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***Organic Agriculture as an Opportunity for Sustainable
Agricultural Development***

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Executive summary

We need drastic changes in the global food system in order to achieve a more sustainable agriculture that feeds people adequately, contributes to rural development and provides livelihoods to farmers without destroying the natural resource basis. Organic agriculture has been proposed as an important means for achieving these goals. Organic agriculture currently covers only a small area in developing countries but its extent is continuously growing as demand for organic products is increasing. Should organic agriculture thus become a priority in development policy and be put on the agenda of international assistance as a means of achieving sustainable agricultural development? Can organic agriculture contribute to sustainable food security in developing countries? In order to answer these questions this policy brief tries to assess the economic, social and environmental sustainability of organic agriculture and to identify its problems and benefits in developing countries.

Organic agriculture shows several benefits, as it reduces many of the environmental impacts of conventional agriculture, it can increase productivity in small farmers' fields, it reduces reliance on costly external inputs, and guarantees price premiums for organic products. Organic farmers also benefit from organizing in farmer cooperatives and the building of social networks, which provide them with better access to training, credit and health services. Organic agriculture generally reduces the vulnerability of farmers as the higher organic prices act as buffer against the low prices and price volatility of conventional markets, as organic systems are often more resilient against extreme weather events, and as the often diverse organic crop-livestock systems provide a diverse set of outputs.

On the other hand, organic farmers in developing countries need to access international markets, they require often costly certification and have increased demand for labour. Overall, organic agriculture thus provides promises for sustainable agricultural development, but its shortcomings need to also be considered. This policy brief therefore concludes with a set of specific recommendations on what policy options could best address the current problems of organic agriculture and ensure the success of an organic agriculture development strategy.

Summary of policy recommendations

Policy goal. Organic agriculture promises to be a more sustainable form of agriculture that is aimed at producing food in a more environmentally friendly and socially just way. Organic agriculture thus potentially provides means of addressing both human and environmental predicaments. This policy brief will summarize the problems and benefits of organic agriculture in developing countries and will assess the potential contribution of organic agriculture to sustainable agricultural development. It will conclude with specific recommendations on ways to improve the performance of organic agriculture and its suitability for poor farmers.

Significance of the issue. During the G8 summit in 2009, the heads of government agreed in a joint statement to “act with the scale and urgency needed to achieve sustainable global food security”. The ability to provide sufficient, accessible and nutritious food at all times is, however, becoming increasingly limited by reduced crop yields due to climate change, scarcer water supply and extending land degradation. Sustainable food security is thus a balance between taking advantage of the ecosystem service of food production for human use, while preventing the exploitation of natural resources to a degree that undermines the ability of the ecosystem to produce this food. Agriculture must meet the triple challenge of increasing food production and providing accessible and nutritious food, while at the same time minimizing the environmental impacts of farming. This will require significant changes in the food system and a systematic assessment of how different farming systems can contribute to meeting this challenge.

Canada’s interest in the issue. Canada and the Canadian International Development Agency (CIDA) have committed themselves to including environmental considerations into their policy making and CIDA has declared sustainable development as one of its priorities. Strategies like organic agriculture, that can potentially address economic, social and environmental issues simultaneously, thus deserve special consideration in Canada’s and CIDA’s efforts in development assistance.

Policy recommendations. This policy brief concludes that organic agriculture can provide important contributions to sustainable agricultural development. To get the most out of an organic agriculture strategy, CIDA should:

1. Contribute to capacity building of organic farmer cooperatives.
2. Promote the development and integration of organic markets.
3. Help in developing domestic organic markets.
4. Support the development of participatory guarantee systems (PGS).
5. Concentrate policies on countries and regions where organic agriculture has the most potential.
6. Support research on organic agriculture in developing countries.

Background

Agriculture is central to human survival - it provides food and fuel and other ecosystem services, is an important source of livelihood, and plays a crucial role in economic development. Agriculture is, however, also a major source of environmental degradation, contributing to climate change, depleting freshwater resources, degrading soil fertility and polluting the environment through fertilizer and pesticide use. Ironically, food production is critically dependent on the very natural resources it is degrading. *Sustainable food security* therefore requires not only that all people at all times have access to sufficient and nutritious food, but also that this food be produced with minimal environmental impact. *Sustainable agricultural development*, instead, requires that agriculture meet the needs of the present without compromising the ability of future generations to meet their own needs.

Current agriculture fails in achieving these goals on numerous ends: Agriculture today is not only a leading driver of environmental degradation and a major force driving the Earth System beyond the 'safe-operating space' for humanity (Parrott *et al.* 2006; Rockström *et al.* 2009) - it also does not feed people adequately, as currently still one in six people in developing countries are undernourished due to lack of sufficient access to nutritious food (FAO 2010). Given that we do not achieve sustainable food security today and given that we will probably need to double food production by 2050 to feed 9 billion people with increasing demand for meat and dairy products (Foley *et al.* 2011), there is a drastic need for changes in the food system. From an agricultural perspective, we need to produce more food in the right locations at affordable prices, ensuring livelihoods to farmers and reducing the environmental cost of agriculture.

Considering the huge challenge ahead of us, it is important to assess the potential contribution of different types of farming systems to sustainable food security. 'Alternative' farming systems that try to mimic ecological processes while minimizing external inputs are often suggested as more sustainable forms of food production. Organic agriculture - a system aimed at producing food with minimal harm to ecosystems, animals or humans (see Box 1 for a definition of organic agriculture) - is the most prominent of these alternative farming systems (see Box 2 for organic agriculture in numbers) and is often proposed as a solution for more sustainable agriculture.

The Canadian International Development Agency (CIDA) has committed itself to environmental sustainability and has identified the integration of development and environmental protection as one of its key strategies (CIDA 1992; CIDA 2006). As a potentially more environmentally friendly alternative to conventional agriculture, organic agriculture could play an important role in sustainable development. The small extent of organic agriculture in developing countries today and the likely further increase in demand for organic produce in developed as well as transition economies (see Box 2) suggest that the organic sector in developing countries has large potential for further growth. Can organic agriculture thus contribute to sustainable agricultural development and sustainable food security? Should organic

agriculture become a priority in development policy and be put on CIDA's agenda? Could an organic agriculture strategy help CIDA achieve its goal of integrating environmental considerations into decision-making?

Box 1 - Organic agriculture in brief

Organic agriculture is a farming system aimed at producing food with minimal harm to ecosystems, animals or humans (FAO & WHO 2007). According to its original ideas, organic agriculture encompasses not only environmentally sound management practices but also a farming system that is socially just and economically responsible. The increasing demand for organic produce and the rapid growth of the organic sector led, however, to the need to regulate organic production. This resulted in the definition of organic standards that were considered best environmental practices, e.g. enhanced crop rotations and crop diversity, use of organic fertilizers and biological pest control. Organic agriculture today is thus closely tied to a certification and labelling process and to a set of prescribed management methods that are regulated by international standards and national laws. Considering the wealth of meanings and definitions of 'sustainable', agroecological or low-input agriculture, it is important to adhere to these rules and standards when discussing organic agriculture (Rigby & Cáceres 2001). Organic agriculture here refers to 'truly' organic systems, i.e. farming systems that follow defined organic standards and regulations.

To assess the potential contribution of organic agriculture to sustainable rural development, we need to understand (1) the environmental benefits and (2) the yield potential of organic agriculture, as well as (3) the impact of organic agriculture on farmer's livelihoods and (4) its accessibility to poor farmers. This policy brief will summarize the scientific evidence on these four dimensions, identifying the problems and benefits of organic agriculture in developing countries.

Box 2 – Organic agriculture in numbers

- Organic agriculture currently covers 37 million hectares globally, which corresponds to 0.9% of global agricultural land.
- 1/3 of organic agricultural land and >3/4 of organic producers are located in developing and transition countries.
- In the US, overall organic sales make up 4% of food and beverage sales, while organic fruits and vegetables represent 11% of all US fruits and vegetable sales.
- In 2010 the global market for organic produce was worth 59 billion US dollars, growing by almost 300% since 2000.
- In 2010 average annual growth in the global organic market has slowed down to a single-digit number (9%) for the first time since 2000 due to the global economic recession.
- 96% of organic sales are made in European and North-American markets.

Source: OTA 2011; Willer & Kilcher 2011

Organic agriculture and the environment

A sustainable farming system should provide food alongside other ecosystem services such as water flow and water quality regulation, climate regulation and biodiversity preservation (Foley *et al.* 2005). Organic agriculture was developed as a farming system that is specifically aimed at producing food in a more environmentally friendly way. On a per unit area basis, organic agriculture has been shown to have several environmental benefits compared to conventional agriculture¹. It reduces pesticide use, it can increase species abundance and richness (Bengtsson *et al.* 2005; Hole *et al.* 2005), reduce soil erosion (Siegrist *et al.* 1998), increase soil fertility (Leifeld & Fuhrer 2010), use less energy and reduce agricultural greenhouse gas emissions (Gomiero *et al.* 2008), and reduce nitrogen losses from the system (Drinkwater *et al.* 1998). On some environmental issues, like soil carbon storage or water pollution through nitrate and phosphorus leaching, the better environmental performance of organic agriculture is, however, not totally unambiguous (Kirchmann & Bergström 2001; Mondelaers *et al.* 2009). Here, the good environmental performance of a farming system is more a question of

¹ *Conventional agriculture* is defined here as any farming systems as are dominantly present today. This includes both low-input farming systems in developing countries as well as high-input industrial agriculture.

appropriate measures, like reduced N inputs, the use of catch crops or reduced tillage, rather than of the organic or conventional system *per se*.

One of the key goals of organic agriculture is to improve soil fertility by returning organic matter to the soil. Soils managed with organic methods have therefore typically a higher organic matter content, which results in soils that can hold more water (Colla *et al.* 2000; Lotter *et al.* 2003) and that are less likely to suffer from erosion (Siegrist *et al.* 1998). Organic management methods can thus potentially provide useful ways of restoring degraded soils or preventing further degradation of soils in regions prone to land degradation.

The large majority of studies on the environmental impact of organic agriculture have, however, been conducted in developed countries and in temperate systems. The environmental performance of organic agriculture in tropical systems and in developing countries thus remains to be examined thoroughly.

The yields of organic agriculture are often at the centre of the debate on the environmental impact of organic vs. conventional agriculture. Critics of organic agriculture argue that due to its lower yields, organic agriculture would require considerably more land to produce the same amount of food, resulting in more widespread deforestation, greenhouse gas emissions and biodiversity loss (Trewavas 2001). Proponents of organic agriculture, instead, claim that organic yields are comparable to those from conventional agriculture. Current evidence suggests that, overall, organic yields are typically lower than conventional yields but that under certain conditions (e.g. legumes and perennials in rainfed agriculture and under favourable soil acidity) organic yields might nearly match conventional yields (Seufert *et al.* 2012). The majority of evidence on organic yields comes, however, from developed countries. In developing countries the evidence is much less clear (see Box 3 for a discussion of organic yields in developing countries).

Summary: Organic agriculture shows a superior environmental performance per unit area than conventional agriculture according to many environmental indicators. Organic management also provides an opportunity to improve soil fertility and reduce soil degradation. The environmental performance per unit output (i.e. per unit food production) depends on organic yields and is less clear.

Box 3 - Yields of organic agriculture

The evidence

Many have argued that organic agriculture as well as other non-certified 'organic' or 'sustainable' management practices can lead to substantial yield increases in low-input farming systems in developing countries (Pretty & Hine 2001; Altieri 2002; Scialabba & Hattam 2002; IFAD 2003; IFAD 2005; Parrott *et al.* 2006; Pretty *et al.* 2006; Badgley *et al.* 2007; UNCTAD & UNEP 2008). In marginal areas, farmers often have limited access to chemical fertilizers, improved seeds, irrigation water, and pesticides due to lack of capital, infrastructure and market access. The reduced input requirements of organic methods could provide opportunities for yield increases in these farming systems. In an extensive survey of projects across the developing world that implemented some form of 'sustainable' management practices, Pretty and colleagues (2001, 2006) showed that the adoption of these practices increased yields on average by 79% while simultaneously increasing the environmental performance of agriculture. The evidence collected by this and similar studies (Scialabba & Hattam 2002; IFAD 2003; IFAD 2005; Pretty *et al.* 2011) is, however, difficult to generalize, as the reported data comes from surveys of projects that lack an adequate control (Phalan *et al.* 2007). Empirical studies of 'truly' organic systems, instead, have to date not been able to support the claim for increased yields of organic agriculture in low-input systems in developing countries due to a lack of quantitative studies with appropriate controls in smallholder farming systems (Seufert *et al.* 2012).

The way forward

Despite the shortcoming of current studies in providing solid proof, an increasing body of literature supports the claim of sustainable yield increases in low-input systems through agroecological methods like agroforestry, integrated pest management, or the use of leguminous green manures (Hassanali *et al.* 2008; Sileshi *et al.* 2008; Méndez *et al.* 2010; Chen *et al.* 2011; Clough *et al.* 2011). To verify the claim that organic agriculture could lead to yield increases in smallholder agriculture, there is thus a strong need for similarly well-designed long-term studies that examine the yields of truly organic systems in smallholder agriculture in developing countries.

Organic agriculture might be able to increase food production by closing part of the yield gap still persistent in many developing countries, especially in Sub-Saharan Africa (Licker *et al.* 2010) if it can increase yields in low-input smallholder farming systems. But organic agriculture is unlikely to achieve as high yields as are attainable in high-input conventional agriculture (Seufert *et al.* 2012). The impact of organic agriculture on yields and thus on food production will therefore strongly depend on what type of farming system it is compared to.

Organic agriculture and farmers' livelihoods

In developing countries, where three out of four poor people live in rural areas and where more than 80% of rural people live in households that are involved in agriculture, improving poor farmers' livelihoods is central for addressing rural development (World Bank 2007). Many studies have suggested that 'organic' agriculture could contribute substantially to farmers' food security and improve farmers' livelihoods (Scialabba & Hattam 2002; IFAD 2003; IFAD 2005; Parrott *et al.* 2006; UNCTAD & UNEP 2008). Many of these studies, however, do not differentiate between 'truly' organic (see Box 1) and other 'agroecological' or 'sustainable' forms of agriculture. The scientific evidence on the livelihood impact of 'truly' organic agriculture, which in developing countries is mainly an export-oriented farming system (see Box 2), is, instead, more mixed.

The economic implications of organic agriculture

The profitability of organic agriculture for small farmers is dependent on organic yields (see Box 3), the cost of organic production, and the size of the organic price premium. All of these factors can vary strongly between systems and years (see e.g. Case study 2 on organic coffee production in Nicaragua). On the one hand, organic farmers often receive higher and more stable prices for their products (Bacon 2005; Bolwig *et al.* 2009; Valkila 2009) and organic inputs are often cheaper and total production costs thus lower (Eyhorn *et al.* 2007; Valkila 2009). On the other hand, organic production comes along with high entry costs, including higher labour requirements that often cannot be met by household resources, the need for increased knowledge and training, substantial certification costs and sometimes the need to purchase expensive organic inputs (Bray *et al.* 2002; Calo & Wise 2005; Chongtham *et al.* 2010). These costs are aggravated during the transition period during the conversion to organic agriculture required by organic standards – in this period organic practices are implemented but the products cannot be sold yet with the organic price premium. The net effect of organic cultivation on production costs thus depends on whether the typically reduced costs of inputs outweigh the typically increased costs of labour and certification. Some studies suggest that the total production costs of organic agriculture are lower than those of conventional agriculture (Margasagayam & Jebaraj Norman 1997; Eyhorn *et al.* 2007; Valkila 2009; Panneerselvam *et al.* 2011), while other studies found that reduced input costs did not always make up for increased labour costs (Lyngbaek *et al.* 2001; Bolwig *et al.* 2009). Premium prices are sometimes not necessary (Eyhorn *et al.* 2007; Panneerselvam *et al.* 2011), while in other cases they are essential and not always sufficient to make up for the costs of conversion and certification (Lyngbaek *et al.* 2001; Bray *et al.* 2002; Calo & Wise 2005).

The social implications of organic agriculture

Organic agriculture can also provide benefits independent from the profitability of the organic cash crop. Organic production in the South can generate social capital and can be empowering to small producers as they organize into cooperatives (Rice 2001). Organic cooperatives often foster social networks, provide training and extension services, as well as access to health and credit programs (Valkila 2009; Méndez *et al.* 2010). In many areas organic agriculture can also provide the opportunity for the use of local resources and for integrating traditional knowledge, as many elements of organic management are reminiscent of traditional farming methods in developing countries. Pioneers of the organic movement, like Sir Albert Howard, Robert McCarrison or Richard St. Barbe Baker, were inspired by peasant farming methods in Asia and Africa and sought to introduce these into Western industrial agriculture through organic management (Conford 2001). Rural areas may also benefit from the creation of employment in labour-intensive organic agriculture (Bray *et al.* 2002; Bakewell-Stone *et al.* 2008). Organic agriculture can also facilitate the participation of women who have less access to the formal credit market and often cannot purchase agricultural inputs (Tovignan & Nuppenau 2004; Goldberger 2008; Thapa & Rattanasuteerakul 2011, see Case study 1 on organic vegetable production in Thailand).

In addition, organic cash crops are often part of a diverse mixed farming system including livestock and cultivation of other crops for subsistence or local markets (Bacon 2005). Such a diverse system can help reduce vulnerability by lowering the economic dependence on a single crop. Last but not least, farming systems following agroecological principles often provide more stable yields and are more resilient to extreme weather events when compared to conventional systems (Holt-Giménez 2002; Lotter *et al.* 2003). This could be especially relevant under a changing climate.

Organic agriculture can also provide considerable health benefits by reducing the pesticide exposure of agricultural workers. It is estimated that up to 25 million agricultural workers in developing countries might suffer an episode of pesticide poisoning each year (Jeyaratnam 1990). By reducing pesticide use, organic management could thus provide an efficient means of reducing the health risk from pesticide exposure for agricultural workers and rural communities.

Summary: Organic agriculture has several benefits for farmers, including cheaper inputs, higher and more stable prices, and organization in farmer cooperatives. Organic cash crop production is, however, also associated with problems, including potentially reduced yields compared to intensive conventional methods, the costs of certification and high labour requirements. Whether the benefits of organic agriculture overcome the problems depends on the socioeconomic and agronomic context, e.g. the magnitude of the organic price premium, the cost of certification, the availability of agricultural labour and of organic inputs.

Box 4 – Organic food, nutrition & health

Although the nutritional role of agriculture has often been overlooked, agriculture can be a useful tool in addressing nutritional and health problems (Welch & Graham 1999). Organic agriculture is supposed to produce healthier and more nutritious food and could thus potentially contribute to dietary and nutritional needs. The scientific evidence on the nutritional quality of organic vs. conventional food is, however, rather uncertain due to the poor quality and contradicting results of many studies (Bourn & Prescott 2002; Magkos *et al.* 2003).

Nutritional value of organic food

Nutrient contents of organically and conventionally produced foods do not appear to differ strongly (Dangour *et al.* 2009). However, their bioavailability as well as the nutrient quality might be better in organic food (Magkos *et al.* 2003). It has also been hypothesized that non-nutrient components, like plant secondary metabolites, might be higher in organic food and might provide the most important health benefit of organic food (Brandt & Mølgaard 2001).

Pesticide residues

The reduced use of pesticides in organic systems is one of the most important reasons for consumers to buy organic. However, in developed countries, pesticide residue levels even on conventional food are low. Although it is likely that the non-use of chemical pesticides in organic systems results in organic food having lower pesticide residue levels, there are not enough studies to provide solid scientific evidence for a significant difference (Bourn & Prescott 2002). In developing countries, where many older and more toxic pesticides are used widely, pesticide residues on conventionally produced food are of more concern (Ecobichon 2001) and organic food might be relatively more important than in developed countries in reducing exposure to pesticides.

Dietary diversity

Dietary diversification is an important means of addressing nutrient deficiencies. Agricultural biodiversity can contribute to diversifying diets of poor farmers (Johns & Eyzaguirre 2006) and the higher diversity of organic systems could thus potentially improve the nutritional status of organic farmers. The contribution of organic agriculture to dietary diversification of farmers, however, has so far not been assessed.

Case study 1 – Organic vegetable production in Thailand

Thailand is one of the leading countries in Southeast Asia in the production of organic food and its domestic market for organic produce has recently bypassed the organic export market. The Government of Thailand implemented an extensive organic agriculture promotion programme in 2005, including several organic vegetable production pilot projects. This organic vegetable production follows organic standards but is not certified organic, rather being aimed mainly at household consumption or local markets.

Gender was the most important factor explaining the adoption of organic agriculture in a case study in Northeast Thailand. Households in which women had a central role were more likely to adopt organic vegetable production, as women were concerned about the health impacts of pesticide use under conventional farming as well as food quality.

The adoption of organic practices was also dependent on extension services, including training in organic management as well as education about the environmental and health problems of conventional farming. But the diffusion of organic agriculture was also mediated through fellow farmers. Another factor influencing the adoption of organic vegetable production was the availability of organic fertilizers – the area under organic agriculture on a farm expanded with increasing availability of organic fertilizers like manure and bio-fertilizers, made from crop residues and molasses.

Source: Scott et al. 2009; Thapa & Rattanasuteerakul 2011

Constraints to the adoption of organic agriculture

If organic agriculture is to play a role in providing sustainable food security and sustainable livelihoods, it needs to be accessible to poor farmers. The adoption or non-adoption of an agricultural technology or practice is influenced by the demographic and socio-economic characteristics of the farmer, by the policy, institutional and economic context, as well as by the nature of the technology itself.

Information and labour

Organic agriculture is a very information-intensive management system, or what has been called a 'software'-based² innovation (Rogers 2003). In addition to information about the concept of organic agriculture, organic certification and

² Rather than a 'hardware'-based innovation, which refers to the technology required.

organic markets, information on how to use organic management practices is crucial for good performance of the organic system. It has been shown that good management practices are more important in organic than in conventional systems for achieving high yields (Seufert *et al.* 2012). Information and education about organic agriculture is thus a necessary precondition for the diffusion of organic agriculture and the lack thereof has often been shown to hinder the adoption and success of organic agriculture (Goldberger 2008; Méndez *et al.* 2010).

In developed countries, organic agriculture has often evolved bottom-up, i.e. through initiatives and networks between farmers, rather than being advanced by government, research or extension agencies (Padel 2001). In developing countries, instead, information about organic agriculture is dependent rather on the presence of governmental or non-governmental extension services, while the actual adoption of organic agriculture is influenced both through bottom-up (i.e. farmer-to-farmer) as well as top-down (e.g. NGO³-to-farmer) channels (Goldberger 2008; Thapa & Rattanasuteerakul 2011).

Another key characteristic of organic farming is that it tends to replace inputs with labour. Instead of using herbicides, it relies on weeding and ploughing for weed management, and instead of using chemical fertilizers, it relies on incorporation of crop residues, cover cropping and compost for nutrient management. This high labour requirement has often been identified as an important barrier to the adoption of organic management (Bray *et al.* 2002; Bachmann 2011) or other low-input farming systems (Moser & Barrett 2003; Lee 2005). The increased labour requirements, especially during the periods of peak labour demands, can often not be met by household resources and thus require additional cash expenditure (Bray *et al.* 2002; Bolwig *et al.* 2009). This is particularly problematic in areas where availability of agricultural labour is limited due to emigration of workmen or due to movement of labour to non-agricultural sectors (Bachmann 2011). On the other hand, the increased labour requirement of organic production can also be an asset by creating employment in rural areas with limited job opportunities (Goldberger 2008).

Dependence on international markets

Organic agriculture in developing countries is an export-oriented farming system (see Box 2). Organic farmers are thus dependent on access to international markets, they need to undergo and pay for an extensive certification process, and they are subject to international regulations dictated often by foreign certification bodies and Northern markets. This dependence on international markets can pose substantial obstacles to small farmers and can potentially increase farmers' vulnerability.

In many developing countries, there can be substantial delays before farmers receive the full payments for their organic produce and organic farmers often sell parts of their organic produce on lower-paying conventional markets to receive

³ Non-governmental organization

immediate payments (Bacon 2005). They also bring produce to the conventional market that they cannot sell to the organic exporting companies, who often have a rather low demand and high quality-requirements (Bacon 2005; Valkila 2009; Chongtham *et al.* 2010, see Case study 2).

The international organic trade has been criticised for reproducing the inequalities of conventional North-South trade by concentrating market power in the hands of transnational organic buyers and certifiers and by imposing additional costs of certification on producers (Mutersbaugh 2002; Raynolds 2004; Getz & Shreck 2006; Scott *et al.* 2009). The bureaucratic organic certification process has also been said to favour large producers and to thereby increase the social inequalities between small and large farmers (Gómez Tovar *et al.* 2005; Getz & Shreck 2006). In addition, the need to conform to organic standards defined by Northern bodies (e.g. the EU or the USDA's National Organic Program) and monitored by local certifiers constrains farmers and prevents them from 'trading on their own terms' (Mutersbaugh 2002).

Summary: Several characteristics of organic agriculture, like its requirement of high management skills and more agricultural labour as well as its incorporation into an international commodity market, can provide considerable barriers for small farmers to adopt organic management or to gain benefits from organic farming.

Table 1 - Organic agriculture and farmer livelihoods

<p>Problems:</p> <p>increased costs (?)¹</p> <p>reduced yields (?)</p> <p>increased dependence³</p> <p>increased labour</p>	<p>Benefits:</p> <p>reduced costs (?)²</p> <p>increased yields (?)</p> <p>increased prices</p> <p>increased resilience</p> <p>increased benefits⁴</p> <p>increased employment</p>
<p>¹+ labour, + certification; ²- inputs; ³+ dependence on certifying & exporting companies; ⁴+ organization, access to health & credit services</p>	

Case study 2 – Organic coffee production in Nicaragua

Coffee is an important commodity for Nicaragua, with organic coffee making up about 4-5% of Nicaraguan coffee exports. Organic coffee is mainly produced by small-scale farmers who are organized in cooperatives. Low coffee prices on the international market as well as reoccurring droughts have led to a coffee crisis in Nicaragua, and the increased livelihood vulnerability of small coffee farmers.

The economic implications of organic production were dependent broadly on coffee yields, production costs and coffee prices. When low-intensity conventional systems changed to intensive organic management, yields increased and farmer incomes generally increased due to lower costs (supplying nutrients from purchased organic inputs was often cheaper than supplying nutrients from purchased chemical fertilizer) and higher prices fetched for organic produce. When high intensive conventional systems changed to organic management, instead, the premium prices did not always make up for the loss in production due to lower yields under organic management. Only in years with very low coffee prices in the conventional market was organic farming more advantageous economically than intensive conventional farming due to the price premiums received. In addition, organic coffee cooperatives were able to sell only 60% of their certified organic produce on the organic market as organic exporters only bought limited quantities of high quality. Overall, organic coffee production reduced livelihood vulnerability by reducing the exposure to the price volatility of conventional coffee markets and by increasing income in years of low coffee prices in the conventional market. The case of coffee producers in Nicaragua shows exemplarily how the impact of organic production on farmers' livelihoods varies widely and is dependent on the characteristics of the preceding conventional and the new organic management.

Source: Bacon 2005; Valkila 2009

Summary

Organic agriculture and certification of environmentally friendly and socially just practices provides a promising means of connecting producers and consumers across large distances. On the one hand, it can ensure consumers that their food was produced following sustainable standards. On the other hand, it provides producers with a means of engaging consumers in a share of the true production costs of food. Translating the noble goals of organic agriculture into a real improvement for poor farmers is, however, a challenging task, and evidence on whether this is actually achieved is mixed (see Table 2).

Table 2 - Assessment of impact of organic agriculture relative to conventional agriculture on selected variables

Area	Indicator	Evidence	Direction
Environmental	GHG emissions	Uncertain	Tendency 0
	Energy use	Consistent	✓
	Soil C sequestration	Uncertain	Tendency ✓
	Biodiversity	Consistent	✓
	N leaching	Uncertain	Tendency 0
	Soil fertility	Consistent	✓
	Yields (overall)	Consistent	Tendency ✗
Socio-	Yields (smallholder)	Uncertain	Tendency ✓

economic	Farmer incomes	Uncertain	Tendency ✓
	Farmer livelihoods	Uncertain	Tendency ✓
	Social justice	Uncertain	Tendency 0 to x
	Gender equality	Uncertain	Tendency ✓
Nutrition & Health	Pesticide exposure	Consistent	✓
	Food pesticide residues	Uncertain	Tendency 0
	Food nutrient contents	Uncertain	Tendency ?
	Food non-nutrient contents	Uncertain	Tendency ✓

0 indicates neutral effect, ✓ indicates positive effect, x indicates negative effect

To achieve environmental sustainability, good organic management practices need to be applied in order to achieve high yields and organic practices need to be adapted to local conditions. Economic sustainability of organic agriculture depends on adequate prices for organic produce and the accessibility of international organic markets. To enhance the social sustainability of organic agriculture, certification costs should be kept to a minimum, and even better, should be shared by both consumers and producers.

Policy recommendations

Organic agriculture provides an opportunity for CIDA to invest in sustainable agricultural development and thus to promote the integration of environmental, economic and social sustainability in developing countries. Organic agriculture provides a variety of development benefits, including probably increased productivity in low-input agriculture, empowerment of women, increased community organizational capacities, decreased exposure to pesticides in farming communities, improved soil fertility in areas where land degradation is an issue, and reduced vulnerability of farmers to market price fluctuations. However, to make organic agriculture beneficial for poor farmers the problems and constraints of organic agriculture need to be addressed and organic agriculture should be adopted where it shows most potential for success.

More specifically, CIDA should:

- 1. Contribute to capacity building of organic farmer cooperatives.** Cooperatives are key for the success of organic agriculture in developing countries. They increase social capital, provide important services like training and education, access to health, and housing and credit services, and they provide support with the certification process and access to international markets. Well-managed cooperatives and well-trained cooperative leaders can contribute significantly to the success of organic agriculture. Training and information are crucial for the adoption of organic practices. Local farmer cooperatives are best suited to provide this training in a culturally appropriate manner and they can ensure follow-up sessions, which are important to ensure long-lasting effects of extension services.
- 2. Promote the development and integration of organic markets.** Certified farmers and organic cooperatives often have problems selling all their organic produce despite high demand in international markets. Small farmers require improved access to international markets if organic agriculture is to become a viable option for them. A better integration of local producers with international markets and a better coordination of local cooperatives and organic extension services with national legislation and international certification standards are needed.
- 3. Help in developing domestic organic markets.** Demand for organic produce in the upper- and middle-class of developing and transition countries is growing. Domestic markets for organic produce therefore need to be developed and could contribute to increased organic production in developing countries (see e.g. Case study 1). Domestic organic markets could also address some of the problems of current export-oriented organic agriculture by making it easier for producers to have a voice in the writing of organic policies and regulations, and by making it easier to access organic markets. CIDA could contribute to this through capacity building of public and private sector institutions on organic management, organic certification and organic markets, as well as by advising governments towards policy- and market development for the organic sector.

4. **Support the development of participatory guarantee systems (PGS).** The need for and cost of organic certification often act as barriers to the adoption of organic agriculture, especially for small farmers. PGS represent an alternative to third party certification and are a peer-review style organic certification based on active participation of producers, consumers and other stakeholders in the definition of standards and the certification process. They are based on trust, social networks and knowledge exchange (IFOAM 2012), they considerably reduce the cost of organic certification and empower producers by enabling them to contribute to the definition of standards (see Case study 3).
5. **Concentrate policies on countries and regions where organic agriculture has the most potential.** The relative advantage of organic agriculture depends on the regional context, the type of farming system currently in place, as well as on the alternatives open to farmers. Organic agriculture should first be implemented in those regions where it could be most useful and most feasible, i.e. where (i) current agriculture is low-input agriculture with low productivity and organic management might provide opportunities for yield increases, (ii) where organic nutrient sources (e.g. animal manure or compost) are available, (iii) where current conventional agriculture has created environmental and health problems, and where (iv) agricultural labour for organic management is available.
6. **Support research on organic agriculture in developing countries.** Organic agriculture in developing countries is not well studied and thus not very well understood. The productivity and the environmental performance of organic agriculture in developing countries especially require further investigation. Research on and improvement of organic management practices under tropical and subtropical conditions is also needed. Organic agriculture research in developing countries should be centred on farmers and conducted with and for farmers, identifying and taking into consideration their problems, needs and perceptions.

These policy recommendations are very much in line with CIDA's policy goals on agricultural development of (1) strengthening agricultural research and knowledge transfer, (2) building institutional capacities and human capital in developing countries, (3) developing domestic markets and improving market access in developing countries, and of (4) creating new opportunities for poor farmers (CIDA 2003). The adoption of an organic agriculture strategy and the implementation of the policy recommendations could thus provide a good opportunity for CIDA to work towards its goal of promoting sustainable agricultural development.

Case study 3 - Participatory guarantee system (PGS) in Mexico

The organic sector in Mexico has grown considerably in recent years, with employment growing on average by 23%, income by 26% and organic agricultural land by 33% annually. The introduction of a national organic program in 2006 limited the use of the organic label to certified organic products. After lobbying by local organic groups who were concerned about the impact of this new law on small farmers who followed organic methods but could not afford certification yet still wanted to differentiate their products from conventional products in the market, the Mexican government also included the recognition of PGS for certification of organic products sold in local markets in the law.

How does PGS work?

The key group in a PGS that oversees the certification process is the certification committee, consisting of volunteer members of local producers, consumers and other stakeholders. Members of the certification committee conduct farm visits to monitor the management practices and provide education to farmers on organic methods. The organic standards required to be certified by the PGS are defined according to local conditions and traditional practices, and result from discussions amongst the group.

The experience with PGS in Mexico

PGS initiatives in Mexico provided opportunities for less affluent farmers to receive organic certification. They contributed to the creation of social capital in local communities by developing social networks, building trust relationships and increasing social justice by assuring fair prices. Members of PGS did usually share more of the ideals of the organic movement and were less economically oriented than organic farmers who were third-party certified. Participation in PGS posed considerable time and work demands on volunteer members. Another constraint identified by PGS members was the potential for social and personal conflicts over certification decisions or the level of commitment to the project.

Source: Nelson et al. 2010; Hochreiter 2011

Further reading

Bengtsson *et al.* 2005 – This study examines the scientific evidence on the impact of organic agriculture on biodiversity through a meta-analysis of primary studies, concluding that organic agriculture has usually positive effects on species richness and species abundance but that the effect differs with organism group and scale.

Halberg *et al.* 2006 – A book edited by N. Halberg from the Danish Research Center for Organic Food and Farming, providing an overview of the potential of organic agriculture at a global scale. It includes chapters on the organic market, the political ecology of organic agriculture, on the potential contribution of organic agriculture to social and ecological justice and food security, as well as chapters on organic soil fertility and nutrient management.

Raynolds 2004 – L. Raynolds examines the global organic food network, discusses the consequences of the globalization of organic agriculture and analyses its implications for the principles and goals of organic agriculture.

Rigby & Cáceres 2001 – A paper discussing the relationship between sustainable and organic agriculture and the role of regulations and certification in organic agriculture, arguing that ‘organic’ and ‘sustainable’ cannot be used as synonyms.

Seufert *et al.* 2012 – This study examines the scientific evidence on organic yields through a meta-analysis of primary studies, concluding that organic yields are generally lower than conventional yields but that the yield difference depends on the crop species, agroecological and management conditions and that under certain conditions organic yields can almost match conventional yields.

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