2.1 Natural and agronomic capital

Natural assets encompass the fauna, flora, soil, climate and other physical endowments to which farmers have access. Agronomic practices affect the outputs that farmers obtain from these resources.

As table 2.1 shows, the benefits from increasing the productivity of natural and agronomic capital accrue as either increased productivity or cost savings. However, the expected results for specific sites will depend on farmers' initial farming systems. An increase in incomes can arise from obtaining organic certification that can bring higher prices if farmers can access formal markets in the EU and North America. This price increase is a consequence of market issues discussed in more detail in the section on financial assets. For farmers deciding whether to become certified, a key consideration is whether increased prices will offset any downsides of forgoing external inputs.

2.1.1 Effect of ORCA on productivity and costs

Areas with rural poverty often have low yields stemming from either degraded resources or unfavourable conditions regarding soil fertility, water availability and pests. Low-income farmers have benefitted little from Green Revolution technologies in part because they lack money to purchase inputs. Recent structural adjustment programs have made many purchased inputs such as mineral fertilizers too expensive even for farmers who used them in the past, so many have reverted to organic-by-default practices. With recent structural changes causing a seemingly long-term increase in prices for mineral nitrogen

fertilizers, this situation will likely become worse. Degraded conditions are becoming more common as population pressure grows, forcing more intense cultivation that does not allow for traditional fallowing or other fertility replenishment (Walaga 2004, Giovannucci 2005). As table 2.1 indicates, studies of ORCA projects report many instances where farmers starting from organic-by-default systems[3] increased productivity, thus improving food security. Farmers transitioning from primarily subsistence farming into selling some produce in informal markets (transition farmers) translated the productivity increases from ORCA into either improved food availability or increased cash from selling marketable surpluses. Cash-crop farmers increased revenue by producing more crop to sell.

The agronomic techniques used in ORCA, particularly on marginal lands, must use low-cost, locally available technologies and inputs (Pretty 2002). ORCA promoters work with farmers to combine locally suitable traditional practices with introduced practices. Commonly used ORCA practices include

(1) managing soil fertility using green manures, compost, animal manure, improved fallows and crop rotation;

(2) increasing diversification by rotating crops or intensifying home gardens;

(3) practicing agroforestry to obtain a range of tree products including fruit, fodder, poles, timber, medicines and such services as soil erosion control, reduced desertification and shade; and

(4) integrated pest management using locally available, natural pesticides.

Table 2.1. Potential sources of improved livelihoods from converting to ORCA

Original Farming System	Productivity	Cost savings
Conventional	Many studies have found that yields decrease upon conversion from conventional agriculture, while others show that after an initial decline ORCA yields for some crops equal or exceed yields in conventional agriculture. In some cases, ORCA crop rotations resulted in additional, new products to market, which increased incomes.	Cost impacts vary from site to site. Whether savings materialize depends on the magnitude and direction of material costs versus labour costs. Case studies showed a tendency for material costs to decrease because locally available materials for soil fertilization and pest control cost less than externally purchased synthetics. However, ORCA methods are often more labour intensive than conventional methods, so labour costs often increase.
Traditional or Organic by Default	Productivity tends to increase as farmers adopt ORCA practices. Higher product prices obtained through certification encourage farmers to invest more in crop productivity.	Cost effects vary from site to site. Input costs usually remain unchanged, as neither the original nor the new system use many purchased inputs. Effects on labour needs can vary depending on the availability of labour. ORCA practices generally require more labour. The increase can often be absorbed with no extra cost in communities with available labour, especially if ORCA practices can be implemented during slack seasons. However, particularly where local sources of soil nutrients are scarce, additional labour requirements for obtaining them can compete with other livelihood activities.

ORCA = organic and resource-conserving agriculture.

[3] Referred to as 'traditional' for reasons stated in the notes to the source in Appendix F.

Many of these practices apply to Africa and are seeing expanded use (IFAD 2003, Parrott and van Elzakker 2003, Walaga 2004, Setboonsarng 2006). Further, some evidence suggests that organic-by-default farmers may have a competitive advantage in converting to certified organic agriculture. Because they have not previously used synthetic chemicals, the organic-by-default farmers need not go through the 2–3 year transition period required of previously conventional farmers. Also, organic-by-default farmers experience fewer pest infestations when converting to organic practices than do conventional farmers (Parrott and van Elzakker 2003, Setboonsarng 2006).

In contrast, conventional farmers often experience yield declines in the first few years after adopting ORCA and then experience increases. According to most literature, yield reductions range from 15% to 60% (Gibbon and Bolwig 2007b). However, in one documented case in India, conversion from conventional agriculture did not bring any yield losses compared with conventionally grown crops in the same area; first-year yield losses were 21% for rice, 27% for sugarcane and 31% for banana, but conventional crops suffered similar yield reductions that year. By the third year, ORCA yields had stabilized, and beginning in the fourth year after conversion they consistently surpassed conventional yields. The organically managed banana actually surpassed the highest yields that had been achieved prior to conversion (Giovannucci 2005).

In other cases, organic agriculture offers a clear opportunity to increase yields in the long term. In Tanzania and Zambia, structural adjustment programs introduced in the late 1980s and 1990s ended subsidies for external inputs, and their use by smallholders drastically declined. Disease and pest infestations increased, and soil fertility declined (Taylor 2006). This situation set the stage for the increased use of ORCA practices such as improved fallows using leguminous shrubs, which were widely adopted by farmers in eastern Zambia in 1997–2005 (Ajayi et al. 2007).

Studies of smallholders' conversion to ORCA found that the effect on agronomic costs varied according to the original farming system. However, the studies looked only at conversions to certified organic production. In general, they found that costs for variable inputs other than labour tended to stay the same for organic-by-default farmers and to decrease for conventional farmers. As labour needs increased for farmers converting from both organic-by-default and conventional systems, whether or not total variable costs rose or fell depended largely on the labour market in specific locations and the labour intensity of the crop.

Changes in costs also varied by continent where farms were located. A study of several cases in Latin America found that certified organic farmers growing sugarcane, coffee, bananas, cacao-banana combinations, and honey had higher variable costs than similarly situated conventional farmers (IFAD 2003). A study of smallholders in India and China found that labour costs for organic-by-default farmers increased while the costs of materials stayed the same. Farmers converting from conventional systems saw labour costs rise, as did organic-by-default conversions, but the costs of materials declined (Giovannucci 2005). Finally, a study of three crops in Africa grown under contract found both labour and input costs lower for certified organic pineapple and vanilla-cacao systems than for conventional systems. In coffee, however, certified organic farmers had significantly higher labour costs and significantly lower materials costs, with total variable costs nearly equal for certified organic and conventional farmers (Gibbon and Bolwig 2007b).

2.1.2 ORCA's potential for environmental benefits

High-yielding crop varieties common in conventional agriculture can greatly increase crop yields, especially when combined with other external inputs such as mineral fertilizer. But they can also worsen the risk of crop failure from variable weather and pest attack and may run contrary to the food security strategies of resource-poor farmers, especially in semi-arid areas. In addition, borrowing to purchase synthetic external inputs exposes farmers to debt risk (IFAD 2003).

ORCA practices such as crop diversification can reduce vulnerability to crop failure from weather variability or pest attacks. And, by using the same space to produce more crops, diversification has increased farm production by 20–60% in some instances compared with traditional low-input systems (FAO 2003 cited in Setboonsarng 2006). Diversification yields more products to bring to market (Rundgren 2002, cited in Setboonsarng 2006; Scialabba et al. undated, cited in Setboonsarng 2006; Sullivan 2002, Lotter 2003, ISP 2002, all cited in Setboonsarng 2006). Some organic practices such as improved shrub fallows enhance moisture retention in soils, reducing the risk of production shortfalls in years with low rainfall (Kwesiga et al. 2003). Crop rotations offer benefits to farmers converting from either conventional or organic-by-default agriculture.

ORCA may have significant environmental benefits over conventional agriculture. It leaves fewer chemical residues, permits less soil erosion, conserves water better, improves soil organic matter, and exploits greater crop diversity and biodiversity than do conventional systems (Pimentel et al. 2005). Overreliance on chemical-based agriculture has sometimes created major problems, including water pollution, salt build up in soil, the poisoning of agricultural workers and beneficial insects, and overdependence on only a few cereal varieties (IFPRI 2002). Unfortunately, the externalities of agricultural practices, either positive or negative, are rarely counted among farmers' actual costs and returns.

2.1.3 Agronomic challenges

Evidence suggests that agronomic obstacles to adopting ORCA practices are not as challenging for traditional farmers as for conventional ones. ORCA is not a radical switch for traditional farmers, particularly those in more remote and often poorer regions where necessity already dictates the use of low-input agriculture (Crucefix 1998, IFAD 2003, Giovannucci 2005). Under ORCA, farmers must rely on knowledge of the natural systems, and farmers in low-input systems often have greater experience in and knowledge about them than do farmers in conventional systems. Having depended on synthetic, chemical inputs, conventional farmers must learn more about the natural processes of their farms, especially for maintaining fertility and controlling pests and diseases. These farmers need time and practice to learn ORCA techniques while simultaneously working to maintain production and reduce pest and disease risks (IFAD 2003, Giovannucci 2005). Finally, because the specifics of ORCA techniques vary according to location, it is difficult to develop a one-size-fits-all approach to these challenges.

Labour issues arising from ORCA practices can present difficulty to farmers converting from organic-by-default or conventional systems. Labour requirements are high for many ORCA practices such as composting and manure collection. Many researchers see the labour intensification arising from ORCA as an advantage for marginal farmers, as labour is often the production factor most available to these farmers (IFAD 2003). But the labour issues constraining adoption are often more

complicated than just the amount of labour that tasks require. First, peak-season labour can be a critical constraint on smallholder systems, so generalizing about labour availability can be misleading (Upton 1996). For example, tree pruning in alley farming must be completed in a timely fashion to keep trees from competing with crops. Pruning is usually needed during periods of peak labour demand and is thus difficult for many farmers, particularly poor ones. And some tasks are difficult for certain types of households to accomplish. In many parts of Africa, female-headed households have problems pruning trees because it is viewed primarily as work for men (Swinkels et al. 2002). Finally, Meertens (1999) cautions that in some cases high dependence on labour-intensive techniques decreases labour productivity and contributes to impoverishing farm households.

Other agronomic issues identified by Meertens (1999), IFAD (2003), Walaga (2004), Giovannucci (2005) and Santacoloma (2007) as complicating the adoption of ORCA are

(1) high mineralization rates of organic matter making it difficult to maintain soil quality;

(2) lack of access to needed plant materials, animal breeds and plant-protection inputs;

(3) few farm animals for supplying manure and limited resources for procuring manure, resulting in lower yields;

(4) inherently infertile soils (for example, it is difficult to grow nitrogen-fixing legumes on some infertile soils);

(5) the length of the adjustment process and development of managerial skills to properly apply ORCA technologies, understand agro-ecology, develop the best rotation cycles, and identify the best varieties for varying conditions and soil typography;

(6) learning to manage locally available fertilizers that are approved under certification; and

(7) managing pests, which studies of Asian, Latin American and Eastern European projects found was the most difficult skill for farmers to learn.

Compounding these challenges is a lack of research, extension and educational support. A study of projects in Asia found that the difficulty smallholders mentioned most often as an obstacle to converting to ORCA was the lack of extension services for organic production. Organic agriculture in general suffers from limited scientific research on organic technologies, especially under smallholder farm conditions (IFAD 2003, Giovannucci 2005). Most research focuses instead on conventional practices.

In some cases, smallholders have abandoned organic agriculture because they could not wait until it became profitable, if ever. Exports of organic pineapples from several West African countries including Cameroon, Togo, Ghana and Cote d'Ivoire collapsed because of the failure to find an alternative method to induce flowering after new organic standards were introduced. This made it difficult to plan production or set delivery targets with buyers or shippers (Parrott and van Elzakker 2003).

2.2 Social and institutional assets

2.2.1 Benefits and needs

Success with ORCA, and particularly with certified organic agriculture, depends on farmers possessing a wide range of social assets or durable organizations formed to carry out activities needed to realize goals (Beinhocker 2006). As table 2.2 demonstrates, farmers need to form bridges with outside entities that can provide information, connect them to markets and bring in technical skills. The farmers must also create organizations among themselves to ensure that certification standards are met and reduce

transaction costs, among other things. The need for social assets becomes increasingly complex as communities become more highly integrated into markets, with participation in certified organic markets posing the most complex needs of all.

ORCA's requirements for social assets suggest that ORCA interventions will require less effort and be less risky in communities with strong organizations and ties to external social resources than in communities without them. However, because ORCA interventions must build the social assets of smallholders, they give smallholders the opportunity to gain more than just the ability to meet the technical demands of ORCA. Smallholders will also be more prepared to meet other livelihood challenges the future

Table 2.2. Needs of organic agriculture initiatives for social assets[a]

Scenarios	Subsistence	Transitional	Cash Cropping[b]
Uncertified			
Needs with socially based solutions	• Group organization for efficiency, learning, soliciting outside assistance and supporting needed group norms • Overall project coordination • Technical and extension services • Research support for organic and other resource-conserving practices	Same as for subsistence scenario, plus • cost-effective access to local buyers and • ways to learn about and meet buyer needs	Same as for subsistence and transitional scenarios, plus • access to formal markets organized so transaction costs are minimized; • organized processes to ensure uniform meeting of quality and other standards as required by formal markets; • organized investment in equipment for value-added processing and social structures to manage such activities; • export services; • processing and packing services; • a supportive policy environment for trade; and • a stable political environment.
Certified			
Needs with socially based solutions	Not applicable[c]	Not applicable[d]	Same as for uncertified, plus • group certification for smallholders, which is the only feasible option for them, so a group must exist to own the certification; • access to affordable national and international certification schemes; • domestic promotion of certified organic produce to raise awareness and create markets; and • an effective policy environment, including support for domestic certified markets and harmonized standards for export markets.

[a] Draws heavily on a similar table in Walaga (2004).
[b] The scenario of high market integration into uncertified markets occurs when farmers adopt organic practices for yield and cost benefits but do not seek the price premiums that require certification.
[c] With no market, certification is not relevant.
[d] For transitional farmers participating in informal domestic markets, certification is unlikely to produce enough benefit to justify the cost. Even for such formal domestic channels as supermarkets, wholesalers and hotels, unless farmers raise a substantial amount of the targeted crop, certification is probably prohibitively expensive. For any groups pursuing certification, the group requirement for the cash crop scenario is relevant.

may bring, such as an increasingly concentrated retail food sector and the further imposition of food safety and other standards. Interventions that build social assets may be particularly valuable in Africa, where case studies show markedly different patterns of involvement by external entities than occur on other continents.

2.2.2 Key roles for developing smallholder capacity

Table 2.3 gives insight into the types of organizations—farmers' group, company, non-governmental organization (NGO) or government agency—most prevalent in ORCA initiatives. The data are from analyses of individual cases from secondary sources (see appendix B for the underlying data). As the table indicates, three key functions are needed, particularly for certified initiatives: initiator-coordinators to manage the overall effort, extension providers for advising farmers on the technical issues of organic production, and exporters and other market service providers. A key conclusion from the following sections on entities that catalyze or support ORCA efforts is that in Africa companies and NGOs performed these functions in the majority of cases. Governments and farmers' groups assisted in relatively few initiatives.

Organic agriculture is rarely adopted spontaneously but rather at the instigation of initiator-coordinators. Initiator-coordinators help farmers to establish structures and systems for successfully producing, monitoring and marketing certified produce. They must teach managerial and technical skills and assist farmer groups in setting up cost-effective internal control systems to ensure that produce meets organic certification standards (Santacoloma 2007). The striking finding for Africa was

Table 2.3. Types of organizations providing the functions necessary for organic agriculture projects by region

		Role (%)[a]											
		Initiator-Coordinator				**Extension provider**				**Marketer-Exporter**			
Region	**No. of cases**	Farmer group	Company	NGO	Gov't	Farmer group	Company	NGO	Gov't	Farmer group	Company	NGO	Gov't
Africa	15	0	45	91	9	0	63	63	13	0	70	40	0
Latin America	16	85	23	46	46	56	22	22	0	62	31	8	15
Asia	17	35	41	35	29	0	27	40	47	19	56	25	13
Total	48	41	37	54	29	16	34	41	25	28	51	23	10

Gov't = government, No. = number.

[a] Percentages sum to more than 100 because more than one entity often perform specific functions in a project. An non-governmental organization and a private company may initiate a project together. Also, case studies did not always specify the entity responsible for a particular role. The percentages in the table were calculated using as a denominator only the projects that stated the entity for the relevant role. See the source table in appendix B for the underlying data.

the complete absence of farmer groups as initiator-coordinators in all 15 ORCA efforts. This compares with 85% of 16 efforts in Latin America initiated by farmer groups and 35% of 17 efforts in Asia. Governments acted as initiator-coordinators in only 9% of African efforts, compared with 46% in Latin America and 29% in Asia. In Latin America, farmer groups most often acted as initiators-coordinators, while in Asia all four types of organizations fulfilled this function in roughly equal proportions. The reasons for these trends are not clear; they may reflect lower capacity in farmer organizations and government agencies in Africa than in Latin America and Asia.

As with their pattern of participation as initiator-coordinators, farmer groups did not provide extension services for any initiatives in Africa or Asia, while in Latin America they provided extension services in 56% of the cases. In Africa, companies and NGOs most frequently shouldered this role, with each providing extension services in 63% of efforts, often with cross-sector partners. In Asia, government entities and NGOs most often provided these services, with each type providing extension to more than 40% of efforts.

Virtually all the reviewed case studies had a specific marketer-exporter participating in the project. In projects promoted by Export Promotion of Organic Products from Africa, identifying an exporter was an indispensible first step toward establishing a project (Forss and Lundstrom 2004, Taylor 2006). Together with extension services, smallholder organic farmers mentioned that marketing—especially being able to do it cost effectively when large numbers of farmer are involved—constituted their most crucial need (Walaga 2004, Giovannucci 2005). Africa stands out also in terms of private companies performing as marketer-exporters in 70% of the projects, compared with 31% in Latin America and 56% in Asia. As with the other roles, farmer groups and governments were noticeably absent in Africa, with no involvement from either in any project. This contrasts with Latin America, where farmer groups most often acted as marketer-exporters, taking on this role in 56% of projects. Asia showed a pattern similar to that of Africa, with companies and NGOs most often acting as marketer-exporters, but with farmer groups and governments taking this role in some instances.

2.2.3 Private company involvement

The relatively heavy involvement of private companies in African ORCA initiatives has both up sides and down. While the private companies bring benefits, conflicts of interest with companies can put farmers in vulnerable positions. On the positive side, private companies can often help smallholders form enduring organizations. The companies can furnish financial and knowledge resources beyond the capability of thinly stretched governments and NGOs. Development efforts that include the participation of private companies have done well at generating innovation. Studies in both Asia and Africa have found that smallholder farmers can benefit from participating in contract farming, an arrangement in which farmers supply produce to companies on contract. The private companies provide supplies, technical support and marketing services to farmers who grow the crops on their own land. Gibbon and Bolwig (2007b) found that certified organic farmers in Africa under contract to produce three different crops generated higher incomes thanks to certification. A study in Asia demonstrated that contract farmers earned greater net income than similarly situated farmers not under contract (Setboonsarng et al. 2006). Of course, these results cannot be generalized, but they show that it is possible for farmers to do well in contract arrangements.

On the less positive side, case studies from China indicated that initiatives with only private companies and no farmer groups saw little of the price premiums from organic certification returned to farmers. Instead, exporters and in some cases government organizations claimed the largest portion of the premiums (Giovannucci 2005). In Latin America, farmer cooperatives have proved key to smallholders' commanding better prices (Bacon 2004). Also, contract farming with smallholders is problematic in many countries in that enforcing contracts is difficult because enforcement costs (e.g., prosecution) are much higher than the value of the contract (Shepherd 2007). In some cases involving private companies, NGOs have taken on the role of negotiating favourable terms for farmers. However, for long-term sustainability, projects should not rely on the continued presence of NGOs (Forss and Lundstrom 2004, Giovannucci 2005).

2.2.4 Farmer groups comprise social assets that can provide multiple benefits

In addition to helping level the playing field where private companies are heavily involved, strong farmer groups can be the keystone for community self-determination, particularly in marketing. Farmer groups may have potential to trim transaction costs sufficiently to allow smallholders to be competitive with large farms. Some specific roles that farmer groups can play in this regard are

(1) negotiating with exporters;

(2) taking command of a marketing strategy that understands the needs of buyers, be they other smallholders in local markets, large supermarket chains or exporters;

(3) organizing alternative outlets more favourable than formal networks;

(4) assembling products in bulk and selling them to buyers at prices higher than would otherwise be the case;

(5) grading and controlling for quality; and

(6) purchasing and managing equipment for postharvest processing.

By organizing into groups, farmers can improve their ability to influence government decisions affecting political, regulatory and economic policy. These policies can have significant impact, both positive and negative, on the performance of ORCA programs, particularly for cash croppers. Parrott and van Elzakker (2003) note that many organic projects in Africa have "fallen by the wayside" due to structural, political and economic challenges. Conversely, Walaga (2004) finds that the successes achieved to date in developing organic agriculture come from economic liberalization policies enacted by many African, Caribbean and Pacific governments. Most governments, particularly African governments, do not have regulations or research policies that support the organic agriculture. The organic sector will not realize its full potential unless explicit government policies and programmes support ORCA and enable farmers to access the required financial, technical and institutional resources (Taylor 2006).

2.3 Human capital

Human capital, specifically knowledge capital, is critically important in managing organic agriculture initiatives because, whereas conventional agriculture is chemical intensive, organic agriculture is knowledge intensive (Walaga 2004, Giovannucci 2005). However, as table 2.4 shows, the obstacles to building this asset are formidable. Moreover, many of the obstacles, such as low literacy and constrained research funding, will likely be beyond the scope of most ORCA projects.

Because of their high knowledge requirements, ORCA initiatives are more likely than conventional initiatives to include components to build this asset. Table 2.4 lists some of the accomplishments of ORCA projects in building

Table 2.4. Human capital: Obstacles and accomplishments toward its accumulation in smallholder ORCA settings

Obstacles to increasing human capital	
	• In developing countries, government extension programs are minimal partly because of cutbacks mandated by structural readjustment programs (Stoll 2002). Most research funds are spent on conventional agriculture (Parrott and van Elzakker 2003, Taylor 2006). • Chemical companies advocate strongly for chemical solutions, which makes farmers more resistant to ORCA (Crucefix 1998, Ferrigno et al. 2005). • Low literacy rates and lack of manuals make it hard to increase individual knowledge and achieve the internal controls required for certification (Walaga 2004). • Lack of integration, or even contact, between practitioners and the research community means most knowledge and expertise on ORCA practices remains the property of the practitioners buried in grey reports (Parrott and van Elzakker 2003).
Human capital accomplishments	
	• Farmer field schools and farmer-led extension programs • Local and international NGO education projects • Continuous learning programmes associated with organic agriculture build knowledge and skills that improve farmers' analytical skills and their capacity to innovate and manage their farms (Hine and Pretty 2006). • Internet access to knowledge hubs maintained by the Research Institute of Organic Agriculture, Rodale Institute and Sustainable Markets Intelligence Center (Giovannucci 2005). • Some farmers say the record-keeping required for certification helped them become more aware of their costs and better able to manage their farms (Giovannucci 2005).

ORCA = organic and resource-conserving agriculture.

knowledge assets. ORCA initiatives should continue to look for effective innovations for building human capital. Doing so is critical for ensuring sustainability once the project is completed and external entities reduce their participation (Forss and Lundstrom 2004).

2.4 Physical assets

Certified organic production requires facilities for processing certified products separately from uncertified ones. Otherwise, the needs of ORCA farmers for physical capital do not differ from those of other farmers targeting similar markets. Table 2.5 lists physical assets that can help smallholders to sustainably improve their livelihoods. Obtaining physical assets is, of course, problematic for poor smallholders. However, ORCA projects can sometimes provide avenues for acquiring at least some of these assets.

Physical resources that subsistence farmers need for ORCA are those that enhance farming productivity, including supplies of nutrients, and materials for controlling erosion and improving water use. Farmers other than subsistence farmers must also acquire these resources, but in addition they need physical assets for accessing markets and/or value-adding activities. With large buyers such as supermarkets, exporters and suppliers for hotels and restaurants imposing on producers requirements for increased standardization, smallholders must cost-effectively meet quality and other demands. In some cases, smallholders with this capacity may earn higher prices, but in many settings such value-added capability is becoming simply the price of admission to the market (Reardon et al. 2005, Garibay 2006, Rundgren and Lustig 2007).

Table 2.5. Physical capital needs for smallholders seeking livelihood improvements

	Subsistence	Transitional	Cash Cropping
Key physical assets needed	• Organic material to replace soil nutrients lost through harvesting • Structures to control erosion and improve water capture as needed under location-specific conditions	Same as subsistence scenario, plus • sufficient transportation infrastructure to reach local markets and • facilities for processing that may improve local marketability	Same as subsistence scenario, plus • sufficient transportation infrastructure to reach distant markets; • processing facilities to enhance quality and food safety so products can meet the standards of formal market channels such as supermarkets; • facilities to enhance capability to add value that can increase incomes; and • processing facilities that can keep uncertified and certified products separated if farmers pursue certification.

ORCA projects can include strategies for acquiring some of the physical assets smallholders need, either through direct donor contributions or, for certified projects, through up-front financing repaid out of price premiums. Projects can leverage investments in farmers' groups by building their capacity either to negotiate effective deals with processors or to purchase and manage processing equipment themselves. This is usually beyond the capacity of individual smallholders. Farmer groups in some of the reviewed cases did acquire their own processing facilities, while others obtained processing services through group contracts or working as contract farmers (IFAD 2003, Giovannucci 2005).

While projects may be able to design in mechanisms for building the physical assets discussed above, the need for transportation infrastructure can present more formidable obstacles. Transportation infrastructure is critically important for projects based on selling to export and distant regional markets. Lack of physical structures such as maintained roads and vehicles, rail links and rolling stock refrigeration, and reliable power supply all raise serious and often insuperable logistical problems for African smallholders wanting to reach distant markets**.** Solutions usually require government investment and cannot be easily addressed by projects alone (Parrott and van Elzakker 2003, Ruben 2005).

2.5 Financial assets: Potential economic impact of organic agriculture on African smallholders

Certified or not, organic agriculture has already made inroads in Africa. Data show that the organic products sector has sustained strong growth in demand, production and area for at least 20 years. Case studies and other analyses demonstrate that in many instances ORCA improved livelihoods by either strengthening food security, raising incomes or both. However, the selection of cases to report appears to be biased towards successful ones.

Projections suggest that the growth in ORCA production will continue. Price data is more ambiguous, as some reports project strong price

premiums and others conclude that competition from more and larger producers is squeezing premiums. Data in the literature are limited, so it is impossible to present comprehensive, up-to-date descriptions for specific crops and locations. Also, differences between conventional and organic prices fluctuate, so it is often difficult to conclude at any particular time whether the price that will be garnered after the long-term commitment necessary to adopt ORCA will cover the cost of certification.

This following section outlines limitations in the data available on organic agriculture, particularly in Africa; the evidence on trends in organic agriculture; factors that influence price premiums; and effects on food security and incomes.

2.5.1 Limitations of available data

No comprehensive set of data on organic production exists. There is no international trade classification for organics in either the Standard International Trade Classification or the Harmonized Commodity Coding System (Giovannucci 2005). Because of this gap, developing accurate, up-to-date descriptions of the status of organic agriculture is difficult, particularly for production volumes, prices and return on investment for organic vis-à-vis conventional products.

The International Federation of Organic Agriculture Movements (IFOAM) publishes an annual survey that attempts to provide comprehensive statistics on the industry. To compile the data, the authors pursue every lead they find for production data. Even with this effort, data are scarce and the 2007 report has no information for most African countries, though the survey notes there is evidence that many of these countries do have organic producers. The survey has no data on production volumes. Data on organic consumption indirectly indicates total global production by providing consumption by country but not production by country. Also, the survey has been unable to successfully quantify consumption in Asia, South America and Africa. Further, the difficulty of collecting the data creates significant lags in reporting. Data in the 2007 survey reflects circumstances as of December 2005 or earlier. The authors of the survey state that to "draw clear conclusions on the potential organic farming has for food security more data than available so far are needed, covering for instance information such as domestic supply with organic food, export volumes and information on yields" (Willer and Yussefi 2007).

Data showing price differences between organic and conventional products for specific crops and countries appear difficult to come by. Neither the EU nor the Food and Agriculture Organization of the United Nations collects data on prices of organic products. The United States Department of Agriculture provides some data on current price differences between organic and conventional products but for limited crops and years. The International Trade Centre recently instituted a bimonthly newsletter that lists organic import transactions for major European markets. Data available for each transaction includes products, varieties, quantities, prices and transport method (ITC undated). This point-in-time information does not provide an overall picture, and prices of conventional products are not included. Food and Agriculture Organization statistics on agricultural prices are not as updated as are the International Trade Centre data. The data do not generally cover uncertified organic production. Because there is more on the certified organic sector, and it is more frequently updated, it may seem to be larger than the informal sector but probably is not (Parrott and van Elzakker 2003). Nonetheless, except as

noted, statistics in this report are for certified organic production only.

2.5.2 Organic production: Farms, area, crops and market channels

The global picture. As shown in table 2.6, sales volumes increased 31% annually, from $10.8 billion to $27.8 billion, between 2000 and 2004 (Sahota 2006). Projections indicate that sales will increase to $40 billion in 2007 (Organic Monitor 2006b). The table indicates that land area reported as organically managed grew significantly subsequent to 2000, from 10.5 million hectares (ha) reported in 2000 (Willer and Yussefi 2000) to 31.5 million ha reported in *Organic farming worldwide 2006: Overview and main statistics* (Yussefi 2006). Europe, South America and Oceania accounted in 2006 for more than 70% of the total organically managed area, but these figures include extensive grazing areas in Australia and South America. The number of organic farmers also appeared to increase rapidly from 188,000 in 2000 to nearly 600,000 in 2006. The figures on area and farmers are only general indications, however, as some changes reflect more comprehensive reporting.

According to data reported by Willer and Yussefi (2007), organic agriculture has considerable potential for improving the circumstances of smallholders in developing countries. One-third of the world's organic land is in countries that receive official development assistance (ODA), and data from IFOAM's global organic survey shows organic farming playing an increasingly important role in many developing countries. Willer and Yussefi (2007) note that, in the light of booming global organic markets, it is likely that organic certification can provide access to international markets for some time to come, particularly for products exported by these ODA recipient countries.

Table 2.6. Sales volume, production area and number of organic farms by continent, reported in 2000 and 2006

Category	Certified organic[a]			% of world total
	Reported in 2000[b]	Reported in 2006	Average annual % change[c]	
Purchases of organic products ($ millions)				
Africa	Not reported			
Asia[d]	250	750		2.7
Europe	6,255	13,700		49.2
North America	4,200	13,000		46.7
Oceania	150	250		1.4
South America	Not reported			
Total world	10,855	27,800	31[e]	
Production area (million hectares)[f]				
Africa	0.02	1.0		3.2
Asia	0.04	4.1		13.0
Europe	3.6	6.5		20.6
North America	1.1	1.4		4.4
Oceania	5.3	12.2		38.6
South America	0.5	6.4		20.3
Total world	10.6	31.6	33[g]	
Number of Farms				
Africa[h]	1,660	119,058		20.0
Asia	9,288	130,000		21.8
Europe	129,092	140,000		23.5
North America	36,539	12,000		2.0
Oceania	1,957	2,662		0.4
South America[i]	9,890	192,927		32.3
Total world	188,426	596,647	36[g]	

[a] Source for organic data is, except as noted, *The World of organic agriculture: emerging trends 2006* (Willer and Yussefi 2006).
[b] Willer and Yussefi 2000. Purchase figures are for only the following: in Asia, only Japan; in North America, only the United States; in Oceania, only Australia is included.
[c] For several areas, large percentage increases reflect improvements in data collection rather than growth alone. Therefore, the change for continents is not very meaningful, in particularly for developing continents, which have the most under-reporting. See Appendix C for the rates of country responses for each continent.
[d] For consistency, data for 2000 reflects 2003 when Japan instituted an organic standard. The figure shown in the 2000 report was $1,200 million, but this included categories not comparable to certified organic categories in North America and Europe.
[e] The purchase data is as of 2004. Therefore, the period for average annual growth is from 2000 to 2004.
[f] None of these figures include areas of wild-harvested plants, which amount to 6.6 million hectares in Africa and 19.7 million hectares worldwide. All numbers include permanent pasture used for extensive grazing. This land-use occupies most of Oceania's organic area, but precise figures are not available.
[g] As the data on production area reported in 2006 are for different years in different countries, this number is a general indicator only, not a precise figure.
[h] Data are missing for many countries, as the *World of organic agriculture* (Willer and Yussefi 2006) did not report data for all African counties. The countries in table 2.9 are those that did report for Africa. Appendix C shows for each continent the percent of countries that reported statistics for this report.
[i] These figures reflect the most recent year for which data are reported for each country. The source includes data only for Argentina, Bolivia, Brazil, Chile, Colombia, Mexico, Peru and Uruguay.

Table 2.7. Area and numbers of farmers practising organic farming in six Latin American countries

	Mexico	Costa Rica	Guatemala	El Salvador[a]	Dominican Republic	Argentina
Area under organic farming (ha)	102,800	7,000	14,700	4,900	44,800	3,000,000
Certified	71,500	3,500	9,000	3,800	43,800	2,684,000
In transition	31,300	3,500	5,700	1,100	1,000	315,800
Organic area as % of total agricultural area	0.1	0.2	0.3	0.3	1.0	1.8
Organic producers, total	33,600	1,700	5,000	n.a.	16,200	1,632
Small organic producers[a]	33,130	1,600	4,950	n.a.	16,068	1,050
Small organic producers as % of all organic producers	98.6	94.1	99.0	n.a.	99.2	64.3
Organic area of small producers as % of total organic area	84.2	53,3	59.7	n.a.	80.0	5.0

ha = hectare, n.a. = not available.
Source: IFAD 2003.

As table 2.7 shows, smallholders dominated organic production in five Latin American countries in the early 2000s, accounting for 50–85% of organic area (IFAD 2003).

Finally, there is evidence that smallholders can compete effectively in certified organic farming (IFAD 2003). The data from a study in Thailand (table 2.8) show that contracting to grow organic rice can be more profitable for smallholders than for farmers with larger holdings. In this study, farms with less than 0.8 ha had profits per unit of area 12% higher than did farms larger than 3.2 ha (Setboonsarng et al. 2006).

Table 2.8. Farm size and profitability of organic rice farms in Thailand

Farm Size	<5 rai[a]	6–10 rai	11–20 rai	>20 rai
All Farms				
Actual profit (per rai)	1,719[b]	1,744[b]	1,723[b]	1,646[b]
Non-Contract Farms				
Actual profit (per rai)	1,374[b]	1,413[b]	1,337[b]	1,276[b]
Contract Farms				
Actual profit (per rai)	2,432[b]	2,076[bc]	2,021[c]	1,866[c]
p-value of profit efficiency between contract and non-contract farmers	0.0276	0.0325	0.1351	0.9902

[a] 1 rai = 0.16 hectares.
[b, c] Same superscript letters across farm size denote homogeneous subsets using the Duncan's multiple range test at the 5% level of significance.
Source: Setboonsarng et al. (2006).

Box 2.1: Organic agriculture in Africa

Certified crops

While statistics are difficult to find, there is evidence that with few exceptions (particularly Uganda) certified organic farming is relatively underdeveloped, even compared with Asia and Latin America. Certified organic agriculture projects operate in Cameroon, Ethiopia, Ghana, Kenya, Madagascar, Senegal, Sudan, South Africa, Tanzania, Uganda and Zambia. West Africa lags behind other regions. While organic agriculture has potential, particularly for tropical fruits, few organic trading links have been established. Key organic products being marketed include coffee in Cameroon, Ethiopia, Tanzania and Uganda; palm oil and fruits in Ghana; and cotton in Benin, Mali and Senegal.

Export and domestic channels

Certified organic farming in Africa takes two main forms: relatively large farms or plantations and smallholder groups that have strong links to export companies. There are some outgrower schemes with large plantations buying additional produce from certified smallholder farms. Most certified production is geared to exports, but certified markets appear to be growing in Egypt, Kenya, South Africa, Tanzania and Uganda.

Certified-formal versus uncertified-informal

Certified organic production is only the tip of the organic iceberg. Much organic production is organic by default, but there is evidence of a far larger agro-ecological movement emerging in Africa. Local NGOs and farmers' groups, as well as development agencies, are adopting organic techniques to improve productivity and address food security. Although West Africa lags behind East Africa in certified production, West Africa is relatively strong in uncertified initiatives promoting rural development, food security, improved soil fertility and the engagement of women.

Sources: Parrott et al. (2006) and Parrott and van Elzakker (2003).

The African picture. Box 2.1 draws on two papers to summarize the status of organic agriculture in Africa, reflecting data collected before 2000.

Table 2.9 shows that of those African countries reporting to the IFOAM *World of organic agriculture* report, Kenya, Sudan, Tunisia, Uganda and Zambia have the largest areas of land under certified organic management, each with more than 10% of all organically managed land in Africa. Uganda has the largest number of farms despite having the smallest share of land among the top five countries, indicating the most substantial involvement of smallholders. Tanzania and Kenya also have large numbers of farms, indicating substantial smallholder involvement.

Table 2.9. African land areas and farms devoted to certified organic agriculture, by country

Country	Land Area by Use						Number of farms
	Arable land (ha)	Permanent crops (ha)	Unknown/ other (ha)	Permanent pasture	Total	% of all African land	
Algeria					1,400	0.14	
Benin	400				400	0.04	650
Burkina Faso	30				30	0	
Cameroon		1,304	5,696		7,000	0.68	
Egypt	15,526	3,801	4,886	333	24,546	2.39	500
Ghana	240	18,892			19,132	1.87	
Kenya					182,438	17.78	30,000
Madagascar		129			129	0.01	300
Malawi					425	0.04	13
Mauritius		150			150	0.01	
Morocco					20,040	1.95	12,051
Mozambique					600	0.06	5,000
Niger					12	0	
Rwanda	30	20			50	0	10
Senegal	53		2,447		2,500	0.24	3,000
South Africa					45,000	4,39	250
Sudan	36,000	164.000			200,000	19.50	650
Tanzania	5,793		50,074		55,867	5.45	30,000
Togo					90	0.01	1
Tunisia	9,515	90,086	24,194	31,529	155,324	15.14	608
Uganda	8,980		92,803	20,217	122,000	11.89	33,900
Zambia	222		187,472		187,694	18.30	2,425
Zimbabwe					1,000	0.10	
Total	76,789	278,382	367,572	52,079	1,025,827	100.00	119,358

ha = hectare.
Source: Parrott et al. (2006).

Table 2.10 shows that significant numbers of African countries together produce a wide variety of certified products. Box 2.2 presents an organic exporter's view of the crops that offer the most potential in organic markets for African producers.

Table 2.10. Certified organic crops produced by African countries

Product group	Countries producing the product
Fresh vegetables	Egypt, Kenya, Madagascar, Malawi, Morocco, South Africa, Tunisia, Uganda, Zambia
Bananas	Cameroon, Ghana, Senegal, Uganda
Citrus fruits, grapes (including wine)	Egypt, Morocco, South Africa
Tropical fruits (fresh): avocadoes, mangoes, pineapples, papaya, etc.	Cameroon, Egypt, Ghana, Madagascar, Senegal, South Africa, Tanzania, Uganda
Dried fruits	Algeria, Burkina Faso, Egypt, Madagascar, Morocco, Tanzania, Tunisia, Uganda
Coffee	Cameroon, Ethiopia, Kenya, Madagascar, Tanzania, Uganda
Tea	Tanzania, Uganda
Cocoa	Cameroon, Ghana, Madagascar, Tanzania, Uganda
Sugar	Madagascar, Mauritius
Cotton	Benin, Egypt, Senegal, Tanzania, Uganda
Coconut oil	Mozambique
Palm oil	Ghana, Madagascar, Tanzania
Olive oil	Tunisia
Groundnuts (peanuts)	Zambia
Tree nuts (cashew, shea)	Kenya, Malawi, Morocco, Tanzania
Sesame	Burkina Faso, Uganda, Zambia, Zimbabwe
Culinary herbs	Egypt, Ethiopia, Ghana, Kenya, Madagascar, Malawi, Morocco, Mozambique, South Africa, Tunisia, Zambia, Zimbabwe
Culinary spices	Cameroon, Egypt, Ethiopia, Madagascar, Malawi, Mozambique, South Africa, Tanzania, Uganda, Zimbabwe
Medicinal and therapeutic herbs and spices	Egypt, Morocco, Namibia, Tunisia, Zambia
Essential oils	Madagascar, Tanzania
Honey	Algeria, Malawi, Tanzania, Tunisia, Zambia
Other forest products	Uganda, Zambia, Zimbabwe
Cereals	Egypt

Source: Parrott et al. (2006).

Box 2.2: A practitioner's view of the African crops with potential in the current organic market

With Europe around the corner, organic produce from Africa can take advantage of short, cheap supply chains. This means that the focus should be on exploiting European potential with only limited attention to the United States, Middle East, Far East, regional and local markets. Organic producers should look to sea freight as the main transport method. African organic producers should grow a mix of crops that does not overly depend on air freight, given consumer concern about food miles and climate change. Where can Africa compete, or add something particularly African, to a growing European market? So far, it cannot compete in organic commodities like soy, sunflower, maize, rice, sugar, palm oil or rubber. While there is organic palm oil in Ghana, organic sugar in South Africa, and possibly organic aromatic rice in Tanzania, these are exceptions. Other regions of the world seem more competitive in producing these commodities.

That said, discerning consumers increasingly like a good story behind the product. Africa can capitalize on its smallholder organic production and provide these stories. And these smallholder farmers are potentially in a strong position with the following products.

(1) **Cocoa**—and not just the beans. Cocoa production can be a major tool to stop deforestation and threats to biodiversity. Work needs to be done to improve quality, flavour (variety), the sustainability of production, certification, marketing efficiency and taxation policies. Lessons learned in organic projects—particularly paying farmers for better practices—can be used to work on carbon sequestration and biodiversity conservation on a much larger scale, for which there is, or soon will be, additional income.

(2) **Coffee.** Ethiopian and Kenyan coffees are two examples of coffees with good market recognition. Ethiopia has potential to become the source of various specialties and, despite its good name, further improve quality. Brand awareness needs to be enhanced so that African coffee is not interchangeable with coffee from other origins. There is potential for coupling organic certification with preserving biodiversity, such as Rwandan coffee marketed to save gorillas. Organic premiums have potential to preserve the last remaining forest coffee.

(3) **Nuts.** Cashew and macadamia certainly do well, and there is room for many other kinds of organic nuts, even where consumers normally regard nuts as already 'natural'. There is plenty of organic-by-default cashew ready to be picked. Good export potential requires developing small and medium-sized enterprises with processing capability and good management. Macadamia supply currently does not meet demand. It is a good crop to grow in association with coffee. Markets are strong now, and Africa can become a market leader.

(4) **Gum arabic and shea butter.** These are very different crops, but certification can bring to both value-addition as well as more sustainable harvesting; reduced bush burning; and the education, organization and empowerment of women. For these crops, organic certification is more a tool to drive a range of changes than just a marketing tactic. However, market demand for organic gum arabic and shea butter is limited.

Box 2.2 (continued)

(5) **Dried herbs, essential oils and spices.** These products are usually more of an add-on than a main cash crop, but they can help farmers capitalize on available labour. A product like honey should have a bright future were it not that local prices are often better than world market prices.

(6) **Fresh fruit.** Fruit can be marketed fresh or as derived products like dried fruit and juices, whether organic or not. Beyond the marketable crop, fruit should be seen as a crop that protects the environment. After farmers plant fruit trees, bush burning declines. Finally, fruit makes important contributions to farm household nutrition. Fruit for export is currently grown primarily on specialized farms.

(7) **Beans, pulses, groundnuts, small cereals, roots and tubers.** Logistics often limit the potential for these crops. More importantly, it is not seen as ethical to export such fundamental food crops. However, combined with agroforestry, organically producing these crops can build organic matter in soils for the long term. This is highly important in Africa. And with firewood in short supply everywhere in Africa, agroforestry can contribute to wood stocks.

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Agro Eco–Louis Bolk Institute, Team Tropics

Bo van Elzakker has worked more than 20 years in projects developing organic exports in Africa. He has assisted in nearly 50 projects with all kind of products, mainly with large groups of smallholder farmers. His organization, Agro Eco, recently merged with the Louis Bolk Institute in the Netherlands (www.louisbolk.org). The new entity provides research, technical assistance and business consultancy services in organic and sustainable agriculture, food and health.

2.6 Studies of organic initiatives in Africa and Latin America: Food security and economic impacts

Even if comprehensive information were available on the difference in prices between organic and conventional produce, the data would not provide meaningful insight into the effects on income and livelihoods of individual smallholders. Such insight requires empirical studies at the farm level on the livelihood effects of conversion to organic agriculture.

Table 2.11 summarizes results on the impact of ORCA initiatives on crop yields, price premiums, net income and food security derived from 11 reports on the effects of 32 case studies of ORCA initiatives, 14 from Africa and 18 from Latin America. Twenty-nine of the studies dealt exclusively with poor farmers[4]. Descriptions of the source reports appear in appendix D, and detailed tables appear in appendix F.

Before examining the results, it is important to note that the number of cases reported on in table 2.11 is small and the methods used in the reports varied considerably. Bias could have arisen in the selection of cases because each of the studies reflects the specific research focus of the author, and the studies report only on operating programs, which are likely to present only successful endeavours. Therefore, the cases described in this section should not be analyzed statistically. The patterns that emerge do not provide any final conclusions but do suggest directions for further inquiry. (Box 2.3 shows some lessons from a study in progress that followed organic initiatives from their inception and so avoided bias.)

The results of the studies demonstrate that in some instances ORCA can outperform conventional and organic-by-default agriculture with respect to yields, net income and food security. Yields improved upon conversion to ORCA in 62% of the 26 cases that reported on yields. Farmers received price premiums over non-ORCA products in 70% of the 20 cases reporting on price premiums. In all 20 cases reporting on price premiums, farmers had obtained certification. Increases in prices paid for certified over uncertified products ranged from 4% to 150%.

Table 2.11. The impact of organic agriculture initiatives on crop yields, price premiums, net income and food security from reports on cases in Africa and Latin America

Factor	Total cases	Cases reporting impact on factor	Of cases with data, those reporting	
			Improvements from ORCA over non-ORCA	The same or worse results from ORCA compared with non-ORCA
Yields	32	26	16 (62%)	10 (38%)
Price premiums	32	20	14 (70%)	6 (30%)
Net income	32	24	19 (79%)	5 (21%)
Food security	32	8	7 (88%)	1 (13%)

ORCA = organic and resource-conserving agriculture.
Sources: See appendix F.

[4] Not all the reports listed the size of farmers' holdings, and those that did were not consistent with one another. Many reports listed only the area planted with organically managed cash crops. Others listed total farm size. Descriptions of the settings for the 32 case studies made it clear, however, that the participating farmers did not have much income or land. Farm size or area under cash crops ranged from 0.87 ha to less than 7 ha.

Surprisingly, there were more cases in which organic farmers realized increases in incomes than there were cases in which they received price premiums. Nineteen of 24 cases with data on net income reported increased incomes while only five of these cases reported incomes the same or lower than incomes from non-ORCA production. The income increases ranged from 4% to tenfold. These cases comprised a mix of

(1) 15 cases of certified production and 4 cases of uncertified,
(2) 3 cases of conversion from conventional practices and 12 cases of conversion from traditional,[5] and
(3) 10 cases that had garnered price premiums, 2 that had not and 7 that did not report on price premiums.

The five cases showing no income increase or a decrease all featured certified production. In all but one case, farmers had converted to organic production from conventional rather than traditional practices. In one case, lower yields offset the price premium. Another case showed a 44% reduction in net income after conversion to organic production of coffee. The author noted: "There appears to be considerable injustice between the extreme preconditions demanded for 'organics' by the largely urban consumer of the industrialized world and the modest rewards received by the organic coffee growers for their strenuous efforts" (van der Vossen 2005). In contrast to the cases without income increase, 12 of the 15 cases with income increases involved conversion from traditional practices. This finding supports the hypothesis that it is more difficult for farmers to benefit from ORCA if they convert from conventional agriculture than if they superimpose ORCA practices onto traditional.

Finally, it is not predictable whether costs will increase or decrease upon conversion to ORCA. In the case studies in which farmers received price premiums, costs do not appear to have caused incomes to decline. Farmers' net income increased in 10 of 11 cases when farmers both received a price premium and information was given about net income. In the one remaining case, the farmer's income stayed the same.

While the case studies summarized in table 2.11 suggest positive results from ORCA initiatives in both Africa and Latin America, table 2.12 shows differences emerging between initiatives in these two regions. The African initiatives show less of an export or commercial orientation than the Latin American ones. African initiatives were more likely to be conversion from traditional management (92%) than were Latin American initiatives (35%) and to display an increase in yields (75% in Africa but only 29% in Latin America). A lower proportion of African initiatives targeted export markets (39%) than did Latin American initiatives (83%). A lower proportion of African initiatives sought certification (46%) than did Latin American initiatives (100%).

If the degree to which studies focus on specific outcomes indicates primary concerns in regions, then African researchers were more concerned with food security, and researchers in Latin America were more concern with price premiums. Half of all African cases reported on food security. Of these, 6 of 7 cases showed improved food security. In Latin America, 17 of 18 cases provided no information on food security effects. In contrast, 17 of 18 Latin American cases (94%) reported on price premiums, compared with 5 of 14 African cases (36%).

[5] As defined in the introduction, traditional agriculture shares with ORCA the minimal use of external inputs and dependence on ecological processes. As noted in the introduction, various factors have caused many traditional farmers to tend toward organic-by-default farming, which refers to farming without using any methods to replenish soil nutrients lost through harvesting. The case studies analyzed throughout this section usually compared groups as 'organic' and 'traditional'. To be consistent with these sources, this section uses 'traditional' rather than 'organic by default' to categorize farming types.

A greater proportion of Latin American studies included information on ORCA effects on income than did African studies. In Latin America, 15 of 18 cases (83%) reported net income data, which only nine of 14 African cases did (64%). However, the African cases performed favourably in regard to income for those that reported on it, with increased income in 89% of the cases reporting, compared with 73% of the Latin American cases.

Table 2.12. The effects of converting to ORCA practices: A comparison of case studies in Africa and Latin America

	Africa		Latin America	
	Number	Percent	Number	Percent
Total cases	14	100	18	100
Management before project				
Traditional	11	92	6	35
Conventional	1	8	9	53
Not farmed	0	0	2	12
Not stated	2		1	
Effect on yield				
Decrease	2	17	5	36
Increase	9	75	4	29
Same	1	8	2	14
Added crop	0	0	3	21
Not stated	2		4	
Price premium received?				
No	2	67	4	24
Yes	1	33	13	77
Not stated	11		1	
Net income effect				
Not increased	1	11	1	7
Increased	8	89	11	73
Decreased	0	0	3	20
Not stated	5		3	
Food security improved?				
Improved by production	6	86	1	100
Improved by income	0	0	0	0
Not improved	1	14	0	0
Not stated	7		17	
Primary market				
Subsistence	2	15	0	0
Local/domestic	5	39	3	17
Domestic/export	1	8	0	0
Export	5	39	15	83
Not stated	1		0	
Certification type				
3rd Party	6	46	16	89
Participatory[a]	0	0	2	11
None	7	54	0	0
Not stated	1		0	

[a] Participatory certification is for national and local markets and consists of a process that builds long-term relationships among smallholder farmers, small enterprises, traders and consumers.

Source: See appendix F.

Table 2.13. The effects of converting to organic practices: A comparison of conversions from traditional management versus those from conventional management

	Traditional		Conventional	
	Number	Percent	Number	Percent
Total	22	100	10	100
Effect on yield				
Decrease	1	5	6	86
Increase	12	63	1	14
Same	3	16	0	0
Added crop	3	16	0	0
Not stated	3		3	
Price premium received?				
No	3	30	3	30
Yes	7	70	7	70
Not stated	12		0	
Net income effect				
Not increased	1	6	1	14
Increased	16	94	3	43
Decreased	0	0	3	43
Not stated	5		3	
Food security improved?				
Improved	7	88	0	
Not improved	1	13	0	
Not stated	14		10	
Primary market				
Subsistence	2	10	0	0
Local/domestic	8	38	0	0
Domestic/export	0	0	1	10
Export	11	52	9	90
Not stated	1		0	
Certification type				
3rd party	12	57	10	100
Participatory group	2	10	0	0
None	7	33	0	0
Not stated	1		0	

Source: See appendix F

ORCA's potential for improving traditional agriculture. Table 2.13 compares results from 22 initiatives that converted to ORCA from traditional management with 10 that converted from conventional management. As expected, conversion from traditional management tended to improve crop yields while conversion from conventional management tended to reduce yields. In conversion from traditional management, yields tended to increase or farmers managed to produce additional crops in 15 of 19 cases in which data were available. In contrast, conversion from conventional agriculture increased yields or produced additional yields in only 1 of 7 cases. Yields decreased in 6 of 7 conversions from conventional management, but in only 1 of 19 conversions from traditional management.

Among traditional farmers converting to ORCA, subsistence farmers and those selling in local markets were better represented (31% of all cases in which traditional farmers converted) than they were among conventional farmers (none of cases in which conventional farmers converted). Traditional and conventional farmers differed in the market channels they pursued, as 89% of formerly conventional farmers sold some or all of their produce through export channels while only 65% of formerly traditional farmers did so. As may be expected given these statistics, all of the conversions from conventional farming obtained 3rd party certification, compared with only 65% of conversions from traditional.

ORCA generally brought higher product prices, whether conversion was from traditional or conventional systems. Net incomes increased in 16 of 17 conversions from traditional agriculture and in 3 of 7 conversions from conventional agriculture.

The data suggest that, for traditional farmers, conversion to ORCA improved food security, primarily through improved food production but also through improved incomes. None of the conversions from conventional agriculture reported on food security effects, perhaps because these households were already food secure.

With evidence that ORCA methods increase yields over traditional methods and improve food security, ORCA appears to offer a feasible option for poor farmers who cannot afford expensive chemical inputs, at least in some circumstances. The results auger well against concerns that the widespread adoption of ORCA may reduce food supplies and worsen food insecurity among the poor. They suggest that some of the adverse affects that have been reported for conventional agriculture can be avoided while strengthening food security.

2.6.1 Likelihood of persistence of price premiums

There is considerable variation in estimates of the relative profitability of organic agriculture compared with conventional agriculture and the size of premiums needed to equate profits between the two. Research on organic agriculture in the US in the 1990s generally concluded that organic farmers need price premiums to make profits comparable to those of conventional farming. On the other hand, university studies at the time found that organic grain and soybean production could be as profitable as conventional even without price premiums because of higher yields, lower input costs and/or a more profitable mix of crops (Greene and Kremen 2003). EU researchers found around the same time that organic farming operations in EU countries needed to earn price premiums of around 33% to compensate for lower yields (Gibbon and Bolwig 2007b). Gibbon and Bolwig (2007b) note that premiums have been falling in the EU and that recent EU data shows a trend toward larger organic operations, possibly reflecting that larger operators survive better as premiums fall. Garibay (2006) stated in a presentation on European markets for tropical fruits that premiums of less than 15% could be realistically expected.

Other researchers find that price premiums for farmers reflect organic supply falling short of demand. This means that the premiums could shrink if supply catches up. It is important to note in predicting trends that premium prices for organic products charged to consumers do not necessarily indicate what premiums farmers receive. Prices of raw materials, which are what African farmers generally sell, show much more volatility than retail prices (Taylor 2006). Finally, Crucefix (1998) notes that farm gate premiums are not usually the cause of high premiums for consumers.

Recent premiums show considerable variation. Taylor (2006) reports that premiums range from 15% for certified fresh vegetables to 300% for some essential oils, cold-pressed oils, honey, and dried herbs and spices. Coffee and tea premiums range from 25% to 30%, and confectionary nuts and fruits attract premiums of around 50–80%.

The size of future premiums depends on supply and demand. A summary on the internet of a proprietary report published in 2006 says it expects organic growth to slow but still show stronger growth than the overall food market at least until 2009. The report predicts that the number of consumers making big purchases of organic foods will not increase. Most purchasers restrict organic buying to a small portion of total grocery purchases (Research and Markets 2006). And, in a proprietary report issued in 2002, the same publisher concludes that, as new food safety measures are imposed on the food chain, certified organic will become less attractive to consumers whose health concerns have driven its growth. If true, this would further reduce the ability of certified organic products to attract price premiums (Research and Markets 2002).

An additional factor potentially influencing demand and prices is the 'eat local' movement, which many organic consumers find appealing. The Soil Association in the UK has campaigned for an organic standard that would ban imports (Research and Markets 2006). Such a prohibition would hurt African farmers growing organic products for export (Gibbon and Bolwig 2007).

There are other views that price premiums for organic products can be ephemeral due to thin and well-contested markets. While price premiums continue to grow in some markets, the future looks cloudy for others as more and larger producers enter the organic niche. Rice and coffee have already seen reductions in price premiums, and promises of high profits may turn out to be misleading (Giovannucci 2005). In any case, as the organic market is 1/100 the size of the total food and beverage market, it is easy to envision mismatches in timing of supply and demand that could cause temporary bumps in price. Consistent with this scenario is the finding by some researchers that much certified produce ends up marketed without the organic label or premium (Giovannucci 2005). A recent study of the reasons that farmers in California, a region with strong organic demand, abandon organic certification noted, among other reasons, difficulty in finding buyers (Strochlic and Sierra 2007). In Africa, a number of organic initiatives have had problems finding exporters willing to invest in what they viewed as risky ventures (Forss and Lundstrom 2004).

In a presentation on organic markets in East Africa, Rundgren and Lustig (2007) offered this range of comments from farmers on prices actually received:

(1) "Pricing of the products is difficult, especially when dealing with both retail clients and wholesale."
(2) "A very small price premium is charged for the organic products."
(3) "The range of varieties sold to supermarkets for good prices illustrates potential for expansion in the domestic organic fruit trade."
(4) "Customers—mainly the big supermarkets—did not pay us satisfactory prices for the produce. We could hardly cover production [costs]."

These findings are seemingly at odds with assertions from several studies that a major benefit of conversion to organic agriculture is that prices are more stable for producers, often established by long-term contract (IFAD 2003). For more discussion on the future stability of price premiums see the section 4.2 below on global food trade trends.

A final point some authors make about market channels is that, while governments encourage pursuing export markets to bring in foreign exchange, more effort should be put into developing local markets for organic products to ensure food security (Parrott and van Elzakker 2003). But little is known about the demand for organic products in developing countries. Rundgren and Lustig (2007) advise that, to develop local markets, the pricing strategy should be to avoid acquiring a reputation for organic products as prohibitively expensive. While it is not clear whether such a strategy would benefit farmers, there is evidence that helping African farmers in subsistence scenarios to increase crop yields is an important means of improving their food security, even if conversion does not increase cash incomes (Crucefix 1998, Hine and Pretty 2006).

Box 2.3: Studies giving unsuccessful ORCA projects a chance for selection offer additional insights

One evaluation of a large organic agriculture initiative that encompassed dozens of projects affecting about 26,000 farmers found generally positive results but with a few surprises. The evaluators randomly selected a sample from all smallholder organic projects in Africa that the Swedish International Development Agency had funded during a specific period. This meant that failed projects had a chance being selected.

Initiatives that succeeded

The projects located in Uganda and Tanzania produced a wide range of crops including coffee, sesame, vanilla, cocoa, pineapple, dried fruits, barkcloth, cashews, honey and essential oils. Although the evaluation did not determine precisely the proportion of farmers that saw increased incomes, field visits suggested that more than half raised production and productivity and all received higher prices. (See appendix G for data on prices.)

The evaluation found that substantially fewer farmers delivered products to exporters than initially contracted to do so. In addition, purchases by the exporters have varied substantially from year to year and from planners' initial estimates. However, the amount of product purchased has generally corresponded with the quantities envisioned, even with far fewer farmers delivering products (see data in appendix G). The evaluation speculates that the number of farmers participating was low because

(1) some farmers who contracted had not yet become certified in time for delivery because not enough time had passed to meet requirements;

(2) farmers chose to sell to an independent trader that bought earlier than the exporter because they needed money; and

(3) farmers elected to grow a different crop than the exporter was buying because they believed they could get a better price.

In some cases, exporters paid a price premium for organic crops but did not market them as such. The authors note: "This is strange as market studies indicated that the organic market is growing more than the conventional one. It was not clear to the evaluator why exporters would purchase organic products, with the higher price implied, and still not export them as organic and thus also get the higher price on the export market."

Box 2.3 (continued)

Organic initiatives that did not succeed

In contrast to the favourable picture from the successful projects, there are a few cautionary reports. One effort in Mozambique failed for multiple reasons: unfavourable weather, an unprepared exporter and internal strife among project staff. Looking at the project after the fact, Coopers and Lybrand concluded:

[B]iological farming requires a higher capacity from the farmer who has to control the biological techniques, especially concerning the timing of its applications; biological farming is considered to be an activity of high risk, dependent on natural conditions with high training and inspection costs; biological cotton can achieve self-sustainability in approx 5 yrs if 1st year costs are treated as non recoverable; the project would probably never have been assumed by a private company because it was a high risk investment with low return in the near future and long term result difficult to predict." (Crucefix 1998)

As the Coopers and Lybrand comment notes, organic initiatives carry a variety of risks. However, documented project failures more often arose from factors such as political instability and unfavourable weather rather than from difficulties related specifically to ORCA practices. (Parrott and van Elzakker 2003, Hine and Pretty 2006). Parrott and van Elzakker (2003) report:

> We have been struck by the number of organic projects that have fallen by the wayside…usually due to structural, political and economic challenges of working in Africa rather than from peculiarities of organic production and certification. Examples are:
>
> - Two of the three sugar plantations in Mauritius that converted to organic production reportedly subsequently abandoned it (agronomic reasons and problems meeting standards).
> - Exports of organic pineapple from several West African countries collapsed because of a failure to find an alternative method to induce flowering after new organic standards were introduced. This made it difficult to plan production or set delivery targets with buyers or shippers.
> - Several initiatives in Madagascar have [ceased] for [many] reasons, including inability to maintain quality control, communication and political instability.
> - Political instability in Zimbabwe and Cote d'Ivoire effectively halted organic exports from these countries, except for vegetables and herbs…
>
> A further element of instability in the certified organic sector appears to be that of maintaining trade relationships with European markets…. Local standard setting and certification schemes may help overcome some of the problems. However, at the same time they will need to be sufficiently rigorous and transparent to maintain support and confidence of importers and consumers in Europe.

Conclusions

Theses were not included in the case study analysis (tables 2.11–2.13) because the report did not offer information segregated by case. The evaluation concludes that there is considerable potential for certified, export-oriented organic agriculture to improve livelihoods in Africa (Forss and Lundstrom 2004).

2.7 Other issues: Gender effects and health

2.7.1 Gender

The potential effects on gender equity need to be carefully considered when designing ORCA initiatives. Projects have shown mixed results on gender equity depending on the specific crops grown, the market channels used and cultural norms regarding land ownership, rights to decision-making, division of labour and rights to income (Setboonsarng 2006, Bolwig and Odeke 2007). Projects must carefully avoid harmful gender impacts while enhancing positive ones (Bolwig et al. 2007).

Many women indicate that ORCA initiatives have improved farm household welfare. Women also report increased stature and feelings of self-worth when they earn additional money or perceive that they are helping to improve the health and well-being of their families (Giovannucci 2005, Bolwig et al. 2007, Bolwig and Odeke 2007). Still pitfalls exist that organic initiatives must guard against. While women generally report that their households benefit from conversion to ORCA, they rarely decide how the additional income is spent, even though conversion can increase their work burden (Bolwig et al. 2007, Bolwig and Odeke 2007).

In many settings in Africa, men own or control the land and control any income arising from it. Customary gender roles often assign management decisions to men, even when women provide much of the labour (Dolan and Sorby 2003). In other cases, women may control subsistence crops, but men control the cash crops. Organic projects that change orientation from subsistence and local markets to cash-crop markets can shift control from women to men. However, in other settings, women and men customarily share decisions, and women may retain control over some of the income (Dolan and Sorby 2003). Where women do not have any say or do not own land, this lack of tenure may leave them with little incentive to take on ORCA to improve the land's fertility and productivity (Giovannucci 2005).

Conversion to ORCA can have mixed effects on improving lives for women because labour consequences can vary. In many settings, women provide much of the agricultural labour even when they do not control the income that their labour generates. In Kenya, women provide 70% of agricultural labour (Taylor 2006). Where organic agriculture intensifies labour requirements and households cannot hire labour, much of the extra burden can fall on women. For some tea and spices in Asia, labour demands on women increased by 40% upon conversion to ORCA (Giovannucci 2005). The extra burden can reduce the time women have for raising their own crops or doing other tasks (Bolwig et al. 2007). Also, when organic conversion involves tasks requiring significant physical strength such as ploughing and digging for soil and water conservation, households headed by women found successful conversion difficult, particularly when they could not hire labour to perform these tasks (IFAD 2003, Giovannucci 2005).

Increased labour requirements for organic agriculture can be beneficial. In some settings these demands create jobs for women in fieldwork, processing, organic certification inspection and other areas. Some organic conversion initiatives in Africa have adopted policies of employing and promoting women in various operations. Paid work increases the social status of women and can help reduce poverty (Taylor 2006). Paid work can have downsides, too, as the daughters of wage-earning women sometimes must take over more domestic chores, reducing their opportunity for schooling (Dolan and Sorby 2003).

2.7.2 Health

An important advantage of ORCA is avoiding health problems from using agrochemicals. Intensive agriculture is sometimes associated with agrochemical pollution, illnesses from exposure to agrochemicals, increased healthcare costs, and death from pesticide poisoning (World Bank 2007). One researcher estimated that pesticide use at recommended levels raises environmental and healthcare costs in the US alone by $12 billion annually, while estimated public and environmental health losses from soil erosion are more than $45 billion annually (Pimentel et al. 2005) Further, there is evidence that problems could be worse in developing countries than in industrialized ones. A report from the World Bank (2007) estimates that 355,000 people die each year from pesticide poisoning. There is evidence that problems fall disproportionately on developing countries where farmers are often illiterate and too poor to afford protective clothing (Parrott and van Elzakker 2003). Moreover, standards and regulations are often weaker in developing countries. In 2000 in sub-Saharan Africa, half the toxic active ingredients in commonly applied pesticides were either not approved or banned in several developed countries. Most of the toxic active ingredients fall into categories of pesticides that the World Health Organization says should not be used in developing countries. Many pesticides are endocrine disruptors that affect hormone systems and can cause birth defects, sexual abnormalities and reproductive failure (Ton 2003).

A long-term comparison study of experimental plots using sustainable and conventional management practices confirmed that ORCA practices such as crop rotations and cover cropping reduced soil erosion, pest problems and pesticide use (Pimentel et al. 2005). Although IFAD's evaluation of ORCA projects in Asia did not include any cases that specifically monitored health issues, anecdotal evidence supported the conclusion that conversion from conventional approaches improved community health. In one case study in the IFAD evaluation, none of the interviewed farmers or farm workers experienced nausea or vomiting after adopting organic practices, though more than half said they experienced such symptoms after working in conventionally managed fields. Another case in the evaluation included an area where pesticide runoff during conventional management caused the hospitalization of several farmers (Giovannucci 2005). A study of 199 organic farmers and 177 conventional farmers in 26 Indian villages found that organic farmers experienced reductions of 10–80% in health-related costs (Vaidya and Partap 2007).

3. A conceptual framework to assess site-specific likelihood of achieving livelihood goals through ORCA projects

Converting to ORCA farming systems can bring benefits to poor farmers, through either changes in farming practices or participation in new markets. Figure 3.1 shows the market integration scenarios described in the introduction and the potential for improved livelihoods available for each. As the figure indicates, farmers can find themselves food insecure in any of the scenarios. For subsistence farmers at the low end of the integration axis, food insecurity comes from low yields. At the high end of the market integration axis, cash-croppers can experience food insecurity when their yields, production costs or product prices result in income too low to purchase sufficient food. Figure 3.1 shows by the green arrows moving rightward and upward that, in general, the highest income potential comes from full integration into formal markets. This conclusion arises from data showing that the farmers earning the highest returns participate fully in formal markets (Narrod et al. 2007). Thus, a strategy for subsistence and transitional farmers can be to target greater market integration at the top of the chart. Food-insecure cash croppers, on the other hand, need to make market integration more profitable but do not necessarily need to change their market orientation. Figure 3.2 illustrates each of the market integration scenarios with a case study.

Table 3.1 lists threshold requirements for farmers' participation at each level of market integration. While few constraints exist for integrating into local markets, farmers must master increasingly sophisticated marketing and organizational skills to move up into the levels with the highest income potential. Doing so requires building the five kinds of capital. However, although integration into formal markets has empirically demonstrated the highest income potential, simply aiming for export markets is not a solution at every site. In some cases farmers have improved their quality of life by moving to less formal markets. In the transitional scenario described in figure 3.2, Argentine farmers found more satisfaction in growing organic produce for local food markets than in exporting tobacco, which they abandoned during a crisis in the tobacco sector (Caceres 2005). In another case, an ORCA intervention helped Kenyan households who historically faced an average of 3 months of hunger per year grow greater quantities of more diverse food, producing a surplus to sell in local markets and using the additional income for healthcare (Hine and Pretty 2006). Such achievements could provide an enormous return on investment for sustainable livelihoods.

As these examples suggest, simply introducing farmers to new technologies or aiming all of them toward more formal markets in a cookie-cutter fashion is insufficient to sustainably improve livelihoods. Farmers need to build assets that support their capacity to analyze their own situation, select goals that are appropriate for their resources, and formulate and execute plans to realize these goals. Such capacity is

required in both organic and resource-conserving agriculture, as shown in table 1.1. Otherwise, as conditions change—whether in climate, product prices, costs of inputs or competitive requirements—farmers may not be able to sustain livelihood improvements. Participatory methods that help researchers work with farmers to identify needs and set project goals can be an important initial step toward developing the skills needed to sustain livelihood improvements (Bingen et al. 2003).

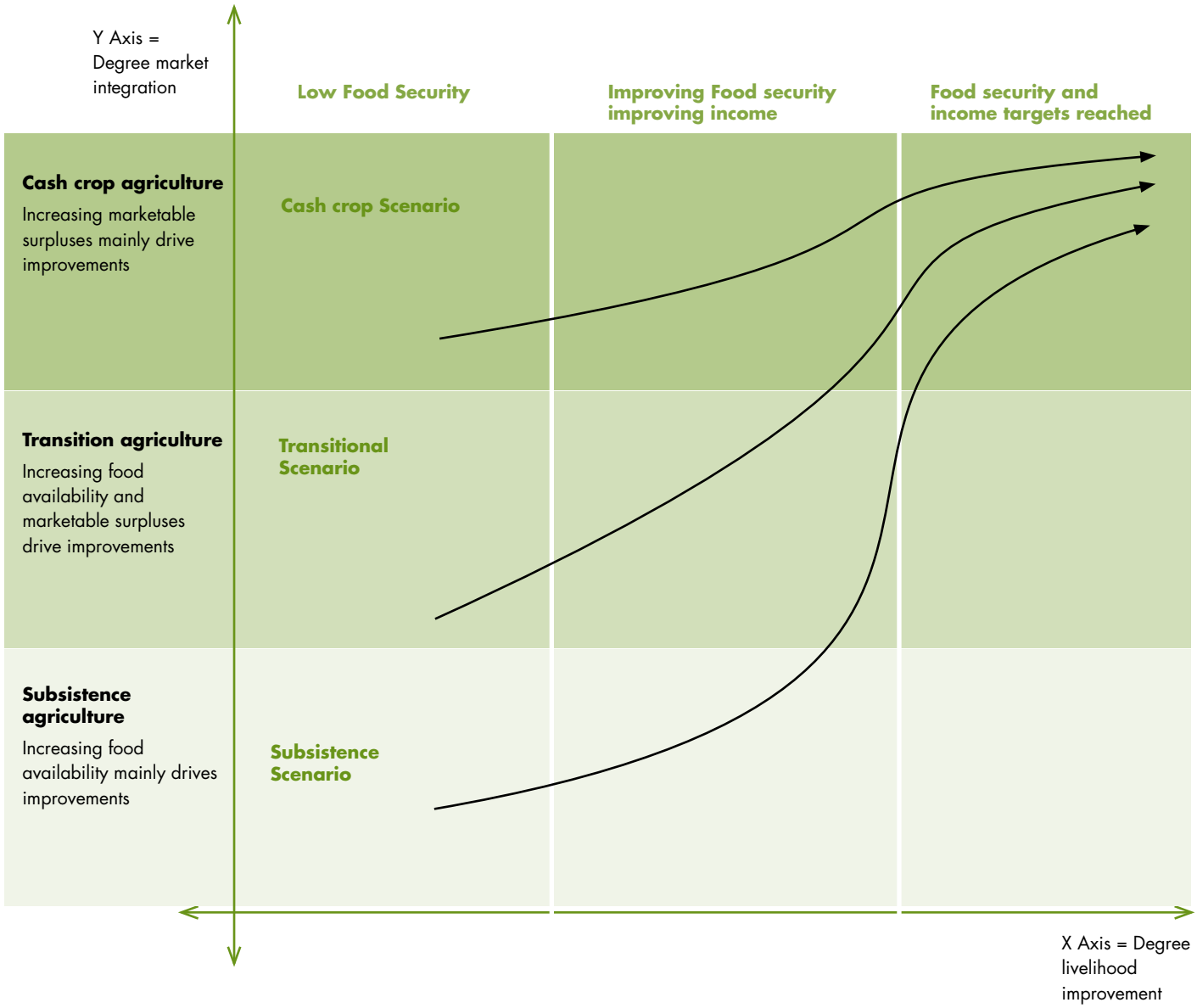


Figure 3.1. Three market integration scenarios for farm communities (individually illustrated in figure 3.2) and pathways from each that can improve food security and incomes.

Subsistence Scenario

Through an ORCA project, an area of Ethiopia moved from complete reliance on emergency food aid to food self-sufficiency plus the production of sufficient surpluses to sell some crops in local markets. The project introduced new vegetable, fruit and tree varieties; promoted organic manures for soil fertility and botanicals for pest control; and introduced veterinary services.

Some 12,500 families achieved a 70% improvement in nutrition and a 60% increase in crop yields. Initially, project staff had to encourage farmer participation through food and work payments. However, as the programme progressed, farmers moved beyond simply conducting activities determined by the project to initiating their own activities. This shift constituted the most encouraging part of the project.

—From the *Food for the Hungry*, a questionnaire administered for the SAFE Research Database 2001 of the University of Essex (Hine and Pretty 2006).

Transitional Scenario

In this ORCA initiative, Argentine peasant farmers converted in the 1970s from traditional systems to high-input tobacco farming for export. However, they abandoned tobacco farming in the face of a crisis in the sector in the 1990s. With the subsequent adoption of ORCA practices, farmers began to produce more food—sufficient to provide for their families and to sell in weekly informal street markets operated by the farmers themselves. The sales are an important source of cash income to replace what the farmers lost when they stopped tobacco farming. The farmers are exercising the entrepreneurial skills and developing the social organization needed to operate in more formal markets, should they choose to do so. They cannot afford formal certification, but they have organized to monitor members' farming practices and product quality. They have a three-part strategy for competing with local shops: (1) sell a diverse line of products unlike what the shops offer, (2) generally agree to charge about 10% less than shops, and (3) maintain an explicit policy of nurturing customer relationships and providing personalized service. Early evidence suggests that the peasants earn slightly less income through this strategy than tobacco farmers. However, because they grow much of their food, the overall livelihood effects may be about the same (Caceres 2005).

Cash Cropping Scenario

Farmers in Uganda began growing cotton for market in the 1940s. In the 1970s, poor prices and unfavourable policy brought cotton farming to an end. This changed again in 1986 when Ugandan farmers began to revive cotton growing. This revival has included certified organic production.

Between 1994 and 2000 the number of Ugandan farmers producing organic cotton increased from 200 to 24,000. These primarily poor farmers adapted such traditional practices as fallowing, crop rotations and natural pest control to produce organic cotton. These organic farmers are reported to obtain higher yields than conventional farmers.

In addition, certified organic cotton generates a 15–20% price premium at the farm gate. Private sector businesses responding to market demand have driven the transition (Walaga 1997 and van Elzakker and Tulip 2000, cited in Hine and Pretty 2006).

Figure 3.2. Case studies illustrating the 3 scenarios facing farmers in Africa.

A strength of ORCA initiatives has been their emphasis on addressing all the assets smallholders need to achieve sustainable livelihood improvements, including focusing on market links (Hine and Pretty 2006). Researchers find that projects that begin with an assessment of market opportunities have stronger records of success than those that do not (Forss and Lundstrom 2004, Best et al. 2005, Davis 2006). Table 3.2a presents a tool that uses a sustainable livelihood lens for assessing the potential of ORCA to improve livelihoods. This tool facilitates evaluating the asset building that farmers need to achieve sustainable livelihood improvement. By focusing on natural, physical, social, human and financial capital, the tool combines consideration of farming system potential with market integration factors and other internal capacity needs. Using the tool to identify the potential for benefit from ORCA also helps understand the flip side: project risk and the intensity of the effort needed to deliver ORCA benefits. Table 3.2b demonstrates the use of the tool through a hypothetical illustration for the subsistence market scenarios. Three other examples are presented in appendix A. The practical application of this framework will require developing measurable indicators for these parameters.

Developing this framework into a rapid appraisal tool can help prioritize communities as intervention targets. Communities lacking many of the required assets, particularly assets over which the community would have only limited control such as transportation infrastructure, would require risky, expensive interventions. A setting such as the one illustrated in table 3.2b for a subsistence scenario may offer a lot of potential gains from an investment that is significant but not less risky. Once the rapid appraisal has identified best-bet situations, the framework can be used to draw up more detailed plans for staffing, costs and estimating the value of potential benefits.

Table 3.1. Three levels of market integration for smallholders in Africa, income potential for each and threshold requirements for participation

	Subsistence farmers	Transitional farmers	Cash-crop farmers
Degree of market integration	Low	Participate in local informal markets only	Participate in formal domestic and export markets
Potential for increasing income from market integration	Low	Medium	High
Threshold requirements for participation	None	Emerging constraints in meeting requirements of quality, safety, consistency of product and regular supply	Must be well organized and able to guarantee safety, uniform quality, consistency of product and regular supply

Source: Narrod et al. (2007).

Table 3.2 A tool for assessing the potential of ORCA projects at specific sites for producing livelihood benefits.

Table 3.2a Conceptual Framework for the ORCA assessment tool showing relative amounts of the assets smallholders would need to improve livelihoods if staying within a specific scenario.

Asset type/attributes needed for project success	Explanation
Natural assets	See section 1.3 for more detailed discussion of assets
Soil quality	The needs for high-quality soil, sufficient water and conditions unfavourable to pests do not differ from scenario to scenario. Farmers will do best in every market integration scenario when they have the best possible conditions regarding these factors. Therefore, the chart shows the same range of need for each of these assets for each of the scenarios.
Water availability	
Environment unfavourable to pests and diseases	
Feasibility of improving production through ORCA	The level for this attribute indicates the feasibility of improving production by increasing the use of locally available, non-synthetic inputs and other ORCA practices. If the use of locally available inputs is already high, it will be difficult to improve yields through ORCA. The sustainable and effective use of local inputs is a goal in all scenarios. Other ORCA practices are discussed in the text.
Social assets	
Social cohesion	This is a precursor for groups. Good social cohesion within the community can indicate potential for groups to effectively operate.
Degree of organization among farmers	If group structures already exist in a community, it shows that farmers have some understanding of collective action and ability to manage it. This is a foundation for forming self-sustaining groups needed for ORCA requirements such as maintaining,= monitoring and quality-control processes and minimizing transaction costs.
Market integration (% community livelihood from selling and/or trading) Minimal needs	This measure provides some insight into the feasibility of certification for raising incomes. If the community is already tied into export markets, it has already overcome many of the obstacles to exporting and can focus on certification issues.
Local market potential Minimal needs	This measure indicates the potential of subsistence and transitional communities to improve their livelihoods without necessarily trying to penetrate export markets. A large gap between demand in the existing local market and the supply available from the communities suggests potential for increased income through production increases and diversification.
Supportive policy and political environments Minimal needs	Informal local markets may be little affected by the policy positions of the government, so policy may not be important to farmers participating in remote local markets. However favourable national economic and agriculture policy, as well as a stable political environment, can greatly facilitate commerce, trade and certification, and they can even catalyze significant growth in local markets.
Presence of marketing support entities Minimal needs	In many successful cases, farmers worked through various entities to get their products into formal domestic or international markets. These entities included exporters, processors and large farming operations that arranged contract farming. The presence of these entities makes exporting, and thus certification, more feasible.

Table 3.2a continued

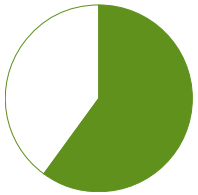
Human assets	
Research and extension support	Research and extension support are important for all three scenarios, as they all need additional knowledge for solving problems.
Farmer-to-farmer knowledge sharing and other self-help initiatives	Because many developing countries do not have the resources to supply adequate extension, and because even the services that are provided often have little expertise in organic production methods, farmer communities often need structures and processes to fill in the gaps.
Entrepreneurial skill and orientation	While not so key in subsistence scenarios, which have limited marketing opportunities, in the other two scenarios the ability to understand buyers' wants and to match them with available resources allows farmers to exploit competitive advantages.
Physical assets	
Transportation infrastructure Minimal needs	This attribute is important for assessing the feasibility of participating in export or regional markets.
Availability of postharvest processing facilities Minimal needs	Products entering formal market channels must meet stringent quality and food safety standards that generally require physical processing structures and equipment. Better prices obtained from formal markets can sometimes pay for acquiring these physical assets, but participation will be much easier if the facilities already exist.
Financial Assets	
Access to credit Minimal needs	Farmers likely need to make sizeable investments for extensive involvement in local markets (transitional activities) and certainly for entering export and certified markets (cash-cropping activities). Certification alone has significant costs attached to it.
High value product and/or price premium potential Minimal needs	This measure indicates whether farmers can expect higher prices than they currently receive either because they grow a high-value crop that will do well in formal markets or because organic (and/or fair trade) price premiums are significant for the crop the farmers produce.
Legend Conceptual need Degree to which farmers in subsistence scenarios need this asset relative to farmers in the other scenarios Degree to which farmers in transitional scenarios need this asset relative to farmers in the other scenarios Degree to which farmers in cash cropping scenarios need this asset relative to farmers in the other scenarios	

ORCA = organic and resource-conserving agriculture.

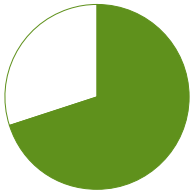
Table 3.2b. Worksheet to assess asset levels relative to the needs shown in the Conceptual Framework (Table 3.2a) when the subsistence scenario is appropriate for the community's livelihood objectives

Capital types and assessment of degree to which target community possess specific assets in the capital type

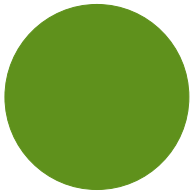
Description of setting	This is a remote, food-insecure community in least-favoured area characterized by soils with low fertility and rainfall conditions less than favourable, but a favourable situation for pest control. An intervention that focused primarily on using ORCA practices to improving agricultural productivity and food security could deliver a very positive return on investment. However, improvements beyond food security might be hard to achieve.
Natural assets	Intervention has good potential for ORCA to improve the food security situation. While this setting does not have favourable natural endowments, the assets have the potential to produce more than the farmers currently harvest. Increases could come from farmers learning to use locally available inputs better. This means that higher productivity is feasible for addressing food insecurity.



Soil quality



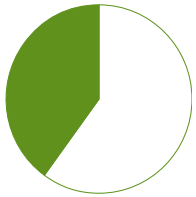
Water availability



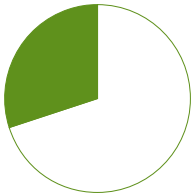
Environment unfavourable to pests and diseases

Feasibility of improving production through ORCA

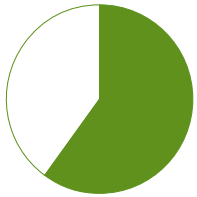
Social assets	The community has good social cohesion, and farmers have developed mechanisms to disseminate knowledge about farming improvements that would lower the cost of disseminating results from interventions. Market integration is low due to remoteness and lack of infrastructure; however there is much unmet local demand for foods that with some soil improvement could be produced in the area.



Social cohesion



Degree of organization among farmers



Local market potential

Presence of marketing support entities

Supportive policy and political environments

Market integration (% community livelihood from selling and/or trading)

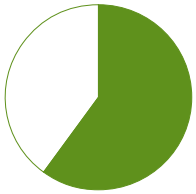
Asset level the community **possesses** relative to that needed to reach targeted livelihood improvements within a subsistence scenario

Amount of the asset a project **must build** for the community to reach targeted livelihood improvements within a subsistence scenario

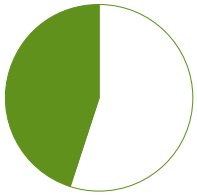
There are minimal needs for this asset for a project seeking to improve livelihoods within a subsistence setting.

Human assets

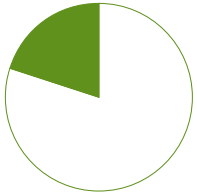
The community has some research support, as a local NGO has worked with farmers to devise practices that would provide better results. Therefore, a good local partner is available. There is a tradition of farmers sharing information and helping each other. Because of the lack of surplus production and marketing outlets, entrepreneurial orientation is low.



Research and extension support



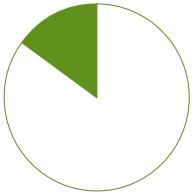
Farmer-to-farmer and other self-help initiatives



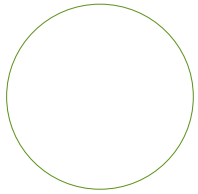
Entrepreneurial skill and orientation

Physical assets

The community has few transportation options beyond a once daily bus and roads are poor. There are no postharvest processing facilities.



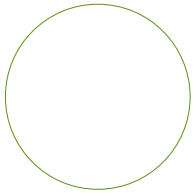
Transporation infrastructure



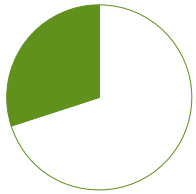
Availability of postharvest processing facilities

Financial assets

The farmers have no access to credit. They may have the ability to produce a crop that recently showed some potential in the regional market, but the community has somewhat marginal rainfall for this crop.



Access to credit



High-value product price premium potential

Asset level the community **possesses** relative to that needed to reach targeted livelihood improvements within a subsistence scenario

Amount of the asset a project **must build** for the community to reach targeted livelihood improvements within a subsistence scenario

There are minimal needs for this asset for a project seeking to improve livelihoods within a subsistence setting.

4. Meta issues: Global trends in certification and consumer food markets

This section depicts global trends that form the context in which smallholders operate. It explains how these trends can affect smallholder benefits from organic agriculture.

4.1 Issues involved in pursuing organic certification

Certification is necessary for gaining access to formal certified organic markets that pay a price premium (IFAD 2003) and can impose significant complication and cost. Projects seeking to help farmers benefit from certification need to work both with farmers and with institutions involved in certifying and exporting organic products.

4.1.1 Working with farmers

Projects must have the capability to manage the complexity that certification brings. Moreover, to ensure the long-term sustainability of the initiative, projects must leave farmers able to manage certification on their own. These capabilities include the following.

Organizing farmer groups to obtain certification. As discussed above in the section on social assets, group certification is usually needed because individual certification can be prohibitively expensive. However, organizing and maintaining effective farmer groups is very difficult (Bingen et al. 2003, Santacoloma 2007).

Selecting the best certification schemes for the setting. The specific requirements for obtaining certified status are beyond scope of this paper. Generally, however, in the EU and US, products labelled for sale as certified organic must have obtained verification from a certification body that the practices used to grow them complied with regulatory standards (Barrett et al. 2002, Kilcher 2006). EU regulation 2091/92 created harmonized, organic standards for EU countries, but the rules for organic products imported into the EU are such that each country can somewhat opaquely impose its own standards (Barrett et al. 2002, Kilcher et al. 2006). Therefore, nearly every country with attractive certified markets has its own legal framework and standards for certified organic labelling. This means organic initiatives in developing countries need to know which countries they will sell to before they seek a certifier.

Selecting a certifier is important because some certifiers' labels carry much more weight with consumers than others. Because of this, the choice of certifier may influence market success. In many cases, however, the exporter for an initiative and not the smallholders will chose the certifier. In any case, the choice of exporters and certification schemes needs to reflect strategic approaches to marketing (Barrett et al. 2002, Santacoloma 2007).

Certifier selection determines the agronomic practices farmers can use. Projects must take care that a selected certification scheme does not impose prohibitions that will not work in the

project setting. In some areas of Rwanda, for example, coffee berry disease may preclude any certified organic production because the disease currently has no effective organic controls. In some cases, however, one set of standards may be impossible to meet while another can be workable. There are a number of standards for coffee that could bring higher prices and show other benefits, such as fair trade certification or Rain Forest Alliance Certification, which claims to protect "wildlife, wild lands, workers' rights and local communities" (Rainforest Alliance 2009). In the IFAD (2003) study in Latin America, many farmer groups that received increased prices had obtained both organic and fair trade certification. To really be on top of certification, farmer groups must have the capability to evaluate the net benefits of the various certifications, compare them, and decide which one(s) will produce the best net value. Their members need to have some understanding of these issues.

Choosing among alternatives: Third party certification, contract farming or reputational strategies. Aside from seeking certification through a group, smallholders have two other paths to certified organic markets. One is to enter into contract farming arrangements. In these arrangements, a contractor obtains the certification and ensures that the contracted farmers meet certification standards, often supplying technical assistance and inputs. As mentioned above, contract farming is more common in Africa than in Asia and Latin America. The other, less-common path is to pursue a reputational strategy by which farmers earn price premiums because of their good reputation among consumers rather than because of certified organic labels.

Determining the best alternative for a specific site adds another layer of complexity to projects. There is little comprehensive research comparing the advantages of each. Contract farming, in particular, offers a daunting array of considerations and schemes without definitive answers on the best options for specific settings (Sartorius and Kirsten 2007). A key benefit of contracting for smallholders is that it can reduce costs and provide access to markets, technology, and capital, among other benefits (Kirsten and Sartorius 2002). In certified organic production, the contractor often has more experience than do local farmer groups in managing certification and negotiating better terms and prices with buyers (Setboonsarng et al. 2006). Disadvantages include loss of autonomy, increased production risk and the greater market power of contractors giving them the ability to earn a higher proportion of the product price than would otherwise be the case (Kirsten and Sartorius 2002). A reputational strategy can avoid the direct costs of certification and works well in markets when consumers are close to producers and have confidence in the quality of the produce. This strategy worked for organized smallholders in Argentina even without a price premium for the uncertified produce (Caceres 2005).

Developing a financing method to pay certification costs. Certification programs usually require annual inspections of farms exporting certified organic products. In many cases, the inspectors come from the importing country. This makes certification costly for smallholder organizations, which usually must pay all certification costs (Forss and Lundstrom 2004). Research in smallholder projects in India and Thailand found that certification costs for rice absorbed up to 9.0% of production costs and 3.4% of gross income (table 4.1). Table 4.2 shows that for vegetables and fruit in Brazil and Eastern Europe, certification costs accounted for 2.6–11.0% of production costs and 2.0–5.5% of gross income. A case study in Costa Rica found that,to cover certification costs, farmers would

have needed a 38% higher farm gate price than they actually got (Lyngbaek et al. 2001).

Giovannucci (2005) found in several Asian initiatives that certification costs did not threaten the viability of any project except for a few with the poorest farmers. In most instances, a donor could be found to pay for certification up front, or the costs could be financed from price premiums. A case study in Uganda, on the other hand, suggested that certification costs may be a greater impediment in Africa than elsewhere because of very small farm sizes and low incomes (Gibbon and Bolwig 2007b).

Table 4.1. Costs and returns of organic certified rice production in four case studies in India and Thailand

Case study / Costs	Indian case study 1	Indian case study 2	Thai case study 1	Thai case study 2
Ongoing cost ($/hectare/year)[a]	444.00	238.00	213.70	135.00
Production/ongoing cost (%)	100	81.5	91	92
Certification/ongoing cost (%)	0	8.8	9	8
Marketing/ongoing cost (%)	0	9.6	0	0
Gross income ($/hectare/year)	796	678	547	562
Ongoing cost/gross income (%)	55	35	39	24
Certification/gross income (%)	0	3.1	3.4	1.7
Gross margin	1.79	2.84	2.55	4.16

[a] Exchange rates: $1 = 40 Thai baht = 44 Indian rupees.
Source: Santacoloma (2007). (Santacoloma 2007)

Table 4.2. Costs and returns of organic certified fruit and vegetable production in three case studies

Case study / Cost	Brazil case study 1	Czech Republic case study 2	Hungary case study 3
Setting-up cost ($/hectare/year)[a]		900	740
Operating cost ($/hectare/year)	1,887	5,171	611
Production cost (%)	35	88.7	90
Certification costs (%)	11	2.6	4
Marketing costs (%)	53	8.7	6
Gross income ($/hectare/year)	3,863	6,850	748
Setting-up costs/gross income (%)		13	98
Operating cost/gross income (%)	49	75	81
Certification/gross income (%)	5.5	2	3
Gross margin	2.04	1.32	1.22

[a] Exchange rates: $1 = 2.5 Brazilian reals = Euro 0.79.
Source: Santacoloma 2007

Keeping records. Certification imposes record-keeping requirements significant enough that, according to a study in Asia, some smallholders complained that keeping records took time needed for crop production. On the other hand, record keeping is an important skill for improving business management. The Asian study also reported that some smallholders found that their record keeping improved their production management (Giovannucci 2005).

4.1.2 Working with institutions

Many researchers and development practitioners claim that the following changes in certification regulations and practices could help smallholders to improve their incomes.

Greater harmonization of import standards among developed countries. The differing standards among countries are seen as barriers to trade for smallholders in developing countries. While data demonstrate that smallholders can penetrate organic markets in developed countries under current standards, farmers would clearly have wider access to markets and thus not be so much at the mercy of thin markets if they could sell to the entire EU, rather than to individual countries (Walaga 2004, Hine and Pretty 2006, Setboonsarng 2006, Setboonsarng et al. 2006).

National and regional standards for Africa. African governments could help simplify certification for African producers by enacting uniform legal and regulatory frameworks. This could give African countries greater bargaining power in bilateral and multilateral negotiations with developed countries and regions, as well as in such fora as World Trade Organization meetings.

East Africa adopted the world's second regional organic standard in 2007. The East African Organic Products Standard became the official standard for Burundi, Kenya, Rwanda, Tanzania and Uganda. Its development drew on intensive, inclusive and transparent regional consultation with participation from representatives of the national standards bodies, national organic movements and organic certifying bodies of interested countries. The standard replaces five separate standards that had existed in the five countries. Supporters of the new regional standard believe that the plethora of previous standards was a technical barrier to trade and collaboration in the regions. The developers expect that the East African standard will boost organic trade and market development in the region, raise awareness of organic agriculture among farmers and consumers, reduce transaction costs, and create a unified negotiating position to help East African organic farmers win access to export markets and influence standard setting in developed countries (Walaga 2004, East African Community 2007).

Some advantages of national and regional standards include the following:

(1) **Promotion of more appropriate agronomic practices.** As agricultural conditions in Africa differ from those in temperate climates, standards need to reflect the differences. For example, EU limitations on how natural pesticide sprays can be used fail to address the alarming rate at which pests can multiply in tropical countries. This enhanced need for natural pesticides that can be used directly on plants should be reflected in organic standards (Barrett et al. 2002, Walaga 2004).

(2) **Potentially lower costs.** With national or regional standards in developing countries, inspectors could be locally based, reducing costs.

(3) **Enhanced African ownership of organic agriculture.** Currently, developed countries dominate the setting of the organic standards that farmers in developing

countries must meet to participate in international markets. African farmers' lack of voice can impede their sense of ownership of organic farming, which can make the standards feel like a new form of colonialism (Parrott and van Elzakker 2003, Walaga 2004). Certainly, certification standards need to reflect the desires of consumers, and nearly all organic consumers are in developed countries. More discussion between certifiers and producers could help to simplify procedures, reduce costs and give producers a greater sense of ownership.

(4) **Development of local markets.** Local certification gives farmers a much more affordable option than international certification (IFAD 2003, Walaga 2004, Taylor 2006). Local certification also gives new options to local consumers, who may prefer organic products but not have access to those with labels from foreign schemes. The limitation of local standards is that demand for certified organic produce in most developing countries is weak, though little research has been conducted to find out if there is demand for certified produce in Africa.

These advantages could potentially benefit African smallholders. Still, to be effective in international markets, national and regional standards will need to be sufficiently rigorous and transparent to retain the support and confidence of importers and consumers in Europe (Parrott and van Elzakker 2003). According to Taylor (2006): "Few stakeholders understand export market regulations adequately enough to properly grasp the limited potential for national or regional standards for international trade. This limitation stems from the current reality that in order to gain acceptance in the export market, producers must follow international standards. To date, the potential to get acceptance for [African] national standard[s] in the United States, European Union and Japan has been limited." Consumers and retailers thus prefer to rely on a narrow range of trusted standards that have proved themselves in the past (Humphrey 2005). Therefore, if new African standards were established, promoters would need a marketing effort backed by performance to convince consumers in the US, EU and Japan to trust the new standards.

Finally, those promoting national and regional standards need to consider whether to pursue governmental action to create legal and regulatory frameworks. While official governmental frameworks may put African products on a more equal footing with developed countries' products, government standards are not always workable. At the same time, there are many examples of private standards already working successfully. These options may be preferable to government intervention (Taylor 2006).

4.2 Trends in the international food trade that affect small producers in developing countries

4.2.1 Will the entry of large retailers into organic markets narrow price premiums?

IFAD, which finances smallholder organic projects in Latin America and Asia, predicts that strong growth for organic products will continue (IFAD 2003, Giovannucci 2005). Acknowledging that past performance is not necessarily a good indicator of future trends, Giovannucci (2005) asserts that product lifecycle theory suggests that, in the US and EU, certified organic markets have moved beyond the awareness stage, in which consumers need to be informed about products, to the growth stage. In the growth stage, dramatic increases arise in distribution market channels. There is also

heightened competition that stimulates greater product variation. However, strong retail prices may not prevail.

The certified organic market continues to be erratic, appearing at times to slow and then to experience surges. In 2002 and 2004, significant quantities of certified organic meat and dairy products had to be marketed without certified labels and their associated price premiums. However, by 2006 nearly all certified organic foods including meat and dairy products were in short supply (Organic Monitor 2006a).

In this context, China has made major inroads into the certified organic market and is poised to make more. From 2000 to 2006, China went from 45th to 2nd place in area under organic management. In 2005–2006 it added 12% to the world organic area, contributing 63% of the world increase in organically managed land. By 2010, China expects one-third of its productive agricultural land will be under organic production. China has followed an organic strategy based on first developing a national standard that allowed Chinese farmers and consumers to learn the benefits of agriculture with low chemical use. Farmers used that experience to develop expertise in meeting international certification standards. China is now in a strongly competitive position to actively pursue organic export markets (Paul 2007).

These trends occurred against a backdrop of dramatic changes overtaking the food sector. Giant retail firms have developed a dominant presence in worldwide food markets. Of the world's 15 largest retail firms in 2003, 12 operated super- or hypermarkets (Coe and Hess 2005). Sexton et al. (2007) show that, in the vertically related, highly concentrated food sector in developed countries, developing country producers can have trouble earning profitable returns. Firms with market power in processing and retailing are able to capture most of the benefits of tariff reductions on agricultural commodities, so developing country exporters do not benefit substantially (Sexton et al. 2007). Another study notes that suppliers in developing countries risk pressure from large companies in the increasingly concentrated European food market. Concentration gives these companies the ability to claim a portion of the returns that would accrue to the producers in less concentrated markets (Humphrey 2005).

The entry of large retailers such as Carrefour and Walmart into the organic market has raised concerns about their impact on production and farmers. Some observed changes include lower prices, higher debt loads (Hall and Mogyorody 2001, Milestad and Hadatsch 2003), marginalization of small producers by large producers, and 'conventionalizing' organic field crops through extensive mechanization, high capitalization, specialized cropping patterns and enlargement of farms (Buck 1997 and Milestad and Darnhofer 2003, both cited in Knudsen et al. 2005). Walmart intends to keep organic prices within 10% of conventional prices, raising the question of what this ceiling may mean for price premiums to smallholders (Warner 2006).

4.2.2 Will the rise of supermarkets make it difficult for smallholders to integrate into formal food markets?

Many organic initiatives have used projections of price premiums to justify interventions that promote smallholder adoption of certified organic standards. But other trends suggest that in the future adapting to various standards may be a requirement for smallholders simply to gain access to any markets. First, as incomes rise in a country, the proportion of the population shopping at supermarkets also rises. Supermarkets are growing throughout the developing world:

(1) In South America, East Asia (excluding China and Japan) and north-central Europe, supermarkets' share of the retail food market increased from 10–20% in the 1990s to 50–60% in the 2000s.
(2) In China, India and Russia, supermarkets showed 20–40% growth rates in the early 2000s.
(3) In Kenya, Zambia and Zimbabwe, supermarket penetration in the 2000s has equalled that in South America in the 1980s, and the supermarket share of the sector is growing (Reardon et al. 2005).

When supermarkets claim more of the retail market, wholesalers shift toward specializing in supplying supermarkets, as do farmers. According to Reardon et al. (2005), supermarket procurement follows an evolution from individual stores handling procurement to the heavy use of specialized and dedicated wholesalers, often using contracts for a preferred supply system that can include technical assistance and credit. Increased supermarket procurement raises private standards for quality and safety. These standards enhance efficiency and lower retailers' transaction costs (Reardon et al. 2005). The differences in standards for traditional markets and supermarkets imply that producers may need to make substantially different investments in technology and organization when supplying supermarkets. The growth of supermarkets generally excludes small processing and food-manufacturing firms from acting as suppliers because of the lower transaction costs of one-stop shopping with large suppliers that can meet all of the supermarkets' needs.

Nonetheless, evidence suggests that smallholders can continue to sell in these formal distribution channels if they develop competitive advantages in the areas that matter to supermarkets. According to Reardon et al. (2005), a general tendency remains for supermarkets to source, where possible, from more capitalized farmers who can meet the retailers' requirements. The good news for smallholders is that, in all regions, medium-sized and smallholder farmers dominate as sources of fresh produce, whether directly or by way of preferred suppliers. But these small and medium-sized farms are highly capitalized in terms of physical, human and organizational assets (Reardon et al. 2005). This trend will likely continue. In the World Bank vision of agriculture for development, production is mainly by smallholders, who often remain the most efficient producers, particularly when supported by producer organizations. However, smallholders must find ways to capture economies of scale in production and marketing, otherwise labour-intensive commercial farming will take over these functions. Even where large farms dominate organic production, there may still be benefits for the poor in terms of increased employment on such farms (World Bank 2007).

These trends clearly point to the need for development programs to help smallholders build the kinds of capital they need to access these markets, particularly where such access is identified as a way to alleviate poverty (Reardon et al. 2005). Where possible, development initiatives should help smallholders analyze what changes they can make that will produce the greatest market returns. In some cases, changes in both the mix of crops grown and market channel used can bring better results. One study in Guatemala showed that farmers with the capital to grow lettuce—a niche crop—could make several times more per hectare if they sold to supermarkets rather than through traditional markets. However, farmers selling tomatoes—a commodity crop—earned about the same net returns whether selling to supermarkets or traditional market wholesalers (Reardon et al. 2005).

Development initiatives need to help smallholders' build their capacity to meet standards as they change. The retail food sector in developed countries has tended in the past decade toward domination by fewer large retailers and their increased ability to oblige farmers to meet ever-growing lists of production and processing requirements (Dolan and Humphrey 2000). Standards imposed by governments and quasi-governmental organizations, such as sanitary and phytosanitary standards established through the World Trade Organization, have created obstacles for farmers from developing countries exporting to developed countries (Henson and Loader 2001). Observers have perceived these as barriers to entry that will ultimately exclude smallholders from lucrative formal and export markets. However, evidence from a study of more than 400 Kenyan farmers of French beans suggest that smallholders can meet EU food safety standards and make significant income gains when they do (Asfaw et al. 2007).

4.2.3 Local markets offer alternatives to smallholders

Although policy makers often focus heavily on developing export crops and markets, local markets can offer several benefits. Accessing local markets does not present the obstacles that export agriculture does. It does not require the investment in and knowledge of transportation infrastructure, relationships with exporters, the ability to meet international standards or the sophisticated marketing knowledge that profitable access to export markets requires (Giovannucci 2005). In addition, focusing on local markets can allow farmers to hone skills in organic production, certification and quality management that they will need later to tackle the more demanding export markets (Giovannucci 2005, Taylor 2006, Paul 2007). Further, Hine and Pretty (2006) and Crucefix (1998) report many examples of ORCA conversions generating surplus yields over organic-by-default practices in Ethiopia, Kenya, Malawi, Tanzania and Uganda (Appendix D). Selling these surpluses through local markets provided additional income that helped poor farmers improve their livelihoods. In urbanized areas, demand exists even for organic products distributed through a variety of channels including farmers' shops, farmers' markets and integrated tourist operations (Rundgren and Lustig 2007).

China is pursuing a multi-strand organic strategy that includes 'Green Food' certification for domestic markets that claims to ensure residue-free food and a standard that eventually earned international certification. The domestic standard allowed China to raise the bar on its agricultural quality. Now, some Green Food farmers are moving to certified organic production, while Green Food is targeted to become the basic standard for Chinese agriculture. With this strategy, China has seen extremely rapid expansion of domestic organic markets (Paul 2007). In addition, expanded local markets can increase opportunities for local value addition offering higher income (Hine and Pretty 2006).

5. Enablers of livelihood improvement

5.1 Complements needed for sustainable paths out of poverty

While technologies that increase yields help end food insecurity, they have not been able to do so alone (Hine and Pretty 2006). Smallholders need other capacities as well—capacities that build assets in the five types of capital identified in the sustainable livelihood framework: natural, physical, human, financial and social. Projects designed to build pathways out of poverty should systematically address the factors that most limit returns on these types of capital (de Janvry and Sadoulet 2005).

ORCA initiatives offer a way to integrate activities that contribute to all five types of capital, but they are themselves complicated processes (IFAD 2003). ORCA initiatives require interventions akin to juggling a number of balls at once. The balls include assisting smallholders to

(1) create and maintain viable producer associations;
(2) implement supply chain processes that facilitate full traceability from farm to point of sale;
(3) preserve the sustainability of natural assets;
(4) organize research on organic production methods, especially on improving and maintaining soil fertility and controlling pests and diseases;
(5) convert to ORCA and learn to work with ecological processes to maintain yields;
(6) find ways to transport products nationally and internationally, as well as provide the means to segregate, collect and store certified organic products;
(7) find processors and exporters and other market outlets;
(8) develop into marketers and improve their business skills and decision making; and
(9) understand consumer values and standards in importing countries and the necessity of using production and marketing practices that meet them (IFAD 2003, Forss and Lundstrom 2004, Giovannucci 2005).

Moreover, projects need to help farmers not only with the tasks listed above, but they must also ensure that farmers develop the skills to handle them on their own and adapt to future changes after projects have ended. The complexity of certified initiatives prompts IFAD to recommend that development practitioners undertake them only "where absolutely the largest possible number of necessary and contributing factors for success are in place" (IFAD 2003).

Figure 5.1 depicts how accumulating the five types of capital can help farmers move toward greater market integration. At each stage of market integration, higher accumulation of one type of capital can drive increases in the other types, improving livelihoods. Capital accumulation eventually becomes sufficient to enable farmers to handle the next, more complex stage of market integration. An implication of

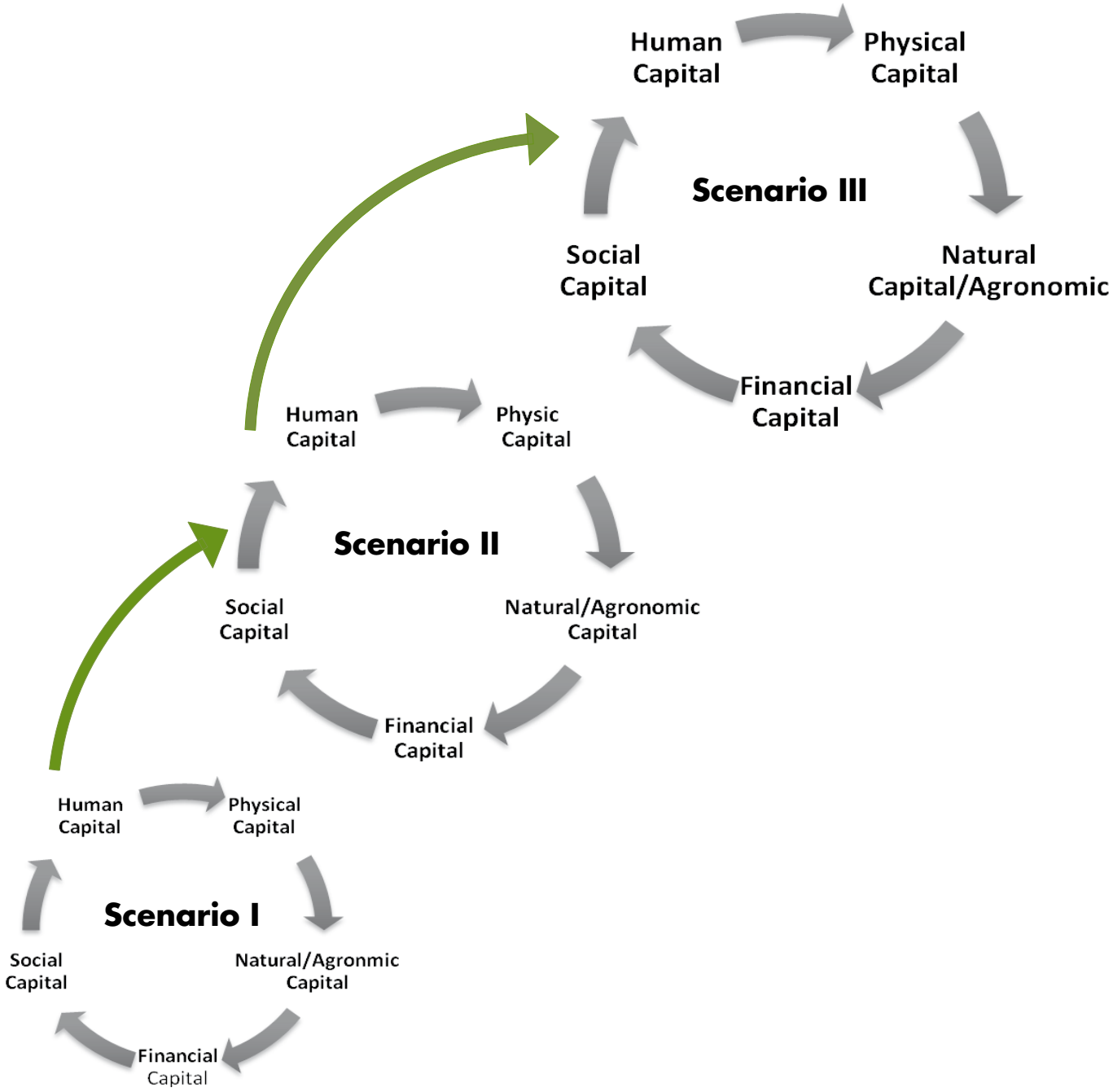


Figure 5.1. Transit from one farm scenario to another with increased market integration fueled by the accumulation of the five types of capital.

the figure is that, when smallholders take on building assets to move their households from subsistence to transition, they start to build assets needed to take advantage of the upside income potential of full integration into formal markets.

5.2 Natural and agronomic assets: Improving skills to analyze, innovate and manage farming systems

Achieving sustainability requires having the agronomic capital to produce enough food and fibre to meet human needs without compromising the future productivity of the natural resources that generate this production (Shennan 2008). The phrase 'adaptive management' refers to the capacity to maintain the balance between productivity and conservation in the context of the many changes that occur in physical conditions (e.g., climate) and social conditions (e.g., markets and policies) (Blackmore 2007, Walcott and Wolfe 2008). Experimentation, learning and understanding ecological processes are key attributes of adaptive management (Hagmann and Chuma 2002, Mog 2006).

Adaptive farm management is a key skill required for successfully implementing ORCA initiatives. Such initiatives usually involve integrating traditional and scientific knowledge and joint problem-solving by researchers and farmers to improve smallholders' capacity to manage complex agro-ecosystems (Giovannucci 2005, Hine and Pretty 2006). But such initiatives are very knowledge intensive. Whereas conventional farmers may simply need to know the recommended fertilizer rate and apply it, organic farmers need to understand fertility management processes sufficiently to try different methods and find the best ones for achieving optimum production within the limits of their farms' natural resources.

Adaptive farm management has shown promise in enhancing farmers' ability to achieve good agronomic results without degrading natural resources. For example, soil improvement projects in Africa have taught farmers about soil processes and how to experiment to find methods best suited to individual farmers' conditions (Defoer 2002, Hagmann and Chuma 2002, de Jager et al. 2004). A project in Zimbabwe helped the poorest-performing farmers reach within 4 years nearly the same productivity as the best-performing farmers in the area. Further, resource management improved overall, and some resource-conserving practices were adopted by 80% of the farmers (Hagmann and Chuma 2002). Elements of adaptive farm management judged to have contributed to the success in Zimbabwe included

(1) a methodology for discovery and experiential learning, creating curiosity and a spirit of trying new methods;
(2) a way to value farmers' own knowledge, showing that complementarity between farmers' knowledge and scientific knowledge contributes to better understanding among scientists and their research partners and raises farmers' confidence in their ability to find solutions; and
(3) measures to enhance farmers' creativity, leading farmers to engage in finding solutions rather than wait for solutions from elsewhere.

Projects that enhance farmers' capacity to adaptively manage help ensure that the practices implemented will produce benefits relevant to farmers' needs. This is because the farmers participate in setting project and research agendas. Such participation can contribute, in turn, to high adoption rates. A project in the Philippines used an adaptive management approach that included a flexible, farmer-led

program of research. Local farmers continuously interacted with scientists in identifying and testing technologies for improving resource conservation. Impact assessment determined that the approach contributed to the programme's remaining relevant and successful with high rates of participant uptake (Mog 2006).

Enhancing adaptive capacity is intimately tied to the ability to learn and innovate. Since 1980, an increasing number of projects have proposed participatory learning components. Participatory learning is characterized by the presence of means for individuals to meet, interact, learn collaboratively and take collective action. Participatory learning approaches have produced successes, but results are mixed overall, according to a review by Muro and Jeffrey (2007). A project in East Africa that specifically tested both participatory learning and more conventional, science-based approaches found that each one had strengths depending on the task at hand. The most successful strategies switched between approaches to match the demands of specific circumstances (German and Stroud 2007). The study concluded that more research aimed at improving learning processes is needed. Finally, both the East African and the Philippine studies found significant benefits from conducting research and development together, rather than as sequential efforts (Mog 2006, German and Stroud 2007).

The implications of the foregoing discussion are as follows:

1. ORCA projects that help farmers to understand ecological processes and continuously experiment to best capitalize on these processes will enhance their capacity to adaptively manage their physical resources.
2. By working jointly with farmers to determine questions for experimental research, researchers will ensure that solutions provide tangible benefits to farmers. This will improve the likelihood that farmers will adopt the solutions, including resource-sustaining ones.
3. ORCA projects should include research to discover the most effective learning methods for the different situations farmers face. This is particularly critical since limited resources do not allow researchers to work directly with all farmers. Methods must be found to mainstream such learning, perhaps by incorporating adaptive farm management into extension efforts.

5.3 Social assets: Building the capacities of farmer groups

5.3.1 Farmer groups

Effective farmer groups can help smallholders capitalize on advantages they may have over large producers and overcome disadvantages. Farmer groups are a virtual necessity for smallholders not in contract farming who seek organic certification. Direct costs such as annual inspections make certification prohibitively expensive for individual smallholders. Group certification allows costs to be spread over many farmers, lowering costs to individuals. However, the mechanisms that allow the lower costs depend on farmer groups' developing and maintaining internal control systems for meeting organic standards. Official inspectors can rely on the controls rather than inspect every farm (Santacoloma 2007). By sharing knowledge and experience, group members can help reduce training costs required for meeting certification standards.

Farmer groups are important for meeting other challenges that smallholders face in addition to organic certification. As structural adjustment

programs have dismantled state support for agriculture, private service providers have not stepped in to fill technical expertise gaps as they were expected to do. Instead, farmer groups proliferated and began to fill the gaps. Membership in farmer groups in the developing world reached an estimated 250 million by 2007 (World Bank 2007). These groups have the potential to improve smallholders' chances of successfully selling in formal domestic and export markets, even as supermarkets and other global players increasingly dominate these channels. Some specific ways that farmer groups have helped improve livelihoods include

(1) facilitating the development and exchange of knowledge when extension services are lacking;
(2) improving production and postharvest quality and food safety controls,
(3) spreading across group members the costs of learning how to assess marketing options, effectively choose among them and participating appropriately after making the choice (Bacon 2004, Giovannucci 2005);
(4) strengthening farmers' role in negotiations with organizations such as research institutes, as farmer groups can help make such organizations more accountable for the services they provide (World Bank 2007);
(5) providing a way for smallholders to have a voice in developing agricultural policy, which is important for governments in developing countries trying to stimulate genuine agricultural growth (Poulton et al. 2006);
(6) reducing transaction costs, especially for input distribution and product marketing, so that large retailers and intermediaries can afford to do business with smallholders;
(7) accessing outside resources, including development assistance, credit and extension support;
(8) improving bargaining power for better prices;
(9) conducting research experiments for resolving pest, irrigation and watershed problems; and
(10) jointly managing common resources such as forests (Hine and Pretty 2006).

Projects that can help develop groups' capability to deliver these benefits can contribute substantially to improved, sustainable livelihoods for smallholders, even as the structure of agricultural markets evolves. However, creating effective groups among smallholders has proved very difficult (Bingen et al. 2003), to the point that Giovannucci (2005) recommends using the existence of groups as a key selection criterion for choosing sites for organic initiatives. Several obstacles can limit group effectiveness. Groups can be co-opted to serve the ends of powerful individuals rather than the community at large. In trying to serve all farmers in a community, groups can find it difficult to exclude members who do not comply with obligations. Better performers end up subsidizing poorer performers, weakening rewards for efficiency and innovation as well as draining resources and morale. Farmer groups often have difficulty maintaining the degree of professional knowledge they need because individual members cannot always cover this role while attending to their own needs. In addition, there is a perception that, in Africa, farmers and farmer groups are not strong enough to play an active role in the value chain (Rundgren and Lustig 2007). Finally, while farmer groups in villages are numerous and often effective, they are rarely federated across villages, preventing them from effectively engaging in large-scale activities. Some notable exceptions are the National Smallholder Farmers' Association of Malawi, which has 100,000 members and implements many large-scale activities to benefit its members (ACDI VOCA 2008). Another example, the Kilimanjaro Native Coffee Union, collects and markets coffee from 96 primary societies representing 150,000 smallholder farmers (EPOPA undated).

Projects need to be designed in ways to limit these potential drawbacks (Hine and Pretty 2006). Focusing on developing basic skills, and not just technical solutions, has shown some success. A review of cases in Cameroon, Mali and Mozambique found that programs to build self-reliance, organizational and management skills, and social capital succeeded in improving the capacity of smallholder farmers to initiate and sustain trading relationships (Bingen et al. 2003). Such programs took longer to produce tangible results than did those focusing exclusively on either facilitating farmer's access to goods and services for a target commodity or promoting improved technologies. However, the skills gave communities the ability to succeed beyond the life of the projects (Bingen et al. 2003). Creating smallholders' capacity to access markets or continue to participate in them requires more than these basic skills. Initiatives also should address

(1) the need to establish and maintain a clear focus on activities that yield tangible benefits to farmers;
(2) ensuring that needed skills and resources are available to farmers;
(3) developing independence, good governance structures and leadership accountability;
(4) determining how to support farmer groups without creating dependency;
(5) lobbying governments and other influential entities to eliminate policies disadvantageous to smallholders;
(6) assisting farmer groups in dealing with situations where governments interfere with their operations, e.g., by interfering with recruitment or removing redundant staff or by not allowing groups to set prices (Poulton et al. 2006, World Bank 2007);
(7) conducting research on effective methods for building farmer groups; and
(8) ensuring the development of managerial capacity for sophisticated value chains and for participating in high-level negotiations.

5.3.2 Building social assets for improving supply chains

Smallholders often display competitive advantage in farm productivity, as well as in organic agriculture because of its relative labour intensity. However, they do not have competitive advantage in delivering products to markets—particularly formal domestic and export markets—because of low volumes, high transaction costs and the need for skills to meet the demands of formal markets (Narrod et al. 2007, World Bank 2007). Table 5.1 shows the increasingly difficult demands that farmers must meet as they move from traditional to formal markets. As formal markets can yield returns far higher than can informal markets, it is critical that smallholders access them (Narrod et al. 2007, World Bank 2007). To do so, smallholders need groups to build the social assets, including relationships with business institutions along the supply chain, that can lower transaction costs and strengthen other abilities needed to participate in transitional and formal supply chains. Some institutional arrangements that have enabled smallholders to participate in these supply chains are the following:

(1) Collective action by farmers with support from public-private partnerships has helped smallholders overcome barriers imposed by international food safety standards. For example, a private marketer worked with a cooperative in India to reduce its 80% rejection rate for grapes bound for Europe. Cold chains and precooling facilities that the cooperative purchased through public funds proved to be critical enablers for bringing rejection rates below 10% (Narrod et al. 2007).
(2) Trade networks provide market identity through standards such as fair trade or organic. The networks include mechanisms for smallholders to ensure they meet standards and connect with

Table 5.1. Three types of markets and their characteristics

Market characteristics	Traditional local fruit and vegetable markets	Emerging modern urban domestic markets (supermarkets, tourist hotels & restaurants, educated affluent consumers)	Export markets in industrial countries (retail markets, modern food services)
Food safety control	Little consumer awareness or concern Little private effort Government control.	Emerging consumer awareness and concern Retailers try to control and sell 'safety'.	High consumer concern High retailer requirements imposed on suppliers
Standardization, grading, supply	Virtually absent Irregular supply	Emerging importance of grading, stable supply	High requirements of grading, consistency, supply schedule
Supply-chain organization	Supply-driven Transaction-based Little or no net benefit from coordination Little durability in relations among private actors No technical cooperation	Efforts by retailers to control quality, safety and reliability of supply Net financial benefits from coordination still fragile Emerging coordination, occasional technical support	Strongly demand driven Durable relations within supply chain, often on contractual basis Cooperation among buyers, exporters, growers regarding technology, information and sometimes regarding finance
Price for grower and consumer	Relatively low Limited willingness to pay for quality and safety	Moderate Moderate willingness to pay for quality and safety	Relatively high High willingness to pay for quality and safety
Value added	Very low	Low to moderate	Moderate to high
Trust between buyers and sellers	Not very important	Of emerging importance	Crucial for long-term successful relations
Competitiveness depends mainly on…	Supply at low cost	Sufficient quantity of improved quality	Efficient, effective coordinated supply chains handling large quantities Flexible response to changing demand Market and product innovation
Participation of smallholder producers	No constraints	Emerging constraints in meeting requirements of quality, safety, consistency of product and regular supply	Only if well organized in outgrower schemes and able to guarantee safety and uniform quality

Source: Adapted from Narrod et al. (2007), citing the World Bank (2006).

exporters that service retail outlets used by targeted consumers. Fairtrade Labelling Organizations International is one example. In 2003, this network included hundreds of companies and more than 800,000 producers in over 40 countries (Bacon 2004). Export Promotion of Organic Products from Africa (EPOPA) is another type of trade network. EPOPA organizes smallholders to meet certified organic standards, builds networks that connect the producers to exporters, and assists in contracting and monitoring all aspects of production and sales (Forss and Lundstrom 2004, EPOPA 2009).

(3) Contract farming and preferred supplier relationships are systems by which contracting entities agree to buy from smallholders all produce that meets contract standards. Contract farming is much more efficient if farmers are organized in groups, and sometimes it is feasible only with groups. Groups take on key functions such as assembling and grading produce and distributing inputs, thus reducing transaction costs.

5.4 Human Assets

This section discusses two aspects of the knowledge component of human capital that agricultural projects must address to sustainably improve smallholder livelihoods. The first aspect concerns the 'how', identifying the processes by which farming communities create, use and disseminate knowledge that strengthens them. The second aspect concerns the 'what', examining what knowledge particular smallholder communities need and generating it. ORCA projects can address both of these aspects, thereby enhancing communities' capacity to develop sustainably.

5.4.1 Strengthening knowledge processes

Knowledge is recognized as a primary source of innovation, wealth creation and sustainable competitive advantage at many scales (Harris 2001, Nonaka 2005, Davenport 2005). In the context of knowledge processes, innovation is defined as "any knowledge (new or existing) introduced into and used in an economically or socially relevant process" (OECD 1999). At the country scale, governments develop national programs to increase innovation capacity (OECD 1999). At the farm community scale, smallholders must build their capacity to innovate to enable participating in markets beyond traditional local ones. According to one study, Ethiopia's strategy for reducing poverty includes raising farm productivity and increasing the commercialization of surpluses. Spielman et al. (2008) concluded from cases in 10 Ethiopian farming communities that achieving these goals requires fostering innovation in institutional approaches for enhancing the ability of smallholders to exchange knowledge. The researchers concluded that weaknesses in Ethiopia's institutional system for innovation have contributed to its low annual rate of agricultural growth per capita of only 0.48% from 1996 to 2005.

The Green Revolution achieved its successes through a linear model of agricultural innovation with scientists developing new technologies that extension services then delivered to farmers (World Bank 2007). While this model worked in Asia in the past, many researchers believe that a broader, more interactive network is required today for Africa. In particular, close relationships among researchers, suppliers and buyers are important sparks to innovation (Cohen and Levinthal 1990). Spielman et al. (2008) found that innovators in smallholder communities in Ethiopia had greater access to sources of knowledge, information, inputs and materials

than did non-innovators. By contrast, non-innovators operated in environments that had less connection to such outsiders as researchers and commercial operators. In the communities' knowledge networks, public service providers played a central role in disseminating information about products, productivity, inputs and credit but did not play a strong role in developing market links or disseminating market information. Surprisingly, private providers also had a similarly minimal role related to market links and information. NGOs with government ties, as well as international NGOs and the community organizations that they helped establish, turned out to be the main entities providing the bridges between the various stakeholders that were needed to catalyze innovations for successfully functioning in markets (Spielman et al. 2008).

ORCA projects often explicitly create conditions needed for building knowledge assets. First, ORCA targets knowledge and innovation as factors of production. It seeks new institutional models that embrace a wide range of actors by integrating traditional knowledge, joint problem solving and farmer-to-farmer exchanges (Giovannucci 2005). Crucefix (1998) noted the need for ORCA projects to involve diverse institutions, concluding that while projects often originate with a single institution, eventually they must harness the resources and commitment of numerous stakeholders, from both the private and the public sector. In particular, ORCA's market orientation often leads projects to place high priority on linking with private sector organizations from downstream in the value chain (Forss and Lundstrom 2004, Giovannucci 2005).

This ORCA orientation toward linking cannot resolve all issues, however. In developing countries, there are often gaps in the range of entities to link to. Among cases studied in Asia and Africa, the need for reliable technical support was critical for smallholders converting to ORCA (Crucefix 1998, Giovannucci 2005). However, in many developing countries, research and extension are underfunded, especially since the imposition of structural adjustment programs (World Bank 2007). Further, national research priorities can reflect a systemic bias toward conventional agriculture. In regions with functioning extension services, organic initiatives that can support training in organic methods and help strengthen systems for delivering such training could be very valuable, particularly as universities and extension workers often have little background in or funding for ORCA (Crucefix 1998, Parrott and van Elzakker 2003, Giovannucci 2005). Farmer-to-farmer extension methods and demonstration projects have had some effectiveness in filling extension gaps in some settings (Crucefix 1998, Giovannucci 2005).

Smallholders also need the knowledge assets that enhance their capacity to innovate. According to Spielman et al. (2008) efforts that should be mounted to building innovation capacity among smallholders must occur at international or national scales. The primary efforts are

(1) strengthening such national organizations as universities, private firms and research organizations;
(2) creating policies that strengthen cooperatives, extension providers and other organizations that facilitate smallholders' capacity to innovate; and
(3) establishing policies to mediate between universities, private firms and research organizations.

These efforts involve finding ways to promote better cooperation and coordination among public organizations at all levels and new players in the system, such as private industrial

companies, cooperatives and civil society organizations (Spielman et al. 2008). The World Bank's *Development Report 2008* echoes the call for increased coordination among the actors that influence agricultural research and development agendas in developing countries. The report notes NGOs' unique advantages as bridging organizations to facilitate these efforts (World Bank 2007).

Public-private partnership has shown promise for improving the innovation capacity of smallholders. According to the *Development Report 2008*, the most successful partnerships develop value chains with farmer, public and private organizations all playing roles. In one model, an international donor organization employed private organic consulting firms to help smallholders in Tanzania set up and manage certification processes and comply with certification standards, as well as to connect the smallholder producers with exporters. Together, the consultants operated as a single entity: Export Promotion of Organic Products from Africa. EPOPA was designed so that consultants build smallholders' capacity and then withdraw after 3–4 years. EPOPA has worked with nearly 60,000 farmers in farmer groups, achieving good success in building groups that operated effectively even after assistance was phased out (Forss and Lundstrom 2004).

Another model for helping smallholders improve knowledge systems for production and marketing involves the direct participation of private businesses that themselves process or market farm products. For example, Giovannucci (2005) reports that arrangements in China between farmer organizations and private trading companies have created opportunities for market-oriented organic agriculture. The trading companies add to the smallholders' knowledge networks, funnelling information to the smallholders that they could not access in other ways. However, in poorer parts of the country, trading companies have excessive market power. With weak farmer organizations, few opportunities to achieve economies of scale and little experience with marketing, farmers in these areas operate at a disadvantage and receive fewer benefits from their organic production (Giovannucci 2005). It is impractical to expect farmer groups to have members with sufficient time or expertise to do all business, marketing and quality-assurance tasks needed to participate successfully in markets beyond local boundaries. Most groups therefore partner with firms that specialize in such functions.

In addition to providing production and marketing services, some formal partnerships focus on research and development for stimulating innovation. Creating formal arrangements for research and development gives farmers a voice in decision making and increases researchers' accountability to the farmers (World Bank 2007). Even so, farmers' voices can still be drowned out by more powerful players. To improve the chances that such partnerships enhance smallholders' ability to innovate, lead NGOs can design projects that strengthen farmer organizations, as mentioned above. Projects should include elements of negotiation support. For example, a project giving forest dwellers support in negotiating land rights provided them with solid scientific information and other assistance toward developing strategies for negotiating with powerful stakeholders. This kind of support is likely to be important for smallholders in many other settings (ICRAF 2005).

Additional promising steps for improving smallholder knowledge systems include (1) using participatory research methods that can come up with location-specific solutions to agronomic, processing and marketing problems

(World Bank 2007) and (2) developing networks among smallholders and outside resources to build knowledge assets and heighten innovation capacity.

5.4.2 Improving knowledge content

In addition to including measures for building knowledge processes, development projects need to help smallholders acquire specific knowledge content. As mentioned above, farmers' greatest need for knowledge in ORCA initiatives has been for location-specific solutions to such agronomic goals as controlling pests or improving yields (Crucefix 1998, Giovannucci 2005). Second on the list for farmers in Asian ORCA projects was marketing knowledge and promotion knowledge (Giovannucci 2005).

Whether they use ORCA or not, smallholders need business and marketing skills to innovate as necessary to meet buyers' requirements and to participate in formal markets. Specifically, they need to acquire marketing, organizational development, and self-help knowledge so they can perform the necessary tasks (Reardon and Berdegue 2006, Santacoloma 2007, Spielman et al. 2008).

Certified organic projects require that smallholder organizations learn the business-operating skills needed to handle scheduling, processing, logistics and quality control to comply with certification standards (Santacoloma 2007). Giovannucci (2005) found that Asian farmers converting to ORCA also needed to learn how to trade with urban retailers and exporters or how to find and negotiate partnerships with traders. Other entrepreneurial skills that farmers in Asia needed for innovating to improve their livelihoods included competencies to

(1) analyze which products they can produce, the quality they can attain, and the packaging and processing they can deliver;
(2) choose whether to focus on domestic or export markets;
(3) select appropriate market channels and develop marketing plans;
(4) map chosen market channels to understand buyers' purchasing patterns and behaviour to estimate current and future market attractiveness;
(5) develop methods to ascertain customers'—including large institutional customers'—needs and factors in their perceptions of value; and
(6) determine a plan of action to meet them (Giovannucci 2005).

Interventions must ensure that famers understand the ways of business enough to negotiate favourable terms with providers. They must build, diffuse and adapt management know-how (OECD 1999).

Helping smallholder groups to increase their knowledge in these areas can improve farmers' ability to succeed not only in organic markets, but more generally in dealing with changing market environments. Research indicates that, even as large firms take over greater shares of the retail food market, smallholders can sell to them if they can meet the retailers' demands that supplies be consistent and of high quality (Caceres 2005, Reardon et al. 2005). Other factors affecting large buyers' perceptions of value include producers' contract compliance, reliability of supply, product traceability, processing capability including freezing, and ability to meet product specifications and continuously improve quality (Garibay 2006). The knowledge required to develop an understanding of target markets and create marketing plans can help even in local markets. When the market crashed for the tobacco they traditionally produced, smallholders in Argentina discovered they could build a loyal clientele at local farmers' markets by forming close

relationships with customers and catering to their desires for high quality and good service (Caceres 2005).

There is considerable evidence that helping smallholders to build business skills helps them to function successfully in markets. However, sustainable development projects that include this component are more often exceptions than the norm (Spielman et al. 2008). The organizations likely to take lead roles in development initiatives often do not themselves have the knowledge needed to ground others in business and marketing skills (Giovannucci 2005). In addition, learning and then performing the tasks required to successfully market crops often requires more time than farmer group members can volunteer. Finally, in some cases smallholders need basic arithmetic and literacy to successfully learn and apply production and market lessons (Bingen et al. 2003). ORCA projects should include research to identify what knowledge is most critical to smallholders to sustainably improve livelihoods. This research should extend to improving methods for farmer groups to build and maintain entrepreneurial knowledge in ways that enhance their ability to meet changing technical and market conditions (Rundgren and Lustig 2007).

5.5 Physical assets

Serving increasingly distant and sophisticated markets requires greater physical capital. Raising investments in international and national infrastructure, such as is required for sea, air and road transportation, is well beyond the capacity of development projects for farming communities. However, raising the stock of assets needed for postharvest processing can be within the scope of community initiatives. Initiatives often need to help farmers acquire funding for postharvest processing assets. In addition, initiatives should help smallholder communities develop the internal capacity to manage the equipment, put systems into place that equitably spread the costs and benefits of the equipment and its operation among users, and adapt operations and equipment capabilities to changing market trends (Davis 2006).

As discussed above, farmer groups undertaking certified organic agriculture must have the physical assets needed to meet organic standards. Certified organic rice, for example, must be stored separately from other stocks and be kept clean and dry enough to avoid pest infestations. Bags for packaging must be clean, and workers must observe food safety rules. While the physical resources needed to meet these requirements enable certified organic processing, they also provide a foundation for more value addition within farming communities. As work by Ruben (2005) shows, the more value addition that occurs in a country, the lower the rate of child malnutrition. Further, smallholder groups that can cost-effectively deliver products with high-quality postharvest treatment can increase their competitiveness in formal markets, even as supermarkets take over larger shares of local markets. To the extent that such processing can better meet customers' definitions of value, it can also contribute to success in informal markets (Briz et al. 2007, World Bank 2007).

Projects delivering the following components could improve smallholder livelihoods by better positioning them in the market as they become more standards driven:

(1) Training smallholders to manage postharvest activities, including developing strategies for obtaining postharvest equipment through purchase or partnership. Smallholders can lack even basic skills for managing postharvest processing, including literacy, understanding markets for their products, grading, and organizing packaging materials, controlling transportation

logistics, and tracking shipments and arrivals (IFAD 2003).

(2) Researching to find better technical solutions to protect shelf life, quality and safety using methods and substances allowable under certification standards (IFAD 2003, Plotto and Narciso 2006).

(3) Facilitating relationships with entities that can offer credit for the purchase of equipment for postharvest value addition and develop the skills smallholders need to acquire and manage credit (Hine and Pretty 2006, Spielman et al. 2008).

(4) Helping smallholders to compare the costs and benefits of owning postharvest processing equipment versus hiring the processing services with others. When buying or forming partnerships can offer more benefits, smallholders should have the capability to negotiate advantageous contract terms.[6]

These components would benefit smallholders by adding value to trade for cash, even if premiums for organic certification sometimes ceased to exist.

6. Conclusions and research needs

6.1 Conclusions

This review focused on studies of contributions to livelihoods from ORCA initiatives. It did not analyze the literature on specific technologies or practices, which would be its own comprehensive study. We found very few studies of livelihood effects of ORCA initiatives that used (1) rigorous cost-benefit analysis, (2) consistent methodologies that allowed generalization of results or (3) methods of selecting samples that would yield insight into the likelihood of farmers succeeding with ORCA ventures if they chose to embark upon them.

Nonetheless, the literature contained cases showing that ORCA has provided positive results for poor smallholders in Africa and that this occurred in most of cases reported. Where farmers previously practised organic-by-default agriculture, improved livelihoods came from increased yields that accompanied ORCA implementation. In other instances, particularly where farmers obtained certification of their organic crops, incomes rose.

Research suggests that specific practices alone usually do not improve livelihoods. A strength of ORCA initiatives is that they often use approaches that address more than practices, building assets in the five types of capital needed to create sustainable pathways out of poverty: natural, social, human, physical and financial. Certified organic initiatives in particular often explicitly address the formation of the five types of capital because they start with a marketing orientation that requires building farmer assets so they can meet buyers' needs sufficiently to compete in formal markets.

Assets in the five types of capital help farmers sustain livelihood increases by augmenting their capacity for adapting to changes that affect farming and markets. Sustaining gains from changes in farming systems requires that farmers have enough knowledge of ecological processes to observe these processes and devise experiments that optimize them. They also need to understand how to integrate their own knowledge with scientific knowledge. The ability to adapt is particularly valuable in the face of changing environmental conditions such at those coming with climate change.

Sustaining livelihood improvements from new marketing approaches means having the ability to adapt to trends in the retail food sector. While certified organic markets have shown strong growth and price premiums for more than a decade, the demand side of the market is very dynamic and complex. First, to keep pace with new technologies and shifting consumer preferences, the rules and regulations governing certified products change and grow more complicated. Also, price premiums and increased access to markets may be reversible. Some large retailers have started to feature certified organic products, which could stimulate consumer demand and thus maintain price premiums.

[6] Economies of scale are, in some cases, driving consolidation that is squeezing out local processors. If smallholders can negotiate effectively, this consolidation need not be bad for improving livelihoods. The consolidation can make it possible to transfer value-added processing from importing to exporting countries. This can create jobs, which improves incomes (Giovannucci 2005, Humphrey 2005).

However, if these retailers come to dominate the organic market, they could exclude many smallholders. Large retailers typically reduce the number of suppliers they use, particularly ones with higher transaction costs, to save money.

Smallholders wanting to access formal markets or remain in them must learn the skills to meet standards and build the institutional and social capacity to do so in a way that keeps transaction costs competitive with those of larger producers. Helping smallholders learn to analyze buyers' needs and figure out competitive advantages in meeting them can improve smallholders' ability to succeed not only in certified organic markets, but more generally in dealing with changing market environments. Research indicates that, even as large firms take over greater shares of the retail food market, smallholders can sell to them if they can meet the buyers' demands that supplies be consistent and of high quality. While formal markets are not a panacea for every smallholder, they do have the most income potential.

The flip side of ORCA initiatives' tendency to build capacity is that the initiatives require that farmers possess a variety of capacities. This means that ORCA interventions with less capable farmers can require extensive effort and be riskier than ventures with better-endowed farmers. However, such an intervention can have better payoffs as well. The conceptual framework introduced in section 3 shows a way to assess the risks and the asset building required for ORCA initiatives at specific sites.

6.2 Research priorities

The limitations of existing studies means the conclusions in this review need further testing with systematic research that has strong methodological underpinnings. To ensure such research captures the holistic strengths of ORCA, it should use a multidisciplinary, participatory approach. The proposed conceptual framework offers a guide for doing so. Such an approach should start with smallholders setting their livelihood goals and, with facilitation by researchers, identifying the strengths and gaps in the enablers listed in the framework. Farmers should also participate with researchers and advisors in selecting the blend of ORCA agronomic practices to test and improve for their particular situation. Finally, research should focus not only on building further knowledge content, such as the specific techniques for building livelihood assets, but also on methods for acquiring and disseminating knowledge when the intervention comes to a close and farmers are left on their own.

The following are specific research questions that should be embedded in this methodological approach.

6.1.1 Research for assessing cost, benefits and impacts on livelihoods

Studies provide some examples of ORCA projects improving the livelihoods of smallholders. Yet the number of studies is limited, and research methods have not been rigorous. More information is needed on the successes, failures, costs and benefits of ORCA initiatives, using uniform methods so that results can be compared across sites. Five particular types of analyses are needed:

(1) Whereas some studies are available on the returns farmers earn in ORCA projects, no rate-of-return studies have been conducted to assess the returns on investing in ORCA projects for smallholders. Comparing the returns on helping farmers invest in conventional agriculture to helping them invest in ORCA could guide policy makers on the relative attractiveness of the two approaches.

(2) Costs-and-returns studies need to take into account both a financial analysis of profitability as viewed from farmers' perspective and an economic analysis of profitability as viewed from society's perspective (Gittinger 1982). The latter takes into account subsidies that society provides as well as other distortions, such as skewed foreign exchange rates or trade barriers.

(3) Studies should focus on whether the poor and women benefit from ORCA and how these groups can gain greater access to ORCA initiatives.

(4) Studies need to go beyond costs and benefits and look at the contribution of alternative approaches to building sustainable livelihoods, as described in this paper.

(5) Researchers need to differentiate between certified and uncertified organic initiatives in their assessments, as the costs and benefits of each are likely to be very different.

Such cross-site analyses could greatly improve our understanding of the scope of ORCA's impact, the factors that influence the success or failure of ORCA initiatives, and how farmers can gain greater benefits from them. Key audiences for this research are farmer groups, policy makers, and facilitating organizations such as NGOs, private companies and donor agencies.

6.1.2 Research for building natural capital and agronomic assets

Experience is needed in conducting participatory research and working with smallholders to deliver science-based research that can best meet their needs. Key questions are how to increase or maintain productivity under ORCA. A large body of research finds that yields decrease upon conversion from conventional agriculture, but some research shows that after an initial decline ORCA yields for some crops equal or exceed yields from conventional agriculture. Research should look at what ORCA techniques work to maintain or enhance yields over conventional yields and how they can be enhanced.

There is a notable lack of integration between organic agriculture practitioners and the agricultural research community (Parrott and van Elzakker 2003). More efforts are needed on both sides to address farmers' problems in ORCA initiatives and strengthen collaboration. Parrott and van Elzakker (2003) and Walaga (2004) suggest that those conducting research on organic agriculture must find more effective ways to report and disseminate their work so that it better serves the needs of smallholders and development practitioners. Currently, many results are not made available to the wider organic community.

6.1.3 Research for building social assets

Strong farmer groups are key to successful ORCA programs, but building them from the ground up is not always a predictable process. What are the factors affecting the success of farmer groups in implementing organic projects? How can outside agents best facilitate farmer groups in Africa to effectively implement organic agriculture projects?

Some research suggests that contract farming is an alternative that can resolve many of the same issues that groups resolve. Research needed in this area would answer the following questions: Is contract farming a preferable alternative to marketing in groups in Africa? Under what circumstances is one approach better than the other and how can they be combined, so that each helps the other function more smoothly? How can smallholders best negotiate favourable terms with contracting companies? Negotiation support is a key skill that facilitating organizations can help provide.

6.1.4 Research for building human assets

The lack of technical advice and extension services was a difficulty mentioned frequently by farmers who converted to ORCA practices. What are the ways that farmers can embed systems of knowledge acquisition and dissemination into their groups and communities, conduct research, promote innovation, share information more effectively, and leverage available extension services? Farmer field schools, private extension systems, and volunteer farmer trainers have proved effective in some settings. Will they work for organic agriculture initiatives, and are they sustainable? Are there other innovations that facilitate farmer-to-farmer learning?

Successfully penetrating markets and maintaining competitiveness—particularly in rapidly consolidating formal markets—require entrepreneurial orientation and skills. These are not typically skills that governments and research institutes have possessed in the past. Which are the right models for teaching entrepreneurial skills? How can the resources for doing so be attracted and retained? One of the most formidable challenges for smallholders is how to gain access to lucrative formal markets in which a few buyers who handle nearly the entire retail food market begin to consolidate suppliers to cut costs.

6.1.5 Research for building physical assets

What structures, organizations, and training do smallholders need to handle certification and phytosanitary and other standards required for participating in formal domestic and export markets? How can they acquire the physical assets needed? How can they manage them?

Finally, the framework presented in this paper uses selected parameters to assess the potential of ORCA to benefit smallholders at particular sites. Research is needed on how such indicators can be meaningfully measured within likely timelines and budgets. Yields per hectare are only one of several criteria for assessing feasibility; other criteria such as returns on labour and the acceptability of new practices to women are also important.

The conclusions reached in this review have the same caveats as much of the literature, which is that few rigorously constructed research reports exist about the efficacy of organic agriculture for alleviating poverty. One evaluation notes that it is based on case studies because only case studies were available and that the case-selection method restricted the sample cases to those active for 2 years or longer, meaning that the study excluded projects that failed. The study authors realized the shortcoming but had little recourse (Giovannucci 2005). Thus more research is needed on assessing the impact of organic agriculture compared with that of producing the same crops under conventional agriculture and with that of producing other conventional crops. Since ORCA encompasses certified organic approaches as well as uncertified ones, care must be taken to note the differences and not simply report on certified approaches alone.

Quantitative analysis is lacking particularly regarding economic returns earned by farmers practising ORCA and the degree to which ORCA can help farmers improve other critical livelihood parameters, such as nutritional well-being. The effect of ORCA on vulnerable groups such as the poor and women is especially lacking. Moreover, research on how such groups can gain access to organic markets is of great importance.

Concerning the lack of integration between organic agriculture practitioners and the research community, work should include a boundary-spanning measure of conducting user-driven research. This can ensure that practitioners and researchers effectively communicate so that research questions address real world problems. Some institutes that traditionally do not regard themselves as part of the organic community (notably the World Agroforestry Centre and the International Centre of Insect Physiology and Ecology) have already done good work in this regard. In general, however, the links between national and international research institutes (particularly those in the Consultative Group on International Agricultural Research) and the organic community are poorly developed and should be strengthened (Parrott and van Elzakker 2003).

Researchers must report on and disseminate their work in ways that better serve the needs of smallholders and development practitioners. Currently, most work ends up as grey literature and is not always available to the wider organic community (Parrott and van Elzakker 2003, Walaga 2004).

Specific research needs mentioned in the organic agriculture literature include

(1) methodologically sound studies of ORCA initiatives' effects on poverty alleviation, including gender effects, to guide development practitioners in designing initiatives and governments in developing policy (Taylor 2006, Setboonsarng 2006);
(2) developing credible baseline data using sound measurement techniques (Giovannucci 2005);
(3) finding location-specific practices that make use of locally available inputs and improving their use efficiency (Walaga 2004); and
(4) peer-reviewed, valid comparisons with conventional agriculture that properly account for subsidies to conventional agriculture when comparing its achievements with ORCA in enhancing farm productivity, food security and the self-regenerative capacity of farm ecosystems in Africa and elsewhere in the developing world.

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Appendix A: Illustrations of the ORCA assessment worksheets for transitional and cash-cropping scenarios (See table 3.2.a for the accompanying Conceptual Framework.)

Table A.1. Worksheet to assess asset levels relative to the needs shown in the Conceptual Framework when a transitional scenario is appropriate for the community's livelihood objectives

Description of setting

For illustration, this community setting has the same natural assets as the subsistence scenario community. However, because it is less remote from population centres, there is local market potential and the community has already achieved some integration into it.

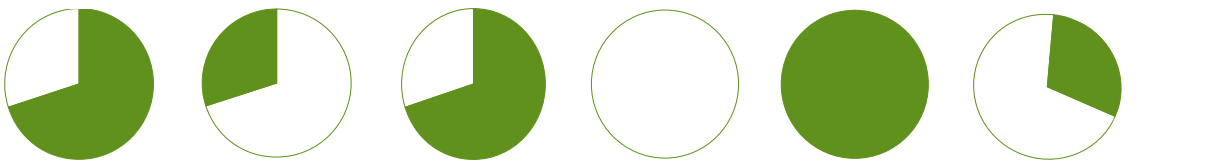
Natural assets

Because of access to strong local markets, the community can improve its food-security and/or livelihood status through increasing both yields for home consumption and income to purchase more food.

Soil quality | Water availability | Environment unfavourable to pests and diseases | Feasibility of improving production through ORCA

Social assets

A project would need to strengthen farmer organizations. Since social cohesion and some farmer-to-farmer initiatives exist in the community, this is not a high-risk proposition. The policy environment and political stability are adequate which are benefits since a single community level project would have difficulty achieving change in these areas. A project in this setting would most likely need to bring together a number of public and private partners with a lead organization providing overall coordination/boundary spanning functions. "Boundary spanning" refers to engaging the participation of all intermediaries needed for sustainable development. It also means assisting all partners in spanning any boundaries created by cultural and disciplinary differences.



Social cohesion | Degree of organization among farmers | Local market potential | Presence of marketing support entities | Supportive policy and political environments | Market integration (% community livelihood from selling and/or trading)

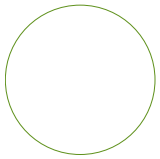
Asset level the community **possesses** relative to that needed to reach targeted livelihood improvements within a transitional scenario

Amount of the asset a project **must build** for the community to reach targeted livelihood improvements within a transitional scenario

Minimal needs

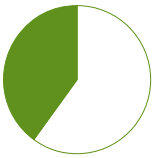
Human assets

The lead organization(s) would need to conduct farming systems/action research combining local and scientific knowledge to improve productivity and discover the best solutions for the local conditions. The lead organization also could add a voice to the community's for obtaining extension and other forms of government support. Finally, the lead organization in its boundary spanning role would develop a strategy for identifying the best entities to address entrepreneurial skills, marketing support, post-harvest facilities and credit access.



Research and extension support

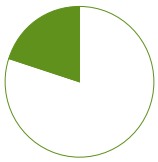
Farmer-to-farmer/ other self help initiatives



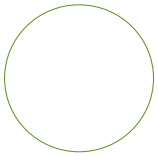
Entrepreneurial skill/ orientation

Physical assets

The small gap in transportation infrastructure for reaching the local market (which is the target in this scenario) suggests that this gap may also be amenable to solutions from project level intervention, since solutions could possibly be smaller scale than public-works-level construction, but rather vehicle purchase or small improvement projects for roads.



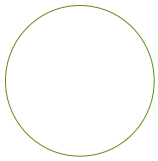
Social cohesion



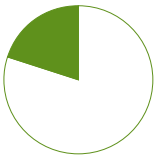
Availability of post-harvest processing facilities

Financial assets

The project will need to address lack of credit, if participating in the local market or increasing productivity demands it.



Access to credit



High value product price/ premium potiential

Asset level the community **possesses** relative to that needed to reach targeted livelihood improvements within a transitional scenario

Amount of the asset a project **must build** for the community to reach targeted livelihood improvements within a transitional scenario

Minimal needs

Table A.2. Worksheet to assess asset levels relative to the needs shown in the Conceptual Framework when a cash-cropping scenario is appropriate for the community's livelihood objectives, when risk is high

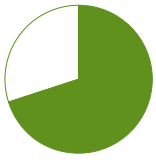
Description of setting

The natural assets are the same as for the previous hypothetical worksheets, for illustration purposes. However, this community grows a crop like coffee or cocoa demanded by the export market but with negligible local demand. This means food security is based largely on income from the cash crop. Because this area already participates in the export market, it has some supporting institutions and infrastructure. However the community suffers because low asset levels mean severe inefficiencies, which makes costs high and income low.

Natural assets

Making this scenario similar to the subsistence and transitional scenarios to better highlight the use of the tool produces a rather unrealistic setting. Given its poor natural assets for its cash crop, farmers are already in a poor competitive position vis-à-vis other operators in the world market. If they could compete at all, they probably would not do very well.An assessment should determine if ORCA practices to optimize yields from locally available resources could improve incomes for farmers. In addition, one aspect of ORCA is to consider if crops grown are the best for the local environment or if others with higher profitability could be introduced. Where other are other crops that might perform better agronomically but that would not have good revenue potential, the need could be noted for research into improving the marketability of the crop. Such research developed a process that to allowed roasters to substitute in coffee blends more Robusta for the more agronomically demanding Arabica coffee. This opened coffee market opportunities to these farmers.

Soil quality



Water availability

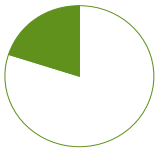
Environment unfavourable to pests and diseases

Feasibility of improving production through ORCA

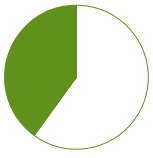
Social assets

This community will face difficulty due to few social assets needed for success in production for export. In particular certified organic production requires a high degree of management sophistication unless done through contract farming. However this community has no entities that use contract farming. Interventions needed to build this capacity are risky, particularly where strong farmer groups are lacking.

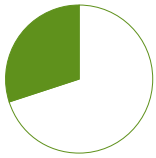
Social cohesion



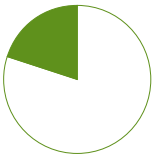
Degree of organization among farmers



Local market potential



Presence of marketing support entities



Supportive policy and political environments

Market integration (% community livelihood from selling and/or trading)

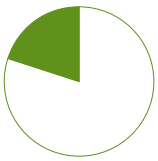
Asset level the community **possesses** relative to that needed to reach targeted livelihood improvements within a cash-cropping scenario

Amount of the asset a project **must build** for the community to reach targeted livelihood improvements within a cash-cropping scenario

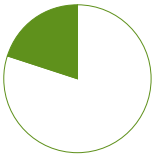
Minimal needs

Human assets

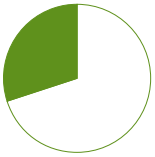
Clearly, a major goal for an intervention would be figuring out how to bring more advising services to the community which is severely lacking in bridges to knowledge from external sources. Such bridges are important for building internal innovation capacity needed to respond to changing environments.



Research and extension support



Farmer-to-farmer/ other self help initiatives

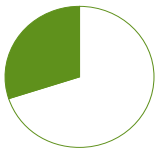


Entrepreneurial skill/ orientation

Physical assets

An intervention in this community would have to address the poor infrastructure. Doing so could require signicant funding and risky long-term construction. In addition, if certification appeared to be part of an ORCA solution, an intervention would need to fund certification costs.

Social cohesion



Availability of post-harvest processing facilities

Financial assets

The intervention would need to address the poor access to credit. In a setting with farmers already engaged in cash-cropping, changes that can improve incomes may likely require significant investment. The potential for price premiums is a plus in this regard the premiums could generate the funds to support borrowing, IF the intervention can successfully address all the capital building needs described above.

Access to credit

High value product price/ premium potiential

Asset level the community **possesses** relative to that needed to reach targeted livelihood improvements within a cash-cropping scenario

Amount of the asset a project **must build** for the community to reach targeted livelihood improvements within a cash-cropping scenario

Minimal needs

Table A.3. Worksheet to assess asset levels relative to the needs shown in the Conceptual Framework when a cash-cropping scenario is appropriate for the community's livelihood objectives, when risk is low

Description of setting

In contrast to the high-risk setting in table A.2, in this setting the area competes well in terms of natural assets with other producers in the international export market. Rwandan coffee producers may exemplify this setting, as they have many competitive advantages in coffee production, but low international market prices for coffee have damaged producers' livelihoods.

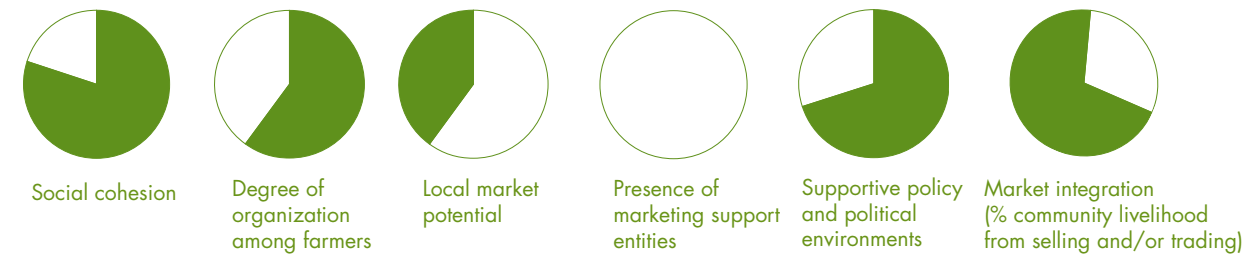
A project to gain organic certification and develop the organizational and entrepreneurial sophistication to gain the best returns for the effort would be less costly and more likely to succeed than in the Table A.2 setting. However, the Table A.2 setting may bring more significant livelihood improvement to the community.

Natural assets

This community has very strong natural assets for competitively producing the crop for the international market. However, production is still largely organic by default, and productivity can benefit from improved ORCA techniques, particularly in pest management and in maintaining the already good soil.

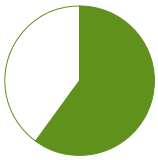
Social assets

The community already has group structures in place, is highly integrated into the international export market, operates in an area with a good complement of market support entities, has a favourable policy environment. In this case, an intervention would primarily assist the community in handling the added complexities that come with certification.



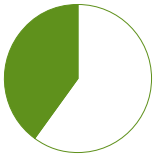
Human assets

With basic assets in place for building knowledge assets, an intervention could focus on in improving entrepreneurial skills to better position the community for negotiating and managing their own economic, environmental and health interests.
It can even position the community to make its own informed decision about whether organic or other certifications are the best strategy given the setting.



Research and extension support

Farmer-to-farmer/ other self help initiatives



Entrepreneurial skill/ orientation

Physical assets

An intervention could take advantage of the social and knowledge assets already present in the community to develop the skills and organizational structures for it to decide the best strategy for acquiring competitively priced post-harvest processing it needs to profitably operate in increasingly standards-drive global markets dominated by fewer and larger retailers. With these same assets, the intervention could also assist the community with a strategy for value-adding activities.

Social cohesion

Availability of post-harvest processing facilities

Financial assets

With all the preceding assets, the intervention could potentially assist farmers to gain higher prices through organic certification. The community would have the foundational internal capacity to determine whether they would likely see higher incomes through certification.

Access to credit

High value product price/ premium potiential

Asset level the community **possesses** relative to that needed to reach targeted livelihood improvements within a cash-cropping scenario

Amount of the asset a project **must build** for the community to reach targeted livelihood improvements within a cash-cropping scenario

Minimal needs

Appendix B: Entities acting as primary driver and providing extension and marketing to organic initiatives in Africa, Latin America and Asia

Table B.1. Analysis of primary drivers for ORCA projects reviewed in this study

Source	Area	Primary driver	Extension/ technical advising	Marketing/ exporting
Africa				
Hine and Pretty 2006	Kenya	NS	NS	NS
Hine and Pretty 2006	Kenya	NS	NS	NS
Crucefix 1998	Egypt	Private company	Private company	Private company
Hine and Pretty 2006	Tanzania	Private company & NGO	Private company & NGO	Private company & NGO
Gibbon and Bolwig 2007b	Uganda	Private company & NGO	Private company & NGO	Private company & NGO
Gibbon and Bolwig 2007b	Uganda	Private company & NGO	Private company & NGO	Private company & NGO
Hine and Pretty 2006	Malawi	NGO	NA	NA
Hine and Pretty 2006	Ethiopia	NS	NS	NS
Hine and Pretty 2006	Kenya	NS	NS	NS
Crucefix 1998	Uganda	NGO	NS	Private company
Hine and Pretty 2006	Kenya	NGO	NS	NS
cited in Hine and Pretty 2006	Uganda	NGO	NGO & government	NA
Gibbon and Bolwig 2007b	Uganda	Private company & NGO	Private company & NGO	Private company & NGO
Crucefix 1998	Mozambique	Government & NGO	NS	Private company
cited in Hine and Pretty 2006	Uganda	NGO	NA	
Latin America				
IFAD 2003	Dominican Republic	Farmer group w/ private company	Private company	Private company
IFAD 2003	Argentina	Government	NS	Government
Bacon 2005	Nicaragua	Farmer group	Farmer group	Farmer group
Damiani 2001	Costa Rica	Farmer group w/ NGO	NGO	Farmer group
IFAD 2003	Mexico	Farmer group w/ NGO-Government	Farmer group	Farmer group
IFAD 2003	Mexico	Farmer group w/ NGO-Government	Farmer group	Farmer group
IFAD 2003	Guatemala	Farmer group w/ NGO-Government	Farmer group	Private company
IFAD 2003	El Salvador	Farmer group w/ NGO-Government	Farmer group	Farmer group
Lyngbaek et al 2001	Costa Rica	NS	NS	NS

Bray et al 2002	Mexico	NS	NS	NS
van der Vossen 2005	Mexico	NS	NS	NS
Crucefix 1998	Dominican Republic	Private company	NS	Private company
Crucefix 1998	Belize	Farmer group w/ private company	Private company	Private company
Crucefix 1998	Mexico	Farmer group	NS	Farmer group
Santacoloma 2007	Brazil	Farmer group	Farmer group w/ NGO	Farmer group
Caceres 2005	Argentina	Farmer group w/ NGO-government	NS	Farmer group w/ support of NGOs-government
Asia				
Giovannucci 2005	China	Farmer group	NS	Farmer group
Giovannucci 2005	China	Farmer group w/ NGO	NGO	Farmer group
Santacoloma 2007	India	Farmer group w/ NGO	Government	Private company
Santacoloma 2007	Thailand	Farmer group w/ NGO-government	Government-NGO	Government-NGO
Giovannucci 2005	China	Farmer group w/ NGO-Government	Government	Government w/ farmer groups helping
Santacoloma 2007	Thailand	Farmer group w/ private company	Government	Private company
Santacoloma 2007	India	Private company	Private company	Private company
Giovannucci 2005	China	Private company	Private company	Private company
Giovannucci 2005	China	Private company	Government	Private company
Giovannucci 2005	China	Private company	Private company	Private company
Giovannucci 2005	China	Private company	NS	Private company-Government
Giovannucci 2005	India	Private company	Private company	Private company
Giovannucci 2005	India	NGO	NGO	NGO
Giovannucci 2005	India	NGO	NGO	NGO
Giovannucci 2005	India	NGO	NGO	NGO
Giovannucci 2005	China	Government	Government	Private company-government
Giovannucci 2005	India	Government	NGO & government	NS

IFAD = International Fund for Agricultural Development, NA = not applicable, NGO = non-governmental organization, NS = not stated.

Appendix C: Countries reporting statistics on certified organic production to the *World of organic agriculture: Statistics and emerging trends*

Table C.1. Countries covered and not covered in international reporting on certified organic agriculture

	Number of countries providing data	Number of countries providing no data	Total countries	% countries providing data
Africa	25	31	56	45
Asia	29	19	48	60
Europe	39	4	43	91
Latin America	23	10	33	70
North America	2	0	2	100
Oceania/Australia	3	9	12	25
Total	121	73	194	62

Source: Baraibar 2006

Appendix D: Summary of studies of economic and food security effects of organic initiatives

Table D.1. Studies reporting on the impacts of conversion to organic agriculture[a]

Location	Farmers affected	Crops	Methodology
Hine and Pretty 2006			
1. East Africa	Looks primarily at capacity-building efforts that train 100s to 10,000s of farmers in sustainable farming techniques without necessarily leading them to certification	Different projects grew vegetables, fruit, maize, cotton, fish, others	Part of a larger study of the potential for resource-conserving agricultural techniques to increase food supplies in developing countries. Consisted of mailed questionnaires to projects and initiatives identified though an extensive outreach effort. Responses were crosschecked by independent experts.
Purpose of study. Report on evidence in East Africa on the best ways to increase agricultural productivity in developing countries experiencing food shortages.			
Findings of study relevant to livelihood improvement. Organic agriculture can increase agricultural productivity, improve livelihoods and raise incomes with low-cost, locally available and appropriate technologies. The study's primary interest is food security. It does not generally provide quantitative data.			
Gibbon and Bolwig 2007b			
2. Uganda	Approximately 4,600 farmers with certified operations	Coffee, cocoa and pineapple	Selected 3 schemes to reflect a variety of organic export crops and scheme sizes, selected farmers within schemes to reflect range of growing conditions, and randomly selected conventional farmers from matching locations. Data obtained through interviews with sample farmers.
Purpose of study. Examine the relative profitability of certified organic and conventional farming operations in tropical Africa, as well as differences between organic and conventional farmers in their rates of adoption of farming practices and in household factor endowments.			
Findings of study relevant to livelihood improvement. Farmers producing certified organic products for export earned significantly more net farm income than farmers using only conventional management, with differences ranging from 32% (which was not statistically significant) to a tenfold improvement. The higher income resulted generally from significantly different gross income, with these differences enhanced by differences in costs and reflected price premiums of 4–150%. See table D.2.			
IFAD 2003			
3. Latin America	12 farmer groups with more than 5,100 smallholder members	Mixed	Analysis of smallholder farmer groups successful in adopting organic techniques and marketing products. Three of the organizations worked with the International Fund for Agricultural Development (IFAD).
Purpose of study. Determine where conditions make organic agriculture a feasible project alternative and identify issues to consider in design and implementation.			
Findings of study relevant to livelihood improvement. In all case studies, farmers received higher prices for certified organic products than if they had sold the products in conventional markets. The premiums varied from 22.2% to 150%, depending on the crop. All initiatives had positive income benefits.			

Table D1 continued

Location	Farmers affected	Crops	Methodology
(Crucefix 1998)			
4. Developing and transitional countries	Data not stated in study	Mixed	Identification of certified organic initiatives in developing and transitional countries through grey literature and interviews and contacts with key personnel.
Purpose of study. Evaluate the field experience of organic agriculture to note the circumstances associated with achieving benefits and with failure to discover what combination of circumstances, design, implementation and funding can bring success.			
Findings of study relevant to livelihood improvement. There is considerable evidence that incomes will rise after adopting organic agriculture through price premiums or reduced input costs. However, most organic projects do not incorporate the comprehensive monitoring and evaluation necessary to verify impact and sustainability.			
The following studies looked at single crops in single locations: 5. Bray et al. 2002. Coffee in Mexico. This published study found increases in yields, prices (initially 43%, then declining to 14–19% and even as low as 5% when conventional coffee prices were high) and a small increase in incomes. 6. Damiani 2001. Cacao in Costa Rica. This IFAD evaluation found that coffee growers received a 60% premium for organic cacao, which had significant positive effect on farmer income. 7. Lyngbaek 2001. Coffee in Costa Rica. This published study found lower yield, higher prices and income equivalent to conventional without cost of certification included. The mean price premium was 20%, with a high premium of nearly 50%. 8. Setboonsarng 2006. Rice in Thailand. Increased incomes from higher prices due to the inseparable effects of high quality, contract farming, and fair trade and organic certification. 9. van der Vossen 2005. Coffee in Mexico and Costa Rica. This published study found organic coffee with lower yields, higher costs and 44% lower income than similarly situated conventional coffee. Conclusions for one site directly contradict the IFAD report on what appears to be the same site. The timeframes are different.			

[a] See the section in the text on food security, price and income effects for analysis of this table.

Table D.2. Analysis of price premiums and income for 3 organic conversion initiatives in Africa

Crop	Average Price			Percent Difference
	Organic	Conventional	Significant	
Pineapple	370	355	no	4.2%
Cocoa	1,465	1,277	yes	14.7%
Vanilla	7,231	2,875	yes	151.5%
Coffee	2,189	1,806	yes	21.2%

Crop	Net income			Percent Difference
	Organic	Conventional	Significant	
Pineapple*	3,713,337	261,392	yes	1320.6%
Cocoa-vanilla	1,234,086	526,005	yes	134.6%
Coffee*	656,177	497,159	no	32.0%

* Conventional farmers at the time of the study had significantly higher fixed costs than organic farmers because they were investing heavily in "spectacularly expanding their operations". Presumably the high fixed costs of the conventional pineapple farmers helped drive the large difference in net incomes between them and organic farmers.

Source: Gibbon and Bolwig (2007b). See under Gibbon in table D.1.

Appendix E: African country-specific data

For information about the status of organic agriculture in individual countries in Africa, see the following sources:

Parrott N, van Elzakker B. 2003. Organic and like-minded movements in Africa: Development and status. Bonn: International Federation of Organic Agriculture Movements (IFOAM). (Available from ftp://ftp.fao.org/paia/organicag/africa.pdf) (Accessed on 26 September 2007)

Parrott N, Ssekyewa C, Makunike C, Mtambi SM. 2006. Organic farming in Africa. In Willer H, Yussefi M. eds. The world of organic agriculture: Statistics and emerging trends 2006. Bonn: International Federation of Organic Agriculture Movements (IFOAM) and Frick, Switzerland: Research Institute of Organic Agriculture (FiBL).

Rundgren G, Lustig P. 2007. Organic Markets in Africa Preview, IFOAM: 17. (Available from http://ifoam.org/growing_organic/7_training/training_pdf/preview_organic_market_africa.pdf) (Accessed on 13 December 2009)

Taylor A. 2006. Overview of the current state of organic agriculture in Kenya, Uganda and the United Republic of Tanzania and the opportunities for regional harmonization. New York and Geneva: United Nations Environment Programme (UNEP)–United Nations Conference on Trade and Development (UNCTAD) Capacity Building Task Force on Trade, Environment and Development. (Available from http://www.unep-unctad.org/CBTF/publications/UNCTAD_DITC_TED_2005_16rev2.pdf) Accessed on 29 December 2007)

Walaga C. 2004. Study visit report: Organic agriculture in Kenya and Uganda. Wageningen, Netherlands: Technical Centre for Agricultural and Rural Cooperation (CTA).

———. 2007. Organic agriculture in Sudan. East Africa Organic Conference: Unleashing the Potential of Organic Agriculture: (Available from http://www.unep-unctad.org/CBTF/events/dsalaam2/day%203/Sudan_Nagla.pdf) (Accessed on 16 January 2008)

Appendix F: Yield, price premium, net income, food security, market channel and certification type for organic agriculture initiatives in Africa and Latin America

Table F.1. Data on farm, economic, marketing and certification characteristics for ORCA projects analyzed in this review

Source	Area	Farm Size (ha)[a]	Crop	Management before project	Yield	Price premium received?	Net income effect	Food security improved?	Primary market	Certification type
Africa										
Crucefix 1998	Mozambique	Not stated	Cotton	Traditional	Decrease[b]	No	Not increased	Not improved	Export	3rd party
Hine and Pretty 2006	Kenya	Not stated	Vegetables	Traditional	50% increase	Not stated	Not stated	Not stated	Local/ domestic	None
Hine and Pretty 2006	Ethiopia	Avg 0.4	Vegetables fruit	Traditional	60% increase	Not stated	Increased	improved	Local/ domestic	None
Hine and Pretty 2006	Kenya	Poor	Vegetables	Traditional	Increase	Not stated	Not stated	Improved	Subsistence	None
Hine and Pretty 2006	Kenya	Avg 2	Maize, fruit	Traditional	Increase	Not stated	Increased	Improved	Not stated	None
Gibbon and Bolwig 2007b[c]	Uganda	Avg 1.07	Coffee	Traditional[d]	Increase	Not stated	Increased	Not stated	Export	3rd party
Gibbon and Bolwig 2007b	Uganda	Avg 2.31	Cocoa, vanilla	Traditional[d]	Increase[e]	Not stated	Increased	Not stated	Export	3rd party
Gibbon and Bolwig 2007b	Uganda	Avg 3.52	Pineapple	Traditional[d]	Increase[f]	Not stated	Increased	Not stated	Export	3rd party
Crucefix 1998[g]	Uganda	Not stated	Cotton	Traditional	Same[h]	No	Increased[h]	Improved	Local/ domestic	3rd party
Hine and Pretty 2006	Uganda	Poor	Mixed	Traditional	Not stated	Not stated	Not stated	Not stated	Subsistence	None
Hine and Pretty 2006	Tanzania	Not stated	Cotton	Traditional	Not stated	Not stated	Not stated	Not stated	Export	3rd party
Crucefix 1998	Egypt	Avg 33.33	Cotton, vegetables & herbs	Conventional	Decrease	Yes	Not stated	Not stated	Domestic/ export	3rd party
Hine and Pretty 2006	Kenya	Poor	Not stated	Not stated	50% increase	Not stated	Increased	Improved	Local/ domestic	None
Hine and Pretty 2006	Malawi	Avg 1,5	Fish culture added to low-input farms	Not stated	Increase	Not stated	Increased up to 600%	Improved	Local/ domestic	None

Source	Area	Farm Size (ha) [a]	Crop	Management before project	Yield	Price premium received?	Net income effect	Food security improved?	Primary market	Certifi-cation type
Latin America										
IFAD 2003	Mexico	Avg 3.5	Coffee	Traditional[d]	Increase	Yes[i]	Increased	Not stated [f]	Export	3rd party
IFAD 2003	Mexico	Poor	Honey	Traditional	Same	Yes[i]	Increased	Not stated[f]	Export	3rd party
IFAD 2003	Guatemala	Avg 0.87	Coffee	Traditional[d]	Increase	Yes	Increased	Not stated[f]	Export	3rd party
IFAD 2003	D Republic	Avg 0.9	Bananas	Traditional	Same	Yes[i]	Increased	Not stated[f]	Export	3rd party
Crucefix 1998	Mexico	Poor	Coffee	Conventional	Not stated	Yes[i]	Not stated	Not stated	Export	3rd party
Crucefix 1998	D Republic	3-4	Bananas	Traditional	Increase	Yes	Increased	Not stated[f]	Export	3rd party
Bray et al. 2002	Mexico	Poor	Coffee	Conventional	15% increase	Yes[i]	Increased	Not stated	Export	3rd party
van der Vossen 2005	Mexico	Not small	Coffee	Conventional	Decrease	No	Decreased[i]	Not stated	Export	3rd party
van der Vossen 2005	Mexico	Not small	Coffee	Conventional	Decrease	No	Decreased[i]	Not stated	Export	3rd party
van der Vossen 2005	Costa Rica	<7.0	Coffee	Conventional	Decrease	No	Decreased[i]	Not stated	Export	3rd party
Lyngbaek et al. 2001	Costa Rica	<7.0	Coffee	Conventional	Decrease	Yes	Not increased	Not stated	Export	3rd party
Bacon 2005	Nicaragua	Poor	Coffee	Conventional	Not stated	Yes	Not stated	Not stated	Export	3rd party
Caceres 2005	Argentina	Poor	Vegetables, fruit	Not farmed	Added crop	No	Increased	Improved	Local/ domestic	Participatory group
Damiani 2001	Costa Rica	Avg 2.0	Cacao, bananas	Conventional	Added crop	Yes[i]	Increased	Not stated	Export	3rd party
IFAD 2003	Argentina	Avg 2.5	Sugar	Conventional	Decrease	Yes	Increased	Not stated	Export	3rd party
IFAD 2003	El Salvador	Avg 0.78	vegetables	Traditional	Added crop	Yes	Increased	Not stated	Local/ domestic	3rd party
Crucefix 1998	Belize	Poor	Cacao	Not farmed	Added crop	Yes	Increased	Not stated	Export	3rd party
Santacoloma 2007	Brazil	8-40	Vegetables, fruit	Not stated	Not stated	Not stated	Not stated	Not stated	Local/ domestic	Participatory group

Appendix F: Latin America continued

avg = average, D Republic = Dominican Republic, ha = hectare, IFAD = International Fund for Agricultural Development.

[a] Some studies that did not report farm size still indicated through descriptions that the farmers participating in the initiative were poor and probably smallholders. When reports indicated such information, it is shown here.

[b] This project failed to be sustainable, first because of unfavourable weather and second because of financial problems.

[c] This study was designed to produce statistically valid comparisons with a control sample.

[d] The paper calls these conventional, but information on the farming systems indicates very low-input, traditional agriculture with no chemical pesticides used on any crops and no fertilizers used, except that 16% of farmers fertilized coffee.

[e] While yields were higher than yields from non-organically managed farms in the area, they were not significantly higher. However, in the interest of consistency this result is being noted here as most of the other studies are anecdotal, listing differences whether they are significant or not.

[f] Many of the studies mention in general terms that organic agriculture can improve food security by improving the productivity of subsistence farming, encouraging diversification that reduces vulnerability to weather and other shocks to food crops, and increasing incomes. However, none of these studies specifically describe any food security effects associated with any of the cases.

[g] According to Hine and Pretty (2006), this initiative was still in operation several years after Crucefix reported. According to Crucefix, the initiative started in 1994/1995 with 200 registered farmers and had 5,100 registered farmers by 1996/1997. According to Hine and Pretty, by 2000, the initiative had 20,000 registered farmers.

[h] Although conversion to organic did not increase cotton yields or prices, the crop rotations that certification requires yielded additional crops. Selling the crops, particularly sesame, increased income and strengthened food security.

[i] Farmers sold these products under fair trade certification, which produces a higher price premium than organic certification. IFAD notes that having organic certification makes obtaining fair trade certification easier.

[i] Using case study production data, the report calculated income by assuming prices based on world prices at the time of the case studies.

Appendix G: Export Promotion of Organic Products from Africa (EPOPA)

All tables from Forss and Lundstrom 2004

Table G.1. Comparison of highest conventional and organic prices[a]

	Organic Cocoa	Conventional Cocoa	Organic Vanilla	Conventional Vanilla
2002	3000	2600	20000	15000
2003	2700	2000	50000	40000
2004	1500	800	no information yet	no information yet

[a] This table shows the highest prices paid in Uganda, in shillings per kilogram, for each of the crops and years shown according to EPOPA field officers.

Table G.2. Income to farmers from selected EPOPA projects including income from organic premium

Project (exporter/ crop)	Total income to farmers	Organic premium	Total income per farmer	Additional income per farmer
UGANDA				
Kawacom/coffee	142.021	2.328	189	?
Esco/cocoa	85.647	16.075	155	29
Esco/vanilla	186.350	33.882	1.285	234
Reco/dried fruit	n.a.	n.a.	n.a.	n.a.
TANZANIA				
KNCU/coffee*	390.000	60.000	170	26
F.Hussein/cashew	360.490	98.924	2.198	603
F.Hussein/honey*	85.680	12.852	50	8
Dabaga/pineapple*	10.500	2.100	210	42

* figures in green signify that organic purchases have not started yet. The figures are based on estimates in project proposals, supplemented by information from interviews.

Table G.3. Numbers of farmers registering, contracting and delivering organic produce[a]

Project (exporter/ crop)	Number of farmers registered*	Number of farmers contracted*	Number of farmers delivering*	Target for the project**
UGANDA				
Kawacom/coffee	2.577	2.577	750	4.500
Esco/cocoa***	1.749	1.791	554	2.500
Esco/vanilla***	1.760	1.760	145	2.500
Reco/dried fruit	773	773	none yet	2.000
TANZANIA				
KNCU/coffee	1.740	1.434	none yet	2.000
PCI/cashew	229	229	164	500
F.Hussein/honey	408	408	none yet	1700
Dabaga/pineapple*	54	40	none yet	60

* figures for the latest harvest season;
** figures for the end of the three year project period ;
*** even though this is a project with one exporter, the crops are different and involve different farmers, hence they are presented here with one row of cells for each crop.

[a] This table shows for selected EPOPA projects the numbers of farmers who registered to be part of the project, contracted to deliver the listed product, actually delivered and the program targets for the numbers of farmers to deliver.

Table G.4. Targets and actual purchases of organic produce in EPOPA project

Project (exporter/ crop)	Targets for purchases year1	Actual purchases year 1	Targets for purchases year 2	Actual purchases year 2
UGANDA				
Kawacom/coffee	-	482 333	300 000*	227 000
Esco/cocoa	-	90 000	300 000*	84 791
Esco/vanilla	-	9 200	3 000*	6 590
Reco/dried fruit	110 000	n.a.	105 000	n.a.
TANZANIA				
KNCU/coffee	87 500	n.a.	150 000	n.a.
F.Hussein/cashew	299 000	230 000	500 000	611 000
F.Hussein/honey	60 000	n.a.	102 000	n.a.
Dabaga/pineapple*	300 000	n.a.	300 000	n.a.

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