PRODUCTIVITY AND PROFITABILITY OF ORGANIC FARMING SYSTEMS IN EAST AFRICA
Productivity and Profitability of Organic Farming Systems in East Africa

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# Table of Contents

List of abbreviations ........................................................................................................ iv  
Acknowledgements ........................................................................................................ v  
Executive summary ........................................................................................................ vi  
1. Introduction .................................................................................................................. 1  
2. Methodology of research ............................................................................................. 4  
   2.1 Documentary search ............................................................................................... 4  
   2.2 Documentation encountered .................................................................................. 4  
   2.3 Defining productivity & profitability ................................................................. 5  
   2.4 Defining organic agriculture in the context of farming systems in Africa ........... 6  
3. Overview of organic agriculture in East Africa ............................................................. 11  
   3.1 General overview .................................................................................................. 11  
   3.2 Certified Organic Agriculture in Uganda .......................................................... 13  
   3.3 Certified Organic Agriculture in Tanzania ....................................................... 15  
   3.4 Certified Organic Agriculture in Kenya ............................................................. 15  
   3.5 Certified Organic Agriculture in Rwanda ........................................................... 15  
   3.6 Certified Organic Agriculture in Burundi ............................................................ 16  
4. Findings of literature review of productivity and profitability of (certified) Organic Agriculture in East Africa ......................................................................................... 17  
   4.1 Relevant research world-wide .............................................................................. 17  
   4.2 Comparing systems in Africa ................................................................................ 19  
   4.3 Productivity .......................................................................................................... 20  
   4.4 Profitability .......................................................................................................... 22  
   4.5 Additional findings ............................................................................................... 23  
      4.5.1 Price premiums .............................................................................................. 23  
      4.5.2 Price premiums and spill-over ...................................................................... 27  
      4.5.3 Out-grower production capacity and income ........................................... 28  
      4.5.4 System improvements ................................................................................. 29  
      4.5.5 System resilience ......................................................................................... 30  
5. Conclusions .................................................................................................................. 32  
6. Recommendations ...................................................................................................... 36  
7. References .................................................................................................................... 38  
Annex 1. Best Practice Comparative Research ................................................................. 41  
Annex 2. Documentation encountered ........................................................................... 42
List of abbreviations

AELBI  Agro Eco Louis Bolk Institute
AUC   African Union Commission
ASC   African Studies Centre
BOAM  Burundi Organic Agricultural Movement
BOKU  Vienna University of Natural Resources and Life Sciences
CAADP Comprehensive African Agriculture Development Programme
CBD   Convention on Biological Diversity
CBO   Community Based Organization
CBTF  Capacity Building Task Force on Trade, Environment and Development (UNEP-UNCTAD)
CFS   Committee on World Food Security
CGRFA Commission on Genetic Resources for Food and Agriculture
DIIS  Danish Institute for International Studies
EOA   Ecological Organic Agriculture Initiative
EPOPA Export Promotion of Organic Products from Africa
FBO   Faith Based Organizations
HODECT Horticultural Development Strategy
ICS   Internal Control System
IFAD  International Fund for Agricultural Development
IFOAM International Federation of Organic Agriculture Movements
IFRC  International Federation of Red Cross and Red Crescent Societies
KIT   Royal Tropical Institute
KOAN  Kenya Organic Agriculture Network
NGO   Non Government Organization
NOAM  National Organic Agriculture Movement
NOGAMU National Organic Agricultural Movement of Uganda
OSEA  Regional cooperation for organic standards and certification capacity in East Africa
PGS   Participatory Guarantee System
ProGrOV Productivity and Growth in Organic Value chains
RBS   Rwanda Bureau of Standards
RHODA Rwanda Horticulture Development Authority
ROAM  Rwanda Organic Agriculture Movement
TOAM  Tanzania Organic Agriculture Movement
UGX   Ugandan Shilling
UNCCD United Nations Convention on Combating Desertification
UNCTAD United Nations Conference on Trade and Development
UNDP  United Nations Development Programme
UNEP  United Nations Environment Program
USD   United States Dollar
WFP   World Food Programme
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Executive summary

This review of literature of the productivity and profitability of organic agriculture in East Africa finds that in 2010/11 approximately 330,000 certified organic producers in Uganda and Tanzania alone generated approximately USD 56 million in export revenue. The main products produced are cotton, sesame and coffee, followed by cocoa, dried fruits, frozen fruit/pulp, fresh mainly tropical fruit and spices. Uganda and Tanzania are the two main organic producing countries in the region. Certified organic agriculture is significantly smaller in scale in Kenya, Rwanda and Burundi.

Certified organic production is largely an institutional arrangement in which exporters organize smallholders to produce and process certified organic produce for export to well established organic markets in Europe, the USA and Japan. The smallholder producers are provided with training and are paid a premium for produce that meets the exporters specifications. However, significant proportions of the certified organic produce are sold locally on conventional markets due to specification issues (e.g. size requirements) and farmers needing cash flow. Local premium markets for organic food are developing in capitals throughout Africa but are still small in size.

This review finds that detailed independent, academic research on the productivity and the profitability of organic agriculture in East Africa is very limited and in-depth organic comparative research even scarcer. This lack of research reflects the general under-representation of organic research in agricultural research programs as a whole.

The data available clearly points to significant yield increases when smallholders in East Africa adopt organic agriculture practices. It also found that farmers that engaged in certified organic export production in East Africa were significantly more profitable in terms of net farm income earnings than those that engaged only in conventional production. The training provided as part of the institutional arrangement between exporters and smallholder producers is critical to achieving productivity and quality gains. The premiums paid by the contracting companies are key to the superior profitability of certified organic smallholders in the region.

The positive benefits of organic export smallholders in East Africa in terms of productivity and profitability reflect the experiences of resource poor farmers with under-developed, degraded and low (organic or synthetic) input farming systems across Africa in general. Studies indicated that average yield increases of over 100% can be achieved, when smallholder farmers receive training in basic organic agriculture practices. The success of organic agricultural systems can also be attributed to their robust performance in harsh rain-fed conditions, an important factor in times of drought and climate change.

These findings are very significant given that ‘green revolution’ approaches have largely failed to date in Africa. Given that the great majority of farms in East Africa, and in Africa in general, are in desperate need of affordable, resilient and productive solutions, organic agriculture systems that empower farmers and build their social and natural productive capital offer an effective and sustainable alternative to costly green revolution approaches. The key to realizing this potential is effective training and extension support and the establishment of stable market linkages to give
farmers the confidence to further invest in their farms and go beyond subsistence approaches to farming. This can be achieved through integrating organic agriculture practices and systems into extension and training programs as well as in policies on climate change, food security, land degradation and drought, biodiversity and sustainable development.

Given the competitive advantage that East African nations have developed in export orientated organic agriculture, it would be beneficial to leverage this capability by expanding certified organic production in conjunction with organic agriculture based rural development. Harvesting these synergies would help bring the productivity, resilience and cost benefits of organic agriculture to a much wider proportion of the East African population – both producers and consumers. The establishment of local market linkages and consistent and effective capacity building would need to be the cornerstone of such approaches so that farmers are able to realize their potential and help to nourish their communities.

In conjunction with Government policy support, forming strategic partnerships with key stakeholders in East Africa and internationally will be necessary to implement organic agriculture based sustainable development that addresses hunger, rural poverty, climate change and land degradation. The proponents of the regional cooperation for organic standards and certification capacity in East Africa (OSEA) are encouraged to establish such partnerships for a comprehensive approach to addressing local food security, poverty eradication and climate resilience based on organic approaches to sustainable development.

The recently established African Ecological Organic Agriculture (EOA) Initiative for Africa, which seeks to mainstream ecological organic agriculture into the African Development Agenda, could be an ideal vehicle for realizing this approach not only in East Africa but across the continent. The African Union Summit decision on Organic Farming in 2011 also recognized this potential. The Summit decision requested the AU Commission and the New Partnership for Africa’s Development (NEPAD) Planning and Coordinating Agency (NPCA) to initiate and provide guidance for an AU-lead coalition of international partners on the establishment of an African organic farming platform based on available best practices; and to provide guidance in support of the development of sustainable organic farming systems and improve seed quality. The AU Commission therefore should also be a key partner going forward especially within the context of existing important policy frameworks such as their Comprehensive African Agriculture Development Programme (CAADP).

Finally its important for the proponents of organic agriculture in East Africa to establish what type of research is needed to advance organic agriculture in the region. Given the complexity and costs of comparative research it is suggested that the impacts of organic agriculture, both certified and non-certified are measured so that the benefits in terms of productivity, profitability, resilience, nutrition etc. can be communicated to decision makers and be used to underpin partnerships for implementation. It is therefore necessary to advocate for much greater support of research of organic agriculture practices and systems.
1. Introduction

There are currently almost 1 billion hungry people in the developing world, the majority of which are smallholder farmers and rural poor. Hunger is an entrenched problem in which at least three-quarters of a billion people have been hungry each day of the last three decades or more despite sufficient food production on a global level. The reasons for this are complex but ultimately they have been systematically locked-out of development with few rights and little access to resources. Due to poverty and relative exclusion from cash-based economies they, like many urban poor in developing countries, can also not afford to purchase food.

Since the global food crisis and the findings of the IAASTD report were released the importance of assisting smallholders has moved to the center of policy discussions on food security and poverty eradication. At least two billion people rely on 450 million smallholder farms for their sustenance. FAO recognizes that organic agriculture has an important role to play in addressing food security given its suitability for smallholder farmers in particular.

More recently and partly as a consequence of the reformation of the Committee for World Food Security (2009), the Rio+20 agreement ‘The Future We Want’ (2012), and the consultations on the UN post 2015 UN global development agenda, the wider issues surrounding food security are being discussed especially in the context of population growth, global warming, climate change impacts and the need for inclusive sustainable development. Issues such as right-based approaches, land tenure issues, land grabbing, women’s empowerment, land degradation, resilience, participatory food system governance, perverse subsidies and unfair trade policies, protection of ecosystem functions, nutrition, rural-urban linkages, food waste, deforestation, diversity and adoption of climate smart agriculture practices (largely based on existing organic practices) are now increasingly seen as part of the holistic approach needed to effectively nourish an estimated 9 billion people by 2050 while simultaneously eradicating extreme poverty.

Given that the world’s population is rising and the increasing severity of climate change, there is a need to increase food production in a sustainable way so as to halt the degradation of ecosystems, ecosystem functions and the loss of natural resources and biodiversity. Much greater resilience, diversity and flexibility will need to be built into food systems at both the local and global levels given the unpredictability and severity of ongoing climate change. If poverty and hunger are to be reduced and not increased as the population grows, much greater participation of people in food systems will also be necessary.

Some stakeholders, especially those from the agribusiness sector call for the sustainable intensification of agricultural production. The premise is that growing more food per hectare will reduce pressure for more land for the expansion of agriculture thereby reducing clearance of forests and savannahs and conserving biodiversity. However the ‘doing more with less’ approach of Monsanto, Syngenta and others to sustainable intensification is focused on intensifying demand for their input products especially seeds, herbicides and pesticides resulting in decreased sustainability and greater external dependency of farms which use their products. It also does not halt the acceleration of industrial plantation scale agriculture, which is deforesting the developing world for
the production of feedstock primarily used for industrial biofuel, paper and meat production. This also relies on intensive use of external inputs to produce these monoculture industrial crops.

IFOAM on the other hand advocates for the ecological intensification of agriculture to raise the resilience, productivity, profitability and ecosystem functions of farms (smallholder position paper). Organic agriculture is defined by IFOAM as: “a production system that sustains the health of soils, ecosystems and people. It relies on ecological processes, biodiversity and cycles adapted to local conditions, rather than the use of inputs with adverse effects. Organic agriculture combines tradition, innovation and science to benefit the shared environment and promote fair relationships and a good quality of life for all involved.” In addition IFOAM’s standards prohibit the clearance or destruction of high conservation value.

Ecological intensification is achieved through increasing the performance of ecological functions at plant, animal, practice and systems levels with a special focus on creating synergies. This is achieved largely through the use of locally available or locally adapted and farmer controlled biodiversity and builds on the practices and systems of traditional agriculture as well as the latest applied ecology and agro-ecological research and practice. Ecological intensification can be considered as a minimum best practice organic agriculture is the starting point for ecological intensification. It represents the great-untapped potential that exists in organic systems to increase performance of the farm and reflects the need for much greater research and development of organic agriculture to begin to adequately achieve this potential.

The uptake of organic agriculture is driven by a number of factors. Consumers seek products grown in a more natural manner with minimum impacts on the environment and which are free from pesticides and antibiotics etc. Many farmers and rural communities, especially those with a strong history of traditional agriculture and respect for nature also wish avoid the contamination of their ecosystems, the degradation of their soils and food with toxic inputs and monocultures which deplete the richness of their diverse systems. Many farmers also wish to access markets with price premiums that are often available for organically produced foods, ingredients and commodities either for their health benefits or for other quality factors such as flavor. Other farmers adopt organic practices and systems as affordable and accessible means of strengthening the resilience and productivity of their farms based largely on locally available resources. In many cases farmers adopt or wish to adopt organic methods because of a combination of these drivers and, depending on their objectives and the requirements of markets, may or may not decide to be certified.

In addition humanitarian organizations are recognizing the appropriateness of organic agriculture practices for the smallholders that they wish to support and strengthen. They feel comfortable with systems that empower the smallholder and communities and which strengthen and regenerate their soils and systems, which increase profitability by avoiding costly inputs that in conventional systems need to be purchased season after season, and importantly which do not expose those they wish to help to toxic inputs. Other important stakeholders such as UNCCD see the importance of sustainable land management practices to address land degradation and improve the resilience of ecosystems and livelihoods, especially in Africa.
In view of the above, the “Regional cooperation for organic standards and certification capacity in East Africa” (OSEA)\(^1\) project launched a literature review in early-2013 to assess what organic agriculture might hold for smallholders in East Africa\(^2\) in terms of productivity and profitability.

This report comprises of four main sections. Chapter 2 presents the methodology of the literature review. Chapter 3 provides an overview of organic agriculture in East Africa. The actual results of the literature review on organic research in East Africa regarding productivity and profitability are summarized and discussed in Chapter 4. The conclusions and recommendations are found in chapters 5 and 6 respectively. East Africa for the purposes of this report is defined as consisting of the OSEA project member countries: Burundi, Kenya, Rwanda, Tanzania and Uganda. These countries also make up the East African Community (EAC).

\(^1\) The OSEA project is being undertaken with support of Swedish development cooperation and implemented by IFOAM in close cooperation with the National Organic Agriculture Movements in Burundi (BOAM), Kenya (KOAN), Rwanda (ROAM), Tanzania (TOAM) and Uganda (NOGAMU).

\(^2\) East Africa is here understood as comprising all members of the East African Community (EAC): Kenya, Tanzania, Uganda, Burundi and Rwanda.
2. Methodology of research

2.1 Documentary search

The bibliographical search for relevant documentation took place in the months of December 2012 and January 2013, through libraries, the Internet, and through key experts in organic agriculture and partners involved in the OSEA project in- and outside Africa.

In the document search the following key words and combinations thereof were used: “organic”, “organic agriculture”, “Africa”, “East Africa”, “Kenya”, “Tanzania”, “Uganda”, “Rwanda”, “Burundi”. The search related to the title of publications, and sometimes to the abstract text - depending on source. Literature on “organic matter”, “comparison of organic and non-organic fertilizers”, “organic growth” etc. was sieved out unless there was clear reference to “organic agriculture” or “organic farming”.

The bibliographical search was carried out through the libraries of the Royal Tropical Institute (KIT), the African Studies Centre (ASC) and Wageningen University in the Netherlands. The search also comprised the proceedings of the 2nd African Organic Agriculture conference (Lusaka, Zambia, 2-4 May 2012), the website Organic E-Prints, and the Internet in general.

Furthermore, e-mail requests for white and grey literature were sent to key experts and institutions, all OSEA project partners and all IFOAM members and affiliates in the research countries were addressed.

2.2 Documentation encountered

Annex 2 lists the main publications encountered on the productivity and the profitability of organic agriculture in East Africa. The documents include comparative research reports (organic vs. conventional), impact assessments and evaluations of organic projects (in their contexts), policy reports (distinguishing organic from non-organic), plus a few publications that relate to the key elements of organic agriculture (i.e. organic soil, crop and pest management) without necessarily referring to that system as such.³ The annex also lists documents that are organic specific, i.e. focusing on organic management of a crop, issues of organic marketing and trade, situations elsewhere in Africa, and more general organic policy influencing materials.

³ Many more documents would of course comply with the latter criterion; the documents included are just considered a “by-catch” of this review of literature.
2.3 Defining productivity & profitability

- **Productivity**

In this literature review productivity is considered at the level of the individual farm. Main indicators of productivity are: total production per hectare, family labor input per hectare, production costs (including seeds, inputs and hired labor), and gross and net margins.

Data on productivity is very location-specific and dependent on factors such as soil quality, water availability, mono or mixed cropping, plant density, etc. For proper comparative research it is essential to have a good context description of the organic system and the reference systems. A plain comparison of organic project data with for example official provincial or national average production figures will not generally lead to relevant outcomes.

For the purpose of comparison, data on productivity should ideally cover the situation before and after adoption and implementation of organic agriculture. A good alternative is to compare an existing organic system in one location with a perceived similar conventional system nearby. However, neither such analysis is common. In-depth system comparisons for East Africa are scarce, and when made, the comparison is often between data from an organic conversion project and perceived “average” conventional production data. Yet, organic conversion projects have their own particularities regarding farmer selection and linkage to markets, which thus restricts the applicability of any conclusions\(^4\). Moreover, the reference “average” in conventional data may refer to the production system as defined by extension agents, rather than by farmer practice.\(^5\)

- **Profitability**

Profitability is here also considered at the level of the individual farm. Main indicators of profitability are price, income, gross margin, net income. A production system may be very productive but be very marginal in terms of profitability. Conversely, a production system may be profitable while not being particularly productive. Profitability is particularly dependent on sale price per unit and on the costs of production.

In competitive markets, price margins are relatively low so that production costs have a significant impact on gross income – this renders the productivity of farm production a particular concern. In more exclusive and specialized markets, such as the organic market, prices per unit are generally higher so that the relative share of farm production costs may be lower, and productivity does not necessarily have to be particularly high. Price premiums may be available to organic producers depending on the crop and on farmers’ linkage to markets. Certified-organic farmers will generally require a higher price to compensate for the costs of inspection and certification. Yet, often producers can only sell part of their organic crops at a premium price, whereas rotational crops may not be able to obtain a price premium at all.

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\(^4\) There is a risk of over-valuation of organic conversion data as compared to conventional. For example, organic conversion projects will usually not work with the very poor for reasons of efficiency, whereas the very poor do appear in average data of conventional production. The transaction costs of organic conversion projects are also often lower than in conventional thanks to external support in training, certification or trade.

\(^5\) For example, expenses on fertilizers may in practice be half of the recommended dose.
Any production system will of course aim for optimal productivity to boost profitability, yet for specialized products such as organics, market access may be more of a concern for profitability than productivity.

Profitability is also dependent on many other factors such as the power relationship and degree of fairness between producer and buyer, the quality of the products and the availability of markets that are willing to pay for benefits such as greater flavor profile of coffee beans or vegetables that are free from toxic chemicals. Resilience to shocks such as price hikes and climate irregularities are also important factors that affect profitability.

It is important to note that organic systems usually differ from other systems both in production and in marketing and trade. The diffusion and appreciation of organic farming by smallholders in East Africa and its impact cannot be understood without a proper analysis of the functioning and the robustness of the downstream stages of the value chain.

### 2.4 Defining organic agriculture in the context of farming systems in Africa

Africa is the last populated continent to develop in a ‘modern’ way. The green revolution of the latter half of the previous century largely failed in Africa. The green revolution refers to a series of research, development, and technology transfer initiatives, occurring between the 1940s and the late 1970s that increased agriculture production worldwide, particularly in the developing world in the 1960s. The inability of farmers to pay for the package of inputs required (hybridized seeds, synthetic fertilizers, herbicides, pesticides), reliance on rain fed systems due to lack of irrigation as well as the high diversity in topography and soil types even within the same locality were key reasons for its limited success in Africa. To this end modern forms of agriculture are far less developed in Africa with Southern Africa being a key exception.

While the green revolution may have failed to take hold in East Africa, the region does however have a long history of investment in large-scale commodity production for export markets enabled largely by foreign investment and foreign controlled enterprises. Unlike the original aims of the green revolution, such agriculture investments are not aimed at enhancing local food security through the local production of staple crops, rather these initiatives take advantage of cheap labor, often tenuous land tenure laws, good soils, and plentiful sunshine to grow crops for consumers in developed nations such as tea, coffee, cotton, sugar, cocoa, tropical fruits and more recently fresh flowers and vegetables. Such export based production systems are usually large in scale and can consist of estates or plantations owned and farmed by the company or they can consist of many smallholder producers contracted and consolidated into groups to achieve economies of scale. In recent years some of these initiatives have been converted fully or partly into certified organic value chains to respond to demand from markets for organic products in developed countries.

The majority of farms in East Africa however are small family farms that are largely subsistence based where any surpluses are sold locally. Most of these farmers have very little cash and don’t have the means to invest in irrigation etc. and therefore the majority relies on rain-fed forms of agriculture. There is huge regional variation in rainfall, which can severely impact the farmer’s ability to produce food. In some regions of East Africa the land is lush and in others, often relatively nearby, it is semi-
arid and suffers from drought and desertification. Such farmers are often food insecure and suffer levels of poverty that do not permit them to meet the basic needs of their families such as health and education services.

These farmers may use a very limited number of conventional and / or organic inputs and practices. Traditionally smallholder farming in East Africa generally uses animal compost and crop residue recycling as the principal soil fertility management strategies. They generally grow maize and legumes as their staple crops. However, going back to before the introduction of maize crops such as millet, sweet potato, sorghum and cassava etc. would have been more prominent. Generally, however, farms are very undeveloped as they lack well planned and well managed systems due to a variety of reasons most notably, extreme poverty, insecure land tenure issues, inconsistent / inadequate rainfall, lack of access to training and advice and also insufficient means to purchase the most basic of inputs such as local seed varieties.

To this end the farms of many traditional subsistence farmers in East Africa could be defined as organic by default as they can rarely afford to purchase synthetic inputs and do not have awareness of organic approaches nor access to training in basic organic practices to improve the productivity and profitability of their farms by natural and predominately local based means. However they are also not consciously choosing to avoid conventional inputs and therefore may also to choose to use conventional inputs such as synthetic fertilizer if they could. To this end it can also be said that with the advent of synthetic inputs and their occasional or random use in smallholder farming the loose concept of traditional farming is evolving to also include casual use of such synthetic external inputs and therefore blurring the definition of what constitutes traditional, conventional and organic.

Figure 1 provides a conceptualization of the relationship between traditional (organic by default), sustainable agriculture, organic agriculture and certified organic agriculture in the context of all agriculture. However, this figure does not capture the differences between the systems effectively and more work is required to do this so that development pathways for smallholder agriculture can be better defined.
What predominately characterizes smallholder farming in Africa however is a lack of development opportunities, poverty and limited access to basic training and resources rather than organic or conventional. There is therefore a lot of overlap in terminology to describe such under-developed farms. Once farmers make conscious decisions to develop their farms and have the resources to do so defining the type of farming system is easier with a progression from either basic to good to highly intensified organic or conventional commercial farms.

In terms of certified organic agriculture, there is a small but highly significant and growing segment of global agricultural production and consumption. Organic agriculture as a system is generally applauded for its perceived positive contributions to humankind, animals, and the environment, thanks to the sustainable production of food, feed and fiber, without the use of any unsustainable contaminants such as pesticides, herbicides, genetically-modified organisms or growth regulators. Organic crop management practices also contribute, by their nature, to the mitigation of and adaptation to the impacts of climate change. Moreover, many consumers actually prefer organic over non-organic products for their taste and image, and they deliberately pay a higher price for organic items. The current status of certified organic agriculture in East Africa is well reviewed in Chapter 3.

- What is considered organic agriculture in this review?

As can be seen above a review of the literature about the productivity and the profitability of organic agriculture in East Africa raises methodological questions as to the definition of organic agriculture and resulting overlaps. The categories “organic”, “traditional (low/no input)” and “conventional” are often not easy to separate in East Africa.
IFOAM defines “organic agriculture” as: “a production system that sustains the health of soils, ecosystems and people. It relies on ecological processes, biodiversity and cycles adapted to local conditions, rather than the use of inputs with adverse effects. Organic agriculture combines tradition, innovation and science to benefit the shared environment and promote fair relationships and a good quality of life for all involved.” IFOAM regards any system that uses organic methods and is based on the principles of organic agriculture as ‘organic agriculture’ and any farmer practicing such a system as an “organic farmer”.

To this end IFOAM’s definition of organic agriculture is based on farming practices rather than control systems such as certification. However countries and groups of countries have developed their own specific regulatory systems for inspection and certification of “organic agriculture” and “organic products” in order to enable the distinction between organic and non-organic products in the market place. Significantly the use of the label “organic” on products in these cases is restricted, controlled and certified; and the resulting products are then “certified organic”. In Europe, for example, if products are to be sold as organic then they must, by law, be third party certified. East Africa is well known for its development of certified organic agriculture that has occurred to meet demand in the burgeoning markets for organic products in the EU, USA and Japan and to comply with the regulatory requirements of these markets. Organic certification is however only recommended by IFOAM for markets that require it. It is the process that shows and guarantees that a product has been produced according to organic production principles and practices.

Third-party certification is based on a third party other than the buyer or producer providing assurances that organic standards are followed. Third-party certification is well established in Africa, with many international bodies and local certification bodies providing services. Third party certification is a service usually provided by a certification body to its clients for a fee (the certification fee). The service consists of an on-site review of farming practices and of the corresponding records and documentation kept by the farmer, to verify compliance with the relevant organic standards. This inspection is done at least once a year, and is performed by an organic inspector hired by the certification body. There are two scenarios under which organic producers can be third party certified:

- Individual third party certification, whereby the farmer alone signs a contract with the certification body and will obtain his or her-own organic certificate.
- Group certification, whereby a group of farmers (either organized in a cooperative way or organized by a buyer) is managing an Internal Control System (ICS) and requests certification as a group.

IFOAM regards third party certification as a reliable tool for guaranteeing the organic status of a product, and one that appears to be most relevant in an anonymous market. But IFOAM does not see this as ‘universal’, and not the only tool to describe organic agriculture. Apart from third party certification there are other methods to assure the market place of the quality of organic agriculture. These can be in the form of self-declarations or participatory guarantee systems. There are also situations where the relation between the consumer and the producers are strong enough to serve as a sufficient trust building mechanism, and no particular other verification is needed. The fundamental criteria for defining whether a farm or product is organic is whether the system uses

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6 Certification may be according to international and national third-party certification standards, or through review under a Participatory Guarantee System (PGS).
organic methods and is based on the principles of organic agriculture and avoids the use of prohibited inputs and practices.

As discussed previously many smallholders and subsistence farmers in Africa could be described as organic by default. All stakeholders however do not automatically necessarily share this perspective. Policy makers and researchers for example may simply consider them as practicing traditional agriculture neither affixing organic or conventional tag to them or they may presume they are not organic as they have not declared themselves as such or mistakenly think that because they are not certified then they ‘cannot’ be organic. On the other hand, for many stakeholders in East Africa, and in many crops, “conventional smallholder agriculture” equals “traditional (low/no input) smallholder agriculture” as synthetic input use is low\(^7\). Smallholder farmers themselves may not be aware of organic agriculture or what defines it.

The consequence of this is that most, but not all, recent studies relating to organic agriculture especially comparative studies with conventional agriculture consider certified organic agriculture only. This is partly due to the difficulty in differentiating between smallholder farming systems in Africa that may or may not use organic or conventional inputs and practices. There is also a general lack of awareness of organic agriculture models that do not require third party certification to guarantee the integrity of their products to their customers.

To this end in the literature, the term “organic” generally refers to “certified organic” as its relatively easy to define compared to non-certified forms of organic agriculture which amongst other factors are currently not systematically recorded as such in any formal manner.\(^8\) This however does not provide a fully representative study of organic agriculture in its various forms in East Africa.

\(^7\) For example, in Uganda and Tanzania the average use of chemical fertilizer is less than one kg per hectare per year, which implies that most land is never fertilized with synthetic fertilizers (Hine et al., 2008).

\(^8\) In advocacy for organic farming practices one may rightly distinguish between certified organic farms and non-certified organic farms, which follow certain organic practices. In Uganda the number of non-certified organic farms is an estimated 3 to 4 times higher than the number of certified organic farms (Walaga & Hauser, 2005).
3. Overview of organic agriculture in East Africa

3.1 General overview

Global certified organic agricultural land was estimated at 37.2 million hectares in 2011, with an additional 32.5 million hectares dedicated to organic wild collection.

In Africa there are slightly more than one million hectares of certified organic agricultural land (i.e. 3% of total), but another 11 million ha of land for wild collection and beekeeping (i.e. 35% of total). The number of producers was estimated at 541,000 in 2011. The African countries with most organic land are Uganda (228,000 hectares), Tunisia (178,500 hectares) and Ethiopia (140,500 hectares) (Willer et al., 2013).

Certified organic agricultural land increased significantly in East Africa between 2007 and 2011 at an annual rate of 14%, 5%, 1% and 14% respectively. No less than two-thirds of East African organic production comes from Uganda (65% of total hectares in 2010) and one third (33%) from Tanzania. Production is negligible, percentage-wise, in Kenya (1%), Rwanda (1%) and Burundi (0%). The vast majority of produce in Africa is destined for export markets, particularly in Europe (Willer et al., 2013).

Local markets for organic produce are developing in most African capitals. Within East Africa local organic markets are most developed in Uganda, Tanzania and Kenya, but the certified organic volumes traded are only a fraction of total produce. Local markets are important, however, for the sale of organic non-export crops. These products may be labeled, for example with the East African Organic Mark established in 2007, but usually they are sold locally as a conventional crop - at the market price of the day.

<table>
<thead>
<tr>
<th>Country</th>
<th>2007 (ha)</th>
<th>2008 (ha)</th>
<th>2009 (ha)</th>
<th>2010 (ha)</th>
<th>2011 (ha)</th>
<th>Change in ha 2010/11</th>
<th>% Change 2010/11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burundi</td>
<td></td>
<td>350</td>
<td>350</td>
<td>350</td>
<td>550</td>
<td>200</td>
<td>57.1</td>
</tr>
<tr>
<td>Kenya</td>
<td>4,636</td>
<td>5,159</td>
<td>4,227</td>
<td>4,842</td>
<td>4,969</td>
<td>127</td>
<td>2.6</td>
</tr>
<tr>
<td>Rwanda</td>
<td>512</td>
<td>3,508</td>
<td>3,697</td>
<td>3,600</td>
<td>3,705</td>
<td>105</td>
<td>2.9</td>
</tr>
<tr>
<td>Tanzania</td>
<td>62,180</td>
<td>72,188</td>
<td>72,188</td>
<td>72,665</td>
<td>115,022</td>
<td>42,357</td>
<td>58.3</td>
</tr>
<tr>
<td>Uganda*</td>
<td>196,203</td>
<td>212,304</td>
<td>226,954</td>
<td>228,419</td>
<td>228,419</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Total</td>
<td>263,531</td>
<td>293,509</td>
<td>307,416</td>
<td>309,876</td>
<td>352,665</td>
<td>42,789</td>
<td>13.8</td>
</tr>
</tbody>
</table>

* No 2011 data were available for Uganda.


There are many African organic farmers for whom formal certification does not have any advantages: this is true for farmers who practice subsistence farming and do not engage in the market at all, and for farmers for whom the organic claim has little or no marketing value. These groups engage in organic agriculture because of benefits such as increased productivity and resilience, lower

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9 In addition, organic areas for wild collection are estimated to cover approximately 158,328 ha in Uganda (2010 data), 99,905 ha in Kenya, and an unknown area in Tanzania.
production costs, a healthier working environment, and other social, environmental, and economic sustainability considerations.

A good example of non-market driven organic agriculture is the "Sustainable Development and Ecological Land Management with Farming Communities in Tigray (Tigray Project)" in Ethiopia. It was initiated by the Institute for Sustainable Development (ISD), the Bureau of Agriculture, Rural Development (BoARD), and, Mekelle University in four villages of the Tigray Province in Northern Ethiopia in 1996, in response to land degradation, food security and livelihood challenges.

Within the Tigray project, farmers have used numbers of innovations and organic practices such as composting, crop diversification and improved water management to reverse the developments in an area formerly severely affected by problems such as overgrazing, soil erosion and depletion of water resources, which exacerbate rural poverty and hunger. The Tigray Project is farmer-led and builds on the local technologies and knowledge of the farming communities. The higher yields achieved through organic management practices resulted in:

- Farmers having the evidence and confidence to withdraw costly synthetic fertilizers;
- A greater diversity of crops
- Improved farm resilience
- Higher ground water tables
- Better nutrition
- New income opportunities.

By 2008 the successes of the project led to its expansion throughout the country including 165 communities in the Tigray region. Moreover, the Tigray Project has become the government model for combating land degradation and eradicating poverty from Ethiopia.

The development of the commercial and export orientated organic sector in East Africa and major organic agriculture based food security projects such as in Tigray in Ethiopia have lead to the potential of organic agriculture in Africa being formally recognized by the African Union Commission (AUC). In 2011, at the African Union Summit, a Heads of State and Government Decision on Organic Farming (Doc. EX.CL/631 (XVIII) was adopted. The Summit decision requests that the AUC and the New Partnership for Africa’s Development (NEPAD) Planning and Coordinating Agency (NPCA) initiate and provide guidance for an AUC – lead coalition of international partners on the establishment of an African organic farming platform based on available best practices and provide guidance in support of the development of sustainable organic farming systems.

This decision was made in the context of the increased need to support sustainable development, ensure food security, alleviate poverty, enhance environmental security, adapt to climate change effects, safeguard human health, preserve indigenous knowledge, plant varieties and animal breeds as well as promote socio-cultural development which conventional farming systems have failed to.

The leadership provided by the AUC lead to the establishment of the Ecological Organic Agriculture (EOA) Initiative for Africa to aid the development of sustainable organic farming systems in Africa. The EOA is an Africa led five-year programme that seeks to mainstream ecological organic agriculture into the African Development Agenda. The EOA initiative is currently being implemented by a number of African organizations that have been leaders in the development of organic agriculture in

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Africa. The initiative seeks to work within the CAADP frameworks and contribute to the attainment of its goal to eliminate hunger and contribute to poverty eradication through agriculture. One of the key pillars of the OA is research, training and extension.

Text box 1. Smallholder systems in East Africa

Organic agriculture in East Africa evolves in a general context of smallholder family farming, which is very different from the farming contexts in other parts of the world where organic agriculture is of importance - particularly in Europe and the USA.

The aim of the smallholder farmer is to meet the family needs in terms of food security and cash income. For most activities the only source of labor is that of the family, although cultivation may be done on a communal basis to ease this task. In some areas, especially in drier and flatter areas, where grain production predominates, the farmer may have, or have access to, an ox plough. An ox plough greatly increases the area that can be cultivated (often four-fold), but can mean that other crop husbandry concerns, such as weeding (which is often the responsibility of women) become new bottlenecks. Farm households often have additional sources of income, such as charcoal making, brewing, petty trading, and selling their labor to other farmers.

Farm size basically varies with the productive potential of the land. In high potential areas, normally hilly and with high rainfall, population is high and farm size is small. An average farm in this area might be 1 to 2 hectare of land. Cash crops are normally perennials and these are intercropped with food crops. Typical organic crops grown in these areas are coffee, cocoa, and vanilla. In some areas, hillside farms are supplemented by distant valley fields where grain crops are grown. In drier areas, with more seasonal rainfall patterns, population is often less dense and average farm size might be 4 to 5 ha of land. Not all of this land will be cultivated. Next to annual grains and root crops, some land is often left fallow, and can be used for cattle grazing. Typical organic cash crops of these areas are cotton and sesame.

A typical smallholder household in East Africa might consist of about eight people, and is a mixture of the nuclear and the extended family. If the head of the family is male and has more than one wife, each wife normally represents another household, because each wife must support her own children and those from the extended family. Households aim to be self-sufficient in basic foodstuffs; usually a starch food, such as cassava, maize, and bananas, and a protein food such as beans, peas, and groundnuts. Essential food purchases for the home normally include salt and oil. The main non-food cash expenses of the household are housing, education, health, clothing, implements etc.; plus smaller needs such as paraffin and soap.

Source: EPOPA (2008), Organic exports: A way to a better life?

3.2 Certified Organic Agriculture in Uganda

In Uganda the number of certified organic farmers was 187,993 in 2008/09, with an average certified organic area of 1.3 hectare each. Most produce is destined to export markets in Europe, the USA and Japan. The export value of organic products was USD 42 million in 2010/11 (Willer, 2012); up from USD 4.6 million in 2002/03. There had been a steady increase in certified land and in the number of organic farmers over the years since 2000, reaching a peak in 2007/08. More export companies have acquired organic status each year, hence more farmers and certified land (Namuwoza &

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11 The domestic market in Uganda for organic food sales was estimated at around USD 700,000 in 2008; i.e. just 2% of the overall organic export value (Bouagnimbeck, 2010).
The organic sector is led by the National Organic Agricultural Movement of Uganda (NOGAMU), which was established in 2001.

Among the products exported, cotton was the most important crop in volume in 2007/08, followed by sesame and coffee (see Table 2). However, organic coffee (Arabica and Robusta) fetches the highest foreign earnings. Other major organic products exported are: cocoa, dried fruits (pineapple, apple banana, jack fruit, mango, papaya), frozen fruit/pulp (pineapple, passion fruit, apple banana), fresh products (pineapple, apple banana, passion fruit, mango, jack fruit, plantain, papaya), ginger, vanilla, bird eye’s chillies, black pepper, cardamom etc.

![Graph showing export volume from 2000/01 to 2005/06](image)

**Table 2.** Total Ugandan certified organic export by product (in tons).


The volume of exported processed fruits (particularly dried fruits and fruit pulp) increased importantly - from 47 metric tons in 2008/09 to 115 metric tons in 2009/10. However, the overall volume of organic exports declined because of problems with organic cotton\(^\text{12}\)\(^\text{13}\), whereas the sales of fresh products (mainly fruit, which is particularly bulky) also declined due to high freight costs, which reduce their competitiveness on the international market (Namuwoza & Tshemerirwe, 2011).

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\(^{12}\) In 2009/10, organic cotton exports declined by 43% due to a reduction of the number of producers (78,770 in 2008/09; 44,076 in 2009/10) and export companies (6 in 2007/08; 3 in 2008/0; 2 in 2009/10). This followed a government directive to scale down the number of organic cotton projects (Namuwoza & Tshemerirwe, 2011).

\(^{13}\) Organic cotton production in Uganda had already been affected negatively by the Ministry of Health’s National Malaria Strategic Plan, under which ‘indoor residual spraying’ with DDT was carried out in some regions of the country (Gibbon, 2006). Traces of DDT contamination were found in shipments of organic products to Europe and America, and several organic exporters were subsequently de-certified (Bouagnimbeck, 2010).
### 3.3 Certified Organic Agriculture in Tanzania

Tanzania had an estimated 115,000 hectare of certified organic farmland in 2011, of which 35,000 ha was used for permanent crops especially coffee. The number of producers was estimated at 145,000 (Bouagnimbeck et al., 2013). The Tanzania Organic Agriculture Movement (TOAM) is the national umbrella organization for the organic sector. TOAM was established in 2005.

The certified organic production consists mainly of coffee, tea, nuts, spices and various types of vegetables. Organic production is located mostly in the Northern and the Eastern parts, where general infrastructure and transport are relatively good. For example, the Northern region of Kagera, bordering Uganda, is only 200 km from the Ugandan capital Kampala with its international airport Entebbe. The region of Arusha, close to the fertile volcano soils of Kilimanjaro likewise has an international airport, and in the East at the coast, the capital Dar es Salaam offers international air travel as well as harbor facilities (Kledal & Kwai, 2010).

In terms of volume, nut products like cocoa, cashew, and coffee are at the top followed by tea, sesame seeds, various spices, pineapples, cotton and vanilla. In economic terms, cocoa and cashew, followed by vanilla and tea, are the most important export products constituting 55% of the total organic export value (of total USD 14 million). Exports are mostly destined to Europe and the USA, with a few products bound for Asia and Australia (Kledal & Kwai, 2010). Organic agriculture is taken into consideration in the Tanzania Horticultural Development Strategy 2012-2021 (HODECT, 2010).

### 3.4 Certified Organic Agriculture in Kenya

Organic agriculture in Kenya (4,969 hectare) is on a much smaller scale in comparison to Uganda and Tanzania. Certified organic agriculture in Kenya dates back to the early 1980s when the first pioneer organic training institutions were established, and a few horticultural companies started growing organic vegetables mainly for export. Initial efforts to promote organic agriculture in Kenya were made by rural development NGOs, CBOs and faith based organizations. In 2004, the Kenya Organic Agriculture Network (KOAN) was formed as an umbrella organization representing all organic organizations in the country (UNEP-UNCTAD, 2010).

Organic production in Kenya is mainly concentrated in the Central Province near Nairobi. In 2005, between 2,200 to 2,400 metric tons of organic produce worth over USD 4.6 million was produced and exported from Kenya. Over the years, exports have diversified beyond vegetables and fruits to include products such as essential oils, dried herbs and spices, as well as products for the cosmetic and pharmaceutical industries that are more often produced by smallholders. There is also a growing domestic market (UNEP-UNCTAD, 2007).

### 3.5 Certified Organic Agriculture in Rwanda

Rwanda is a small country, but it has some of the highest population densities in the region. The government acknowledges that organic agriculture can play an important role, side-by-side with conventional agriculture (Rundgren, 2007). Several policies have been adopted that encourage organic production practices, such as building soil fertility through animal manure, promoting biodiversity and tree planting, banning the use of polluting plastic bags, and (compulsory) community

In 2010, three companies were involved in organic production in Rwanda, exporting hot chillies, geranium oil and fresh fruits. There is no local market for organic products yet (UNEP-UNCTAD, 2010). The Rwandan Organic Agriculture Movement (ROAM), established in 2007, acts as a focal point for the organic sector.

### 3.6 Certified Organic Agriculture in Burundi

The certified organic sector in Burundi is still very small with 550 hectares of land in 2011. Burundi exported organic fresh fruit way back in the early 1990s. However, exports ceased as a result of the deteriorating security situation between 1994 and 2004. Burundi remains in a state of recovery from conflict and the government and development agencies are more concerned with encouraging food security than with exporting organic agricultural products. Poor airfreight connections hamper exports. In 2008 one single company exported fresh organic fruit from Burundi (UNEP-UNCTAD, 2010).

There is an interest in organic agriculture though. Organic production and marketing is viewed as an important opportunity to support Burundi in its next stage of development. Government agencies expressed interest, and Burundi’s most recent Agricultural Strategic Plan refers to organic agriculture in terms of building soil fertility. The lack of NGOs directly involved in support for, and training in, the agricultural sector is problematic given the instrumental role that NGOs have played in this sector elsewhere in East Africa. The Burundi Organic Agricultural Movement (BOAM) was formed recently, in 2010, to support the development of the organic sector (UNEP-UNCTAD, 2010).

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14 The Rwandan Bureau of Standards (RBS) and the Rwanda Horticultural Development Authority (RHODA) both have dedicated organic units and these are well supported by the government with the aim of developing commercial organic production (UNEP-UNCTAD, 2010).
4. Findings of literature review of productivity and profitability of (certified) Organic Agriculture in East Africa.

The key finding of the literature review of the productivity and profitability of organic agriculture in East Africa is that very little research has been carried out to date, which is in line with the general under-representation of organic research in overall agricultural research programs. For East Africa, in fact just one single publication was encountered that compares in-depth organic with conventional production on productivity and profitability: Gibbon, P. & S. Bolwig (2007), The economics of certified organic farming in tropical Africa: a preliminary assessment. A few other publications touch upon organic and conventional system comparisons in a more rudimentary, qualitative form, which are discussed in this section. Several new research studies however have recently started but results are not yet available:

- The Systems Comparisons trial in Kenya, which examines the contribution of organic agriculture to food security, poverty alleviation and environmental conservation.
- The Productivity and Growth in Organic Value-chains (ProGrow) which will address research and development issues through nine PhD and six MSc studies at universities in Uganda, Kenya and Tanzania.

4.1 Relevant research world-wide

Emerging alongside global market growth for certified organic agricultural products has been a small but generally consistent literature on the economics of organic farming in developed countries. Looking at the relative revenue effects of organic and conventional agriculture in the EU and the USA, authors converge, finding broadly similar levels of profitability for the two farming systems, where price premiums and lower non-labor input costs compensate for organic agriculture’s normally lower yields (Gibbon et al, 2009).

Critics argue that organic agriculture has lower yields and would therefore need more land to produce the same amount of food as conventional farms. Seufert et al. (2012) find in their meta-analysis of available literature\(^{15}\) that organic yields are typically lower than conventional yields. But these yield differences are highly contextual, depending on system and site characteristics, and they range from 5% lower organic yields (rain-fed legumes and perennials on weak-acidic to weak-alkaline soils\(^ {16}\)), 13% lower yields (when good practice organic practices are used), to 34% lower yields (when the conventional and organic systems are most comparable). Seufert et al. argue that with good management practices, particular crop types and growing conditions, organic systems can almost match conventional yields, whereas under other conditions at present it cannot.

\(^{15}\) Seufert et al. (2012) considered 66 studies that compared the yields of 344 different crops. They only included studies: (1) of ‘truly’ organic systems, defined as those with certified organic management or non-certified organic management, following the standards of organic certification; (2) with comparable spatial and temporal scales for both organic and conventional systems; and (3) reporting (or from which one could estimate) sample size and error. Conventional systems were either high- or low-input commercial systems, or subsistence agriculture.

\(^{16}\) A possible explanation is the difficulty of managing phosphorus (P) in organic systems. Under strongly alkaline and acidic conditions, P is less readily available to plants as it forms insoluble phosphates, and crops depend to a stronger degree on soil amendments and fertilizers. Organic systems often do not receive adequate P inputs to replenish the P lost through harvest (Seufert et al., 2012).
The yield response of organic systems varies substantially across crop types and species. For example, yields of organic fruits and oilseed crops showed a small (-3% and -11% respectively), but not statistically significant, difference to conventional crops, whereas organic cereals and vegetables had significantly lower yields than conventional crops (-26% and -33% respectively). Part of the yield responses is explained by differences in the amount of nitrogen (N) input received by the two systems. The release of plant-available mineral N from organic sources such as cover crops, compost or animal manure is slow and may not keep-up with the high crop N demand during the peak growing period (Seufert et al, 2012).\(^\text{17}\)

Water relations also influence organic yield ratio. According to Seufert et al the performance of organic agriculture systems is -35% under irrigated conditions, but only -17% under rain-fed conditions. This could be due to a relatively better organic performance under variable moisture conditions in rain-fed systems. Soils managed with organic methods have shown better water-holding capacity and water infiltration rates and have produced higher yields than conventional systems under drought conditions and excessive rainfall (Seufert et al., 2012).

The ability of organic agriculture to perform well without irrigation and fast release synthetic fertilizers (as well as pesticides etc.) is not an unintended phenomenon. Organic agriculture systems intentionally build the water holding capacity and fertility of soils. When organically managed soils are combined with local traditional crop varieties they have been shown, as is the case in the well-documented Tigray project in Ethiopia, to match the performance of comparable conventional systems while increasing yields against control plots by 100%. This is postulated to be because traditional varieties respond better to organic conditions which are closer to those under which they evolved whereas conventionally bred seeds respond better to the conditions they were developed under i.e. in conjunction with irrigation, synthetic fertilizers and pesticides etc.

Such well designed and executed organic systems are not only are shown to be highly productive they are also more profitable even without the availability of price premiums for organic produce due to the significantly lower input costs. Furthermore the organic system is significantly more resilient as the organic management practices build soil structure rather than degrades it, increases the water holding capacity, enables fast drainage of storm water in floods reducing waterlogging, anaerobic conditions and flood damage and significantly increases resilience to drought. The use of robust local varieties that are often more nutritious also increases reliance to pest and disease pressures, builds diversity into the system which have a raft of positive attributes that increase resilience and performance of the farm. Such systems build the performance and resilience of the actual farm; minimize expenditure and are highly aligned with the needs of smallholder farmers especially in the context of climate change in Africa.

For developing countries, the results of the meta-analysis by Seifert et al. differ dramatically (minus 43%)\(^\text{18}\) from those of Badgley et al. (2007; plus 80%). This would be because Badgley et al. mainly

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\(^{17}\) Seufert et al. (2012) suggests that organic legumes and perennials perform better. This would not be because they received more N, but rather because they seem to be more efficient at using N. Legumes are not as dependent on external N sources as non-legumes, whereas perennials, owing to their longer growing period and extensive root systems, can achieve a better synchrony between nutrient demands and the slow release of N from organic matter.

\(^{18}\) This poor performance of organic agriculture in developing countries may be explained by the fact that a majority of the data (58 of 67 observations) from developing countries seem to have atypical conventional
included yield comparisons from conventional low-input subsistence systems, whereas Seufert et al. (2012) mainly included data from high-input systems for developing countries. However, Seufert et al. (2012) do not rule out, nevertheless, the claim that organic agriculture can increase yields in smallholder agriculture in developing countries. "But owing to a lack of quantitative studies with appropriate controls we do not have sufficient scientific evidence to support it either." 19

In fact, for the tropics only a handful of economic studies of organic farming are available. Some comparative research on organic agriculture has been carried out, particularly in Latin America, regarding coffee and cocoa. Gibbon et al. (2009) discussed publications by Damiani (2002), Lyngbaek et al. (2001), Bray et al. (2002), Carpenter (2003), Bacon (2005) and Van der Vossen (2005). None of these studies were found to report comprehensive farm budget-related survey data, or to use analytical statistical methods. 20

The most commonly reported farm-level data was on prices, where organic premiums ranging between 19% and 150% were described for coffee in Mexico (Bray et al., 2002; Van der Vossen, 2005), Costa Rica (Lyngbaek et al., 2001) and Nicaragua (Bacon, 2005), as well as for cocoa in Costa Rica (Damiani, 2001).

Data on yields was reported in only three studies, all involving comparisons between organic and apparently high synthetic input-based conventional coffee production in Costa Rica and Mexico. Two of these studies (Lyngbaek et al., 2001; Van der Vossen, 2005) provide results similar to those obtained in developed countries, with organic farmers’ yields being 22% and 43% lower than conventional; the third (Bray et al., 2002) described organic yields 15% higher than conventional ones. No detailed data on costs was provided by any of the studies.

However, data on net income is reported in three studies. Van der Vossen (2005) reported organic farmers’ net incomes being 44% lower than conventional, while Lyngbaek et al. (2001) found no consistent difference, and Carpenter (2003) described organic rice farmers in the Philippines as having incomes 48% higher than conventional in ‘grain equivalent’ terms (Gibbon & Bolwig, 2007). In any case, the results cited here cannot automatically be transposed to tropical Africa, as we will discuss in the next section.

4.2 Comparing systems in Africa

Conventional agriculture in tropical Africa is generally semi-industrial or non-industrial. For example, synthetic fertilizer consumption levels in tropical Africa are low compared to those in most other developing regions. This has implications on the yield changes that can be expected when conversion takes place from conventional to organic agriculture in the extent to which African farmers certified

19 Seufert et al. (2012) write: “Fortunately, the Swiss Research Institute of Organic Agriculture (FiBL) recently established the first long-term comparison of organic and different conventional systems in the tropics. Such well-designed long-term field trials are urgently needed.”

20 According to Gibbon & Bolwig (2007), many either report on sample sizes of 20 farmers or less or gave no information on sample size.
to organic standards really have to adopt a radically new set of farming practices in order to maintain soil fertility and remain economically viable, as they would if synthetic inputs had to be forsaken. Gibbon & Bolwig (2007) emphasize that because of low input use, it can be expected in Africa that, with conversion, both reductions in yield, changes in commitments of labor and savings from reduced use of synthetic inputs will be considerably more limited than elsewhere. Certain variables having key positive or negative influences on organic farming’s profitability in other countries are likely to be broadly neutral in the tropical African context.

Secondly, the institutional context for both conventional and organic agriculture is an important factor. Amongst other things, no public assistance is available for the conversion or uptake to organic agriculture in Africa, while private credit and domestic savings are generally too low to support independent conversion – especially for third-party certified organic agriculture where certification fees are required and not insignificant in size. This in turn implies that certified organic farming is generally only a realistic option for large-scale commercial operators or in the context of privately financed and coordinated contract farming schemes.

Furthermore, participants in such schemes may be deliberately selected by scheme owners rather than be self-recruited, just as scheme owners may require them to conform to standards over and above organic ones once they become members. In other words, transposing a revenue effect focus to tropical Africa requires close attention to variables confounding measurement of the effects of adoption of organic agricultural systems. These variables include the prevalence of non (certified) organic farming systems that are ‘organic by default’, as well as the organization of smallholder certified organic agriculture in contract farming schemes (Gibbon et al, 2009).

### 4.3 Productivity

One of the largest studies examining sustainable agriculture initiatives in developing countries was carried out by Pretty et al. (2005). The study comprised the analysis of 286 projects covering 37 million hectares of land in 57 countries. Hine et al. (2008) reanalyzed this database on agricultural sustainability through 15 case studies on the productivity and profitability impacts of organic-equivalent farming practices in East Africa as compared to “traditional” or conventional agriculture.

The conclusions of Hine et al. (2008) are very positive with regard to “organic agriculture”: “Organic agriculture can increase agricultural productivity and can raise incomes with low-cost, locally available and appropriate technologies, without causing environmental damage. (...) All case studies which focused on food production in this research where data have been reported, have shown increases in per hectare productivity of food crops, which challenges the popular myth that organic agriculture cannot increase agricultural productivity.” In fact, Pretty et al. (2005) had found that average crop yields covering a variety of systems and crops increased by 79% when sustainable agricultural practices were adopted. Reanalyzing the same database, Hine et al. (2008) found an even higher average crop yield increase for all African projects (116%) and for the projects in East Africa (128%).

However, the study by Pretty et al. (2005) and Hine et al. (2008) includes “certified organic” as well as “near-organic” practices. While this is valuable for illustrating the broad potential benefits of organic agriculture systems and of systems in which organic agriculture practices predominate, for
the purposes of system comparisons, selected organic-compatible practices cannot be equated with an organic system that meets organic standards. However, it does emphasize that many organic agricultural practices can enhance conventional or traditional agriculture systems. The study also included several projects that added a new system component, which could also have occurred under conventional or traditional agriculture. Their positive impacts on productivity and profitability cannot be attributed to “organic agriculture” as such in a system-comparison approach.

Gibbon & Bolwig (2007) focus on certified organic systems specifically. They examine the relative profitability of certified organic and conventional farming operations in tropical Africa as well as differences between organic and conventional farmers in rates of adoption of farming practices and in household factor endowments. The paper is based on three surveys in Uganda of smallholder farmers of organic coffee, cocoa, and pineapple, and of matching control groups of conventional farmers. Organic production was in all cases organized on a basis of contract farming, in schemes operated by the firm exporting the organic product.

The three schemes selected for study were the Kapchorwa Arabica coffee scheme operated by Kawacom (U) Ltd., the Bundibugyo cocoa-vanilla scheme operated by Esco (U) Ltd. and the Luwero-Kayunga pineapple scheme operated by Biofresh (U) Ltd. In 2005-06, when fieldwork was conducted, these schemes had 3,870, 1,700 and 34 members respectively. All the schemes received support from the Swedish public development cooperation agency Sida for feasibility studies, farmer registration, certification, training and marketing. All schemes were certified compliant with the EU organic regulation 2092/91.

Gibbon & Bolwig (2007) found that organic conversion in tropical Africa is associated with increases rather than reductions in yield, which probably relates to the low-input characteristics of conventional farming on the continent and to the under-development of smallholder farming in Africa in general. Focus group interviews suggested that organic farmers enjoyed higher yields due to more effective farm management technique.

A confounding variable in the yield comparisons in the study is the access to good quality farmer education and extension that in this case was part of the project activities. Given the general under-development of smallholder agriculture in Africa, yields can be increased in general through training and extension, and are therefore not necessarily automatically related to type of management. However it is clear from the study that with training in good organic management practices yields can be increased without the need for synthetic inputs that are often out of financial reach for most African smallholders, which has livelihood, food security and sustainability benefits.

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21 Gibbon (2006) provides a comprehensive overview of certified organic export production in Uganda. He found that Swedish funding support had been continuous and generous through the program Export Promotion of Organic Production in Africa (EPOPA), which concentrated on subsidizing certification and providing technical assistance for setting up internal control systems (ICs), training of project personnel and marketing. Of the 16 export operations with certification at some point during 2005, 12 had received support from EPOPA. EPOPA has also been active in supporting the development of Uganda’s wider institutional environment for organic agriculture, supporting the establishment of the National Organic Agriculture Movement of Uganda (NOGAMU; in 2001) and the national inspection and certification body UgoCert (in 2004).
4.4 Profitability

In the case of Uganda, Gibbon & Bolwig (2007) concluded that farms that engaged in certified organic export production were significantly more profitable in terms of net farm income earnings than those that engaged only in conventional production. This was the result of generally significant differences between organic and conventional farmers’ gross farm incomes, although these differences were further amplified by differences in costs. Income differences related partly to differences between organic and conventional farmers’ factor endowments.\(^{22}\)

Gibbon et al. (2009) examined the revenue effects of certified organic contract farming and of the use of organic farming methods in a medium-sized organic cocoa and vanilla contract farming scheme run by a multinational trading company\(^{23}\) in Bundibugyo district (bordering DR Congo) in western Uganda, as well as from a control group of non-organic cocoa smallholders in the same area which can be considered ‘organic by default’ and which are without contractual relations. The analysis finds that there are positive revenue effects for the certified crops from both participation in contract farming and, more modestly, from using organic farming techniques.

<table>
<thead>
<tr>
<th>Case study 1. Bundibugyo organic cocoa and vanilla scheme</th>
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<tbody>
<tr>
<td>The Bundibugyo organic cocoa and vanilla scheme comprised of 1,721 certified organic farmers in 2005. The scheme is located at an altitude of 635-900 metres with average rainfall of 2,150 mm per year and average temperatures of 28-35 degrees Celsius. Land degradation is pronounced and higher parts of the area are subject to landslides.</td>
</tr>
<tr>
<td>Organic certification is to the standards embodied in the EU regulation and is paid for by Esco. A group certification system is used, based on an internal control system (ICS) whose central component is an annual or semi-annual farm inspection performed by locally-recruited company field officers trained in organic farming methods. During this, farmers’ compliance with organic standards and other scheme requirements is monitored and farmers are provided with technical advice. In addition, the field officers also train contact farmers, who run demonstration plots in each of the 44 villages in the scheme area.</td>
</tr>
<tr>
<td>Esco employs various means to enable and induce growers to comply with its organic and quality standards: regular farm inspections, training of contact farmers, individual advice by contact farmers, reject of sub-standard and suspected off-scheme cocoa, a price premium, and a procedure for de-registering farmers who consistently or grossly violate project rules.</td>
</tr>
<tr>
<td>The contract with farmers obliges Esco to pay an organic premium if the cocoa or vanilla is deemed to be of suitable quality. The size of the premium is not specified and there has been no direct price negotiation between Esco and the farmers. In 2004, Esco paid a price premium of about 20% percent</td>
</tr>
</tbody>
</table>

\(^{22}\) Given that organic scheme areas or members were actively selected by operators, it is not surprising to find that in all cases organic farmers had somewhat larger farms, larger areas under cash crops, greater numbers of cash crop trees or plants, and in most cases more cash crop (Gibbon & Bolwig, 2007).

\(^{23}\) The scheme is operated by Esco (U) Ltd, a subsidiary of the Swiss commodity trading house Schluter SA. Schluter SA’s main business is trading coffee from the Great Lakes region, although it had withdrawn from the Ugandan coffee market at the time of fieldwork. Esco is Uganda’s largest cocoa trader and one of its two largest vanilla traders (Gibbon et al, 2009).
above the prevailing (‘conventional’) price in Bundibugyo for fully processed cocoa and 100% for vanilla. In 2005 it increased the cocoa premium to about 30% while retaining a 100% premium for vanilla (Gibbon et al., 2009).

The positive scheme participation effects reported are most obviously explained with reference to the price premium offered to scheme members in the context of the workings of the cocoa market. For scheme members, a price premium from selling organic cocoa is only available for produce that has been fully processed. While in the conventional market processed cocoa beans also command a premium, this is subject to the vagaries of the market and is usually lower. Processing is costly in terms of time and labor. It further requires the processor to have a critical mass of raw beans or to cooperate with other farmers in pooling raw beans (opening up for possible distributional disputes later). Above all, it involves deferring receipt of revenue until processing is completed. This implies that it is an investment with uncertain returns. A price premium for scheme members may offset these risks and increase the extent to which farmers engage in adding value through processing.

Evidence has been generated in favor of the superior profitability of certified organic farming for Sub-Saharan African smallholders, compared to the common alternative situation of ‘organic by default’ farming systems. On the other hand, this superiority is bound up with the organization of certified organic production in contract farming schemes. The evidence supports the case for contract farming systems with specific contract design features (notable price premiums for good quality) rather than for contract farming schemes as such, whether these are organic or conventional. Scheme participants could obtain a share of the rent deriving from product differentiation by adding value through processing; an option, which is also available in the conventional market (Gibbon et al., 2009).

Yet, Gibbon (2006) found that the overall volume of production by certified organic out-growers was considerably higher than the volume of certified organic exports24. Firstly, some certified organic out-growers side-sell product to conventional buyers because of pressing needs for cash. In some traditional cash crop projects only around half of the output from certified organic out-growers is being sold to project owners. Conversely, project owners sometimes decline to purchase output from certified out-growers. This can be because of private additional quality requirements over and above those for certified organic production, because of temporary lack of demand in export markets25, or because of a lack of crop finance. The latter mainly applies to smaller-scale exporters, and can induce new side-selling.

4.5 Additional findings

4.5.1 Price premiums

The project Export Promotion of Organic Exports from Africa (EPOPA) supported a total of 44 projects between 2002 and 2007 for the export of organic products from Tanzania and Uganda. It is the project in East Africa for which most data on farmer income and premiums is available. The

24 Although this was not the case for every crop.
25 In case of lack of demand in export markets, project owners may be obliged to sell certified organic output as conventional, to sell it under another type of certification, or to store it until the next season (Gibbon, 2006).
Tables 5 and 6 provide a summary of financial 2006-2007 estimates for participating farmers and exporters in Tanzania and Uganda (EPOPA, 2008).

In Tanzania, producers of 11 product categories reported that they received an average price premium of 19% from exporters, with premiums ranging between 2% and 51% according to case. For two other product categories no premium was paid. In Uganda, producers of 20 products reported that they received an average price premium of 27% from exporters, with premiums ranging between 10% and 50%. For one other product category no premium was paid.

Exporters may also receive price premiums. In Tanzania, exporters of 10 product categories received an average premium of 19% over the normal export value, within a range of 14 to 34%. Exporters of three other product categories did not receive any premium. In Uganda, exporters of 17 product categories received an average 22% price premium on exports; varying between 10% and 47%. Exporters of five others did not receive any premium on exports (EPOPA, 2008).
Table 5. Organic conversion projects supported by EPOPA in Tanzania (data for 2006-2007).

<table>
<thead>
<tr>
<th>Area/District</th>
<th>Crop/Product</th>
<th>Number of farmers registered</th>
<th>Number of farmers delivering</th>
<th>Quantity</th>
<th>Number of farmers bought from sales to exporter</th>
<th>Number of farmers paid to exporter</th>
<th>Premiums of Farmer sale</th>
<th>Premium on export</th>
<th>% Premium on delivering</th>
<th>% Premium</th>
<th>Sales per farmer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kilimanjaro:</td>
<td>coffee</td>
<td>2.675</td>
<td>1.126</td>
<td>102</td>
<td>192.170</td>
<td>42.750</td>
<td>22%</td>
<td>260.980</td>
<td>87.800</td>
<td>34%</td>
<td>171</td>
</tr>
<tr>
<td>Iringa:</td>
<td>canned pineapple</td>
<td>104</td>
<td>81</td>
<td>196</td>
<td>11.585</td>
<td>5.880</td>
<td>51%</td>
<td>108.002</td>
<td>21.600</td>
<td>20%</td>
<td>143</td>
</tr>
<tr>
<td>Tanga:</td>
<td>spices</td>
<td>523</td>
<td>300</td>
<td>80</td>
<td>34.375</td>
<td>10.312</td>
<td>30%</td>
<td>67.747</td>
<td>9.775</td>
<td>14%</td>
<td>115</td>
</tr>
<tr>
<td>Rukwa:</td>
<td>peanuts</td>
<td>908</td>
<td>127</td>
<td>20</td>
<td>4.200</td>
<td>76</td>
<td>2%</td>
<td>not yet</td>
<td>not yet</td>
<td>-</td>
<td>33</td>
</tr>
<tr>
<td>Tanga:</td>
<td>tuna</td>
<td>518</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Kagera:</td>
<td>vanilla</td>
<td>530</td>
<td>213</td>
<td>3</td>
<td>9.000</td>
<td>-</td>
<td>0%</td>
<td>9.600</td>
<td>-</td>
<td>0%</td>
<td>42</td>
</tr>
<tr>
<td>Singida:</td>
<td>sesame</td>
<td>1.200</td>
<td>450</td>
<td>63</td>
<td>41.069</td>
<td>8.214</td>
<td>20%</td>
<td>168.000</td>
<td>33.600</td>
<td>20%</td>
<td>91</td>
</tr>
<tr>
<td>Singida:</td>
<td>cotton</td>
<td>-</td>
<td>275</td>
<td>100</td>
<td>8.273</td>
<td>-</td>
<td>0%</td>
<td>16.545</td>
<td>-</td>
<td>0%</td>
<td>30</td>
</tr>
<tr>
<td>Tanga:</td>
<td>ginger</td>
<td>42</td>
<td>-</td>
<td>-</td>
<td>not yet</td>
<td>not yet</td>
<td>-</td>
<td>not yet</td>
<td>not yet</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Mara:</td>
<td>coffee</td>
<td>512</td>
<td>256</td>
<td>154</td>
<td>86.780</td>
<td>6.675</td>
<td>8%</td>
<td>307.200</td>
<td>-</td>
<td>0%</td>
<td>339</td>
</tr>
<tr>
<td>Mbeya:</td>
<td>cocoa</td>
<td>21.000</td>
<td>6.300</td>
<td>630</td>
<td>639.450</td>
<td>63.945</td>
<td>10%</td>
<td>1.449.000</td>
<td>289.800</td>
<td>20%</td>
<td>102</td>
</tr>
<tr>
<td>Kagera:</td>
<td>coffee</td>
<td>12.000</td>
<td>3.377</td>
<td>450</td>
<td>382.500</td>
<td>76.500</td>
<td>20%</td>
<td>828.000</td>
<td>124.755</td>
<td>15%</td>
<td>113</td>
</tr>
<tr>
<td>Coast:</td>
<td>cashew</td>
<td>470</td>
<td>470</td>
<td>1.700</td>
<td>71.200</td>
<td>142.240</td>
<td>20%</td>
<td>2.353.000</td>
<td>470.600</td>
<td>20%</td>
<td>1.513</td>
</tr>
<tr>
<td>Mbeya:</td>
<td>coffee</td>
<td>4.100</td>
<td>3.768</td>
<td>85</td>
<td>102.000</td>
<td>10.200</td>
<td>10%</td>
<td>255.000</td>
<td>76.500</td>
<td>30%</td>
<td>27</td>
</tr>
<tr>
<td>Rufiji:</td>
<td>sesame</td>
<td>330</td>
<td>330</td>
<td>75</td>
<td>105.000</td>
<td>21.000</td>
<td>20%</td>
<td>175.000</td>
<td>35.000</td>
<td>20%</td>
<td>318</td>
</tr>
<tr>
<td>Kagera:</td>
<td>instant coffee</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>-</td>
<td>153.000</td>
<td>30.600</td>
<td>20%</td>
<td>n/a</td>
</tr>
<tr>
<td>Total:</td>
<td></td>
<td>44.912</td>
<td>17.073</td>
<td>3.658</td>
<td>2.327.601</td>
<td>387.792</td>
<td>17%</td>
<td>6.151.074</td>
<td>1.180.030</td>
<td>19%</td>
<td>136</td>
</tr>
</tbody>
</table>

Source: EPOPA (2008), Organic exports. A way to a better life?
Table 6. Organic conversion projects supported by EPOPA in Uganda (data for 2006-2007).

<table>
<thead>
<tr>
<th>Area/ District</th>
<th>Crop/ Product</th>
<th>Number of farmers</th>
<th>Number of farmers delivering</th>
<th>Quantity bought from farmer</th>
<th>Number of farmers exporter</th>
<th>Premiums paid to farmers to exporter</th>
<th>% premium of Farmer sales</th>
<th>Export value on export</th>
<th>% premium of value on delivery</th>
<th>Sales per exporter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nakasongola</td>
<td>fish</td>
<td>249</td>
<td>43</td>
<td>n/a</td>
<td>n/a</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Luwero</td>
<td>coffee</td>
<td>760</td>
<td>446</td>
<td>9</td>
<td>8.947</td>
<td>1.789</td>
<td>20%</td>
<td>13.764</td>
<td>2.753</td>
<td>20%</td>
</tr>
<tr>
<td>Mubende, Luv. fruits</td>
<td></td>
<td>196</td>
<td>96</td>
<td>142</td>
<td>67.262</td>
<td>29.038</td>
<td>43%</td>
<td>105.060</td>
<td>49.440</td>
<td>47%</td>
</tr>
<tr>
<td>Mubende, Luv dried fruits</td>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Lira</td>
<td>shea nuts</td>
<td>1.533</td>
<td>300</td>
<td>29</td>
<td>10.545</td>
<td>3.164</td>
<td>30%</td>
<td>21.000</td>
<td>2.464</td>
<td>12%</td>
</tr>
<tr>
<td>Arua</td>
<td>honey</td>
<td>195</td>
<td>59</td>
<td>9</td>
<td>11.592</td>
<td>2.116</td>
<td>18%</td>
<td>13.800</td>
<td>-</td>
<td>0%</td>
</tr>
<tr>
<td>Lira</td>
<td>vanilla</td>
<td>853</td>
<td>680</td>
<td>22</td>
<td>51.700</td>
<td>25.850</td>
<td>50%</td>
<td>102.080</td>
<td>10.208</td>
<td>10%</td>
</tr>
<tr>
<td>Wakiso, Kayur</td>
<td>vanilla</td>
<td>120</td>
<td>105</td>
<td>500</td>
<td>151.515</td>
<td>30.303</td>
<td>20%</td>
<td>640.500</td>
<td>128.100</td>
<td>20%</td>
</tr>
<tr>
<td>Wakiso, Kayur</td>
<td>dried fruits (1 ton/month)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>120.000</td>
<td>24.000</td>
</tr>
<tr>
<td>Mukono</td>
<td>vanilla</td>
<td>314</td>
<td>283</td>
<td>19</td>
<td>58.485</td>
<td>11.697</td>
<td>20%</td>
<td>105.000</td>
<td>-</td>
<td>0%</td>
</tr>
<tr>
<td>Mukono</td>
<td>cardamom</td>
<td>314</td>
<td>283</td>
<td>5</td>
<td>5.891</td>
<td>1.636</td>
<td>28%</td>
<td>10.800</td>
<td>-</td>
<td>0%</td>
</tr>
<tr>
<td>Wakiso, Luwe</td>
<td>fresh fruit</td>
<td>200</td>
<td>106</td>
<td>405</td>
<td>247.273</td>
<td>123.636</td>
<td>50%</td>
<td>607.500</td>
<td>121.500</td>
<td>20%</td>
</tr>
<tr>
<td>Wakiso, Luwe</td>
<td>dried fruit</td>
<td>-</td>
<td>-</td>
<td>4</td>
<td>30.000</td>
<td>6.000</td>
<td>20%</td>
<td>335.788</td>
<td>100.736</td>
<td>30%</td>
</tr>
<tr>
<td>Kaberole, Mt.</td>
<td>lemon grass</td>
<td>342</td>
<td>240</td>
<td>130</td>
<td>5.515</td>
<td>-</td>
<td>0%</td>
<td>72.930</td>
<td>-</td>
<td>0%</td>
</tr>
<tr>
<td>Palisa, Kabera</td>
<td>hibiscus</td>
<td>264</td>
<td>264</td>
<td>50</td>
<td>12.920</td>
<td>6.120</td>
<td>47%</td>
<td>18.000</td>
<td>3.000</td>
<td>17%</td>
</tr>
<tr>
<td>Apach, Oyam</td>
<td>cotton</td>
<td>27.000</td>
<td>16.000</td>
<td>1.140</td>
<td>1.243.636</td>
<td>310.909</td>
<td>25%</td>
<td>2.487.273</td>
<td>497.455</td>
<td>20%</td>
</tr>
<tr>
<td>Apach, Oyam</td>
<td>sesame</td>
<td>27.000</td>
<td>16.000</td>
<td>1.173</td>
<td>959.727</td>
<td>106.636</td>
<td>11%</td>
<td>2.428.110</td>
<td>485.622</td>
<td>20%</td>
</tr>
<tr>
<td>Kachorwa, N</td>
<td>coffee</td>
<td>19.019</td>
<td>15.300</td>
<td>3.565</td>
<td>5.723.023</td>
<td>1.144.605</td>
<td>20%</td>
<td>8.804.650</td>
<td>1.760.930</td>
<td>20%</td>
</tr>
<tr>
<td>Mount Elgon</td>
<td>coffee</td>
<td>7.000</td>
<td>6.500</td>
<td>468</td>
<td>903.474</td>
<td>180.695</td>
<td>20%</td>
<td>1.389.960</td>
<td>277.992</td>
<td>20%</td>
</tr>
<tr>
<td>Makeramaido</td>
<td>sesame</td>
<td>20.000</td>
<td>7.800</td>
<td>680</td>
<td>494.545</td>
<td>49.455</td>
<td>10%</td>
<td>1.141.679</td>
<td>342.504</td>
<td>30%</td>
</tr>
<tr>
<td>Bundibugyo</td>
<td>cocoa</td>
<td>7.141</td>
<td>4.180</td>
<td>2.244</td>
<td>2.469.760</td>
<td>493.952</td>
<td>20%</td>
<td>6.058.800</td>
<td>1.211.760</td>
<td>20%</td>
</tr>
<tr>
<td>Bundibugyo</td>
<td>vanilla</td>
<td>7.141</td>
<td>-</td>
<td>63</td>
<td>148.050</td>
<td>74.025</td>
<td>50%</td>
<td>445.361</td>
<td>89.072</td>
<td>20%</td>
</tr>
<tr>
<td>Kasense</td>
<td>dried pineapple</td>
<td>1.800</td>
<td>1.800</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Masaka</td>
<td>bark cloth</td>
<td>220</td>
<td>132</td>
<td>2</td>
<td>18.851</td>
<td>3.600</td>
<td>19%</td>
<td>94.256</td>
<td>28.277</td>
<td>30%</td>
</tr>
<tr>
<td>Mukono, W.</td>
<td>vanilla</td>
<td>150</td>
<td>51</td>
<td>1</td>
<td>650</td>
<td>130</td>
<td>20%</td>
<td>2.400</td>
<td>-</td>
<td>0%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>87.356</td>
<td>54.385</td>
<td>10.664</td>
<td>12.623.362</td>
<td>2.605.356</td>
<td>21%</td>
<td>25.018.711</td>
<td>5.135.812</td>
<td>21%</td>
</tr>
</tbody>
</table>

Source: EPOPA (2008), Organic exports. A way to a better life?
Bolwig & Odeke (2007) note, however, that receiving an organic price premium does not imply that overall income from the crop increases by the same. Describing the case of the company BioFresh in Uganda, they found that the average price received per pineapple was only slightly higher for organic farmers than for conventional ones, despite the organic price premium for export size pineapples. This was due to the fact that three-quarters of the organic pineapples (76%; most of non-export size) were sold in the conventional market.

*Organic farmers earned significantly higher revenues from pineapple sales than their conventional counterparts (UGX 3.8 million in 2005, versus UGX 1.8 million), but the key explanation here was volume rather than price.* Focus groups likewise revealed that organic farmers had experienced a large increase in pineapple revenues in recent years, due to expanded production and to higher and more stable prices (Bolwig & Odeke, 2007).

### 4.5.2 Price premiums and spill-over

For another case, Bolwig & Odeke (2007) describe the spill-over effects of organic prices and demand on local conventional buyers. Kawacom is a company involved in coffee production in Uganda. The grower contract obliges Kawacom to pay an organic premium to growers if the coffee is ‘of suitable quality’. The size of the premium is not specified.

The organic buying price is communicated daily from the Kawacom Kampala office to the organic branch manager. Farmers get this information through the field officers and contact farmers. Kawacom has never directly negotiated the price with their growers, but the latter frequently complain to Kawacom about low prices and the field officers monitor the price offered to the organic farmers by local middlemen. The latter are willing to pay a premium for the higher quality of organic coffee, which they use to mix into lower-quality coffee bought from other farmers. And because organic farmers are free to sell their coffee outside the project, Kawacom must thus compete on the price with middlemen.

The difference between the price offered by Kawacom and by middlemen for the same quality is at times very small, as is illustrated by the price movements in 2005/06 (September to February). At the beginning of the season the organic price was UGX 2,350/kg, which was only slightly higher than the local price of UGX 2,300. Towards the end of season the organic price reached UGX 2,650 while conventional buyers offered UGX 2,450. Thus while the organic producer price depended mainly on international market conditions, it was also influenced by the local competition for high quality coffee.

Local price competition may help ensure that farmers do get an organic premium as promised. Hence the prevalent buying price for conventional coffee in other parts of Mount Elgon during 2004/05 was UGX 1,650, which meant an organic premium of about UGX 300, or 15%. The same premium was observed in the 2006/07 season. Significantly, because local traders match the Kawacom price quite

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26 Kawacom is one of the largest exporters of conventional coffee from Uganda and the biggest exporter of organic coffee. It operates the Sipi Utz Kapeh and Organic Arabic Project in Kapchorwa district as well as two other organic coffee projects in Uganda. Kawacom is a subsidiary of the international trading house Ecom Agroindustrial Corporation, based in Switzerland.
closely, local conventional farmers and organic farmers who sell off the project also get a premium. This is an important local spill-over effect of the organic certification/quality improvement program.

One could argue that higher quality rather than organic certification accounted for most of the organic premium; on the other hand, the presence of the organic buyer is necessary to sustain a ‘quality premium’. “We have thus observed that the local price drops dramatically when Kawacom stops buying at the end of the season (e.g. from UGX 2,450 to UGX 2,000 in early-2006) and it increases again when Kawacom starts buying (e.g. from UGX 1,900 to 2,300 in September 2006).” (Bolwig & Odeke, 2007).

4.5.3 Out-grower production capacity and income

In the Kawacom case, Bolwig & Odeke (2007) found evidence suggesting that the changes in coffee farm management practices, which did not signify a ‘deep conversion’ to organic agriculture, were large enough to have significant productivity effects in terms of improved quality and higher yields. Yet, most of the changes in farm management were not required for organic certification but were practices that enhance coffee yield and quality.

Focus group interviews indicated that there had been a general increase in the productive capacity of coffee farmers in the area since around 2000 when the organic project was established. Increased production had been the result of expanded acreage (although the general land scarcity limited this dynamic considerably), replanting of existing fields, and higher yields per tree due to improved management (fertilization and weeding). Farmers cited the higher and more stable prices (a result not only of organic conversion but also of improved international prices since 2003) as the main factors underlying these investments. Another reason has been the low profitability of maize, related to low yields and low prices. Maize is the alternative cash crop to coffee in the area. Aside being less profitable to smallholders, maize farming was also much more demanding in cash and land resources than coffee. Therefore, where coffee farms were expanded, this was often at the expense of maize.

<table>
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<th>Case study 2.</th>
<th>Kawacom organic coffee scheme</th>
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<td>The vast majority of the Kawacom organic farmers are small-scale farmers. The average farm size was 1.1 ha of land according to the household survey, and the average area under coffee 0.24 ha of land. Bolwig &amp; Odeke (2007) found no statistically significant differences in farm size (whole farm or coffee farm) between organic and conventional farmers, but other factors indicated that <strong>organic farmers had a higher production capacity than conventional farmers</strong>: organic farmers had 62% <strong>more coffee trees</strong> (indicating more intense land management), organic coffee yields (at 836 kg parchment equivalent per ha) were 33% <strong>higher than conventional yields</strong>, and organic farmers <strong>produced 40% more</strong> coffee in 2005/6 than conventional farmers (249 kg against 177 kg parchment eq.). All differences were significant.</td>
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<td><strong>Organic farmers also had a higher capacity (and incentive) for coffee processing</strong>: in 2005/06 they sold 89% of their coffee as dried parchment (and the rest as raw cherries or semi-processed), against only 58% for conventional farmers. The higher level of processing, together with the organic price premium, resulted in organic farmers getting a significantly higher average price for their coffee than conventional farmers (UGX 2,108 per kg parchment equivalent, versus UGX 1,806; i.e. plus 21%).</td>
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Higher volume and higher prices meant that the organic farmers’ coffee revenue exceeded that of conventional farmers by 26% in 2005/06 (UGX 817,616 versus UGX 646,901), although the difference was not significant (P = 0.08). Cash expenditures on inputs, land, equipment and hired labor for coffee were low (20% of organic coffee revenues) and there were no significant differences between organic and conventional farmers on these indicators. Altogether this meant that organic farmers’ coffee (net) income was 32% higher than conventional farmers’ (UGX 656,177 versus UGX 497,159), although this difference was not significant (P = 0.061) (Bolwig & Odeke, 2007).

Focus groups interviews likewise revealed that organic farmers had generally experienced a significant increase in coffee incomes since organic certification. The household survey confirmed that 84% of farmers had experienced an increase in coffee income, while only 3% had seen their income reduced. The survey also showed that 85% of farmers found that their income from coffee had become more stable since certification, and 74% said that they got paid earlier in the season for their coffee. Improved income stability and timing are likely to have had a positive influence on food security (Bolwig & Odeke, 2007).

Yet, Wiethegger (2005) relativizes the overall income effects of organic premiums. “The premium needs to be seen in its social context. The majority of farmers own less than 400 coffee trees; so at a yearly harvest of 150 kg clean coffee, these farmers earned Tsh 112,500 (some USD 175) in 2004/05. Most of the money is spent on food supplements. Education, diet and housing might have improved due to the premium, especially among the more well-off farmers. The premium can thus be perceived as a nice extra. By trickle-down effect also other villagers might benefit from it. Farmers appreciate the direct payment on delivery of their coffee beans. Yet, many farmers do not see the extra work they have to spend on processing activities justified by the premium. An unknown percentage of coffee is thus sold outside to non-organic traders.”

4.5.4 System improvements

Jacobsen (2009) examined the development potential of organic agriculture for small-scale subsistence farms in Uganda. A total of 175 farmers were surveyed in two different locations (northern Lira and western Mbarare) in Uganda to examine what effects their conversion to organic production had on their standard of living.27 The conversion to organic cultivation techniques was found to have several positive effects on the livelihoods of the smallholder farmer households: increased yields of both food and cash crops, increased incomes and financial stability due to linkages to organic export markets, and increased skills and knowledge of the production system that maintains their livelihood.

Jacobsen (2009) considers that the main barrier to expanding the organic production system in Uganda is the high cost of conversion to organic agriculture which makes producers dependent on the organizations and companies that fund certification and conversion costs entirely. This

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27 Households selected for interviews were all small farmers who are part of an out-grower scheme and who sell to intermediaries collecting and exporting their products. A control group of comparable households were interviewed as well. These were farmer households situated close to the organic farmers, who are using traditional farming methods, growing the same type of crops, and on the same scale as the households in the main research group (Jacobsen, 2009).
dependency is accentuated by the government’s lack of recognition and support towards an organic sector that has so far had a good track record. “While the organic sector is in continuous growth, this makes it uncertain whether the dissemination of organic agricultural techniques will reach a critical mass.”

The connection to an organic buyer that offers stable prices and steady marketing possibilities can contribute immensely to financial security of a household, while it enables the latter to plan ahead on a scale that was not previously possible. Another contributing factor to the increased income of organic farmers was their ability to sell larger quantities of produce. Organic production techniques can increase crop yields significantly, especially when converting from a low-input traditional agricultural system. In Lira, Uganda, where cotton was a main crop, organic farmers grew 500 kg of seed cotton per acre per season, compared to 200 -300 kg for neighboring non-organic farmers. This translates into USD 41- 61 additional incomes per acre for the organic producers, a notable sum for smallholder farmers (Jacobsen, 2009).

Wietheger (2005) confirms in her MSc thesis about organic coffee in Uganda that for the farmers organic is the one that brings more money. However, she warns that the farmers “do not perceive organic in the first instance as related to the mere practical farming aspects. (...) It is therefore doubtful if farmers will continue organic production when the incentive in terms of money is getting less.”

4.5.5 System resilience

Next to the financial and economic resilience of the production system of smallholders, there are other elements of system resilience to be considered in a system comparison between organic, “traditional” and conventional agriculture in the tropics.

Established organic agriculture, in which soils and biodiversity have been nurtured over time and the system has balanced out, is generally considered to be an ideal agricultural production system for sustainability. Organic agriculture has been criticized for issues of productivity, price and feasibility, but it is generally applauded for its sustainability impacts.

Organic agriculture has many positive system impacts compared to conventional - depending on the situation before conversion, and the degree of the ‘organic system optimization’:

- The soils hold substantial organic matter, are well aerated and have good structure, which provides them with a high water storage and retention capacity. This is of particular importance during drought periods, and in view of climate change.
- The production system is diverse, thus creating a multitude of ecosystems at micro-level, which is beneficial to general biodiversity. The more biodiversity, the less likely it is that one single pest or disease will affect farm production substantially.
- The diversity of the cropping system relates to the number of species and varieties (horizontally), as well as to the integration of trees, shrubs, crops and soil cover crops (vertically).
• Livestock and crop production are generally integrated, whether through fowl and small ruminants or through livestock, thus enabling the recycling and production of plant absorbable nutrients through composting.

• Trees and crop production are generally integrated, thus enabling the uptake and recycling of nutrients for different soil layers, while providing multiple additional services to flora and fauna (fruits, shadow, humidity, organic matter from leaves, soil cover, wind break, nesting sites for birds and insects, etc.).

It should be noted, however, that organic farms -in East Africa and beyond- may well not (yet) have an “optimized system”. For example, the quality of organic fertilizing practices may differ widely between smallholders in terms of the amount of nutrients added, because of limitations in access to manure, compost, transport or labor. Abundant diversity is also not guaranteed on certified organic farms; organic fields can sometimes be as mono-cropped as are conventional ones. Because of this, organic proponents tend to distinguish in practice between “fully organic” farms (which are close to ideal in terms of diversity) and “certified organic” farms (which only meet the minimum criteria for organic certification). This is a distinction to take into account also for future organic comparative research.
5. Conclusions

Demand for organic products is on the rise around the globe. Consumers are increasingly interested in the organic proposition to care about the origins of their food, and to encourage the holistic management of the land, water, air, plants and animals that agriculture depends on for sustainability. Many consumers prefer organic over non-organic products for their taste and image, and are ready to pay a higher price for organic items.

Organic agriculture is widely applauded for its contributions to people, animals and the environment through the sustainable production of food, feed, fibre and fuel, without the use of any contaminants such as synthetic pesticides and herbicides, genetically modified organisms or growth regulators. The organic crop management practices can contribute, by their nature, to mitigating and adapting to the impacts of climate change and enhancing the resilience of farms and rural livelihoods.

While the global agricultural policy debate remains focused on how to produce more food for a growing global population in the context of the accelerating impacts of climate change there is at the same time increasing recognition of the need to address environmental and social issues. The green revolution is widely recognized for having averted famine for millions of people in the 1960's, especially in Asia, through its package of hybrid seeds, synthetic pesticides and fertilizers and irrigation. Today, it is recognized that this form of agriculture and food production that drives problems such as deforestation, land degradation, water scarcity, greenhouse gas emissions, decline in pollinators, malnutrition, diet related disease, land-grabbing, human rights abuses and ecosystem toxicity.

The green revolution never gained traction in Africa, as farmers could not afford the inputs and irrigation. Today many small-scale farmers in Africa remain locked out of development with millions suffering from hunger. Finally international attention has reached the plight of the world’s smallholders, especially in Africa, which has initiated a much broader global discussion with regard to what form should agricultural based development take. Livelihood approaches, ecosystem based approaches, resource rights approaches, participatory decision making processes, food sovereignty, nutrition, farmers rights, phasing out of perverse subsidies and unfair trade policies, resilience, poverty eradication and inclusive sustainable development are also now a core part of a much broader discussion beyond productivity.

With this broader recognition of the challenges for agricultural development in Africa in mind, this study has come to eight broad conclusions ranging from difficulties differentiating between organic and non organic farms in Africa through to the structure of the organic sector in East Africa, lack of research on the economic of organic farming systems in the region, its productivity and profitability as well as its contribution to food security, resilience and potential application as a sustainable development tool for rural development in East Africa.
Conclusion 1: Identifying organic farms beyond those which are certified is difficult given the current nature of smallholder farming in Africa

The relative underdevelopment of smallholder agriculture in Africa makes it difficult to clearly differentiate between farming systems, especially those that are often described as traditional and which largely represent many of the neglected smallholders that have been in recent decades more-or-less locked-out of development opportunities.

There is great overlap between traditional farming that is organic compatible ('organic by default') and traditional farming that may also use some conventional inputs from time to time depending largely on whether the smallholder can afford them. Importantly it is not so much what differentiates these farms in terms of whether they occasionally use conventional inputs or not but rather that their farms are unproductive and vulnerable due to the low intensification of either organic or conventional practices and inputs. These farmers desperately need support in terms of capacity building and access to resources as well as greater rights to increase the resilience, productivity and ultimately the profitability of their farms and livelihoods.

Conclusion 2: Detailed independent, academic research on the productivity and the profitability of organic agriculture in East Africa (certified or not) is very limited and in-depth organic comparative research is even scarcer. This lack of research is inline with the general under-representation of organic research in agricultural research programs as a whole.

The literature review finds that research on the productivity and the profitability of organic production in East Africa is very limited. To establish organic agriculture as an important tool in sustainable food production, the factors determining organic yields need to be better understood, alongside assessments of the many social, environmental and economic benefits of organic farming systems (Seufert et al., 2012).

Conclusion 3: The limited literature available clearly points to significant yield increases when organic agriculture practices are used to improve low input conventional traditional agriculture in Africa. This is significant given that the great majority of farms in East Africa and in Africa are of this nature.

This literature review finds that, globally, organic yields tend to be lower than in intensive conventional production. However, for developing countries, and for East Africa in particular, there is not much proof that productivity of organic agriculture in terms of yields is lower than conventional. Conventional production in East Africa is not generally intensive. The limited literature available to date shows that in this context organic conversion projects in East Africa generally lead to higher yield levels for participating farmers. The higher yields derive from improved farm management with enhanced attention for the basic processes and techniques underlying agriculture and sustainable soil, water and crop management.29

This finding is in line with experiences in other parts of Africa both for certified and non-certified organic agriculture. Hine et al. (2008) found an average crop yield increase of 116% across Africa and

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28 New organic research projects have been initiated recently (ProGrOV East Africa initiative, AELBI Pan-African research initiative, BOKU long-term organic research, FiBL global system comparison). Of these, only the FiBL research (in Kenya, India and Bolivia) specifically focuses on a comparison of agricultural systems.

29 The ecological resilience of organic agricultural crops may also provide a tremendous opportunity to increase the productivity of (...) arid and semi-arid lands and other fragile farming ecosystems (UNEP-UNCTAD, 2007).
128% for projects in East Africa when farmers switched from low input traditional farming to systems using organic or near organic practices. In Ethiopia for example studies have indicated that good practice organic agriculture that utilizes good soil management practices combined with robust and resilient local seed varieties, doubles yield over traditional low input conventional approaches, and, has parity in terms of yields with best practice conventional agriculture but at the fraction of the cost in terms of financial outlay for inputs. There are many reasons to engage in research to improve the performance of organic farms, as the potential of increasing yields is likely to be very high.

**Conclusion 4:** Certified organic agriculture in East Africa is largely an institutional arrangement in which export market-orientated parties engage smallholder farmers on a contract-basis.

Contract farming affects the division between partners of risks in production, finance and trade. Organic system comparisons should take these factors into account. Contractual arrangements may provide farmers with training and the means to improve their production in a sustainable manner, a certain degree of market and income stability to the farmer, or include early payment after harvest. The connection to an organic buyer that offers stable prices and steady marketing possibilities can contribute immensely to financial security of a household, while it enables the latter to plan ahead on a scale that was not previously possible. Yet, contracts are difficult to enforce and non or partial compliance of contracts does occur. Product quality requirements may give preferential market access and a good price, but they can as well significantly reduce the effective percentage of produce sold at a premium. Farmers’ access to organic premiums may also be conditional of primary processing of the harvested product, which implies additional production costs. As a consequence much of the produce has to be sold in conventional local markets.

**Conclusion 5:** The literature review finds that farmers engaged in certified organic export production were significantly more profitable in terms of net farm income earnings than those that engaged only in conventional production

The superior profitability of certified organic farmers was primarily due to the participation in contract farming arrangements that included price premiums. Interestingly the review found that premiums were however also available outside the arrangement of the certified organic contract farming value chain. There was also evidence that the use of organic farming techniques also contributed to lower production costs.

**Conclusion 6:** Organic agriculture in East Africa is dominated by well-established certified organic export-orientated value-chains in Uganda and Tanzania.

Uganda and Tanzania have by far the most developed certified organic sectors in East Africa. The sectors consist of export-orientated value-chains responding to demand from well-established organic markets in Europe, USA and Japan. In Uganda the number of certified organic farmers was approx. 188,000 in 2008/09 with an export value of USD 42 million in 2010/11. Cotton, sesame and coffee are the most traded crops with other major organic export products being cocoa, dried fruits, frozen fruit/pulp, fresh mainly tropical fruit and spices. Tanzania had an estimated 115,000 ha of certified organic farmland in 2011 with an estimated 145,000 producers in 2013 producing mainly coffee, tea, nuts, spices and vegetables. Organic agriculture on the other hand in Kenya is much smaller with less than 5,000 ha of certified production. However the local market is more developed and there is a history of promoting organic agriculture as a rural development tool lead by NGOs, CBOs, FBOs and local organic training institutions. A number of horticultural companies grow organic
vegetables mainly for export. Certified organic production in Rwanda and Burundi is smaller again with hectares approximately 4000 ha and 500 ha respectively.

**Conclusion 7: Organic agriculture can have many positive system impacts compared to conventional and under-developed traditional farming - depending on the level of ecological intensification of the organic system**

Established organic agriculture, in which soils and biodiversity have been nurtured over time and in which the system has reached a degree of equilibrium or stability, is generally considered as an ideal agricultural production system for sustainability. Organically managed soils have a high water storage and retention capacity, which is particularly important during drought periods, and in the context of climate change. Ecologically intensified organic production systems are diverse in terms of the number of species and varieties (horizontally), as well as to the integration of trees, shrubs, crops and soil cover crops (vertically) and the establishment of a multitude of ecosystems at micro-level. Ecologically intensified systems increase nutritional diversity and marketing options, they minimize the proliferation of pest and disease and significantly reduce risk of crop failure.

The integration of livestock and crop production enable the production of valuable livestock products while sustaining the fertility of the production system through the recycling and production of plant absorbable nutrients aided by composting. The integration of trees and other perennials into crop production facilitate the uptake and recycling of nutrients for different soil layers, while intensifying production through multiple additional services such as fruits, nuts, organic matter and fodder from leaves, soil cover, habitats for beneficial insects etc. and the provision of wind breaks, shade and humidity etc.

Such sustainable intensification of productivity and resilience is highly suitable for many smallholder farmers in Africa but requires extension support, especially training and access to biodiversity based inputs to realize this potential.

**Conclusion 8: The utilization of organic practices for improving the resilience, productivity, profitability and sustainability of agriculture production and livelihoods as well as enhancing food access to food and food availability is largely an untapped opportunity in East Africa.**

The export value of organic products from Uganda and Tanzania in 2010/11 was USD 42 million and USD 14 million respectively. These sectors have improved the livelihoods and resilience of approximately 330,000 farmers through application of organic farming practices and access to premium overseas markets. While these initiatives however are not primarily aimed at increasing local food availability they can contribute to local food security for two reasons. Firstly significant proportions of the produce end-up, for various reasons, being sold in local conventional markets for local consumption and secondly the raised incomes of these farmers provides them with the cash to access food – provided it is available.

Organic agriculture enables farmers to improve their production systems and productivity without the need for significant financial outlay. Therefore, all produce need not necessarily have to be sold at a premium to be profitable for the farmer. There appears to be tremendous opportunity for cost effective agricultural growth in East Africa through an ecosystem approach to agricultural intensification. The training of smallholders and the creation of new local and export markets will both, and jointly, favor agricultural intensification and growth.
6. Recommendations

Recommendation 1: Advocate for much greater support of research into organic agriculture practices and systems
The lack of research encountered in this literature review reflects the general under-representation of organic research in agricultural research programs as a whole. Given the global shift towards more sustainable agriculture and the need to strengthen smallholders, greater support of research into the economic, environmental and social benefits of organic systems is warranted.

Recommendation 2: The systematic evaluation of the costs and benefits of different organic agriculture management options is critical to give farmers and decision makers confidence in supporting the uptake of such practices.
Focus should be on organic agriculture initiatives, which already appear to be providing farmers, households and communities with significant livelihoods, resilience and food security benefits. This should be done in the context of major national, regional and international policy processes and programs in order to increase relevance and traction. Agricultural productivity, food security, nutrition, climate change, biodiversity, land degradation, drought, sustainable development and rural economy policies, targets, strategies, initiatives of national governments, the African Union, the UN (e.g. UNFCCC, UNCCD, CFS, WFP, IFAD, CBD etc) and organizations that support farmers and rural communities including farmers organizations, humanitarian organizations (e.g. IFRC, World Vision) should be the target of the research as well as key private sector companies. Such a strategic approach could be coordinated in the context of the EOA initiative and leverage the African Union’s commitment to organic agriculture and CAADP.

Recommendation 3: Develop export orientated organic agriculture in conjunction with organic agriculture based rural development to harvest synergies and bring benefits to a much wider proportion of the East African population
East Africa has a competitive advantage and a strong basis to increase the development of export orientated value-chain initiatives for tropical and counter-seasonal organic products. This success provides a promising platform from which to expand the reach and impact of organic agriculture in East Africa. Efforts could be made to develop local organic markets for products that don’t meet export specifications and training programs could be extended to farmers in the region to spread the benefits and provide local markets with a wider range of produce. This would help establish resilient and sustainable livelihoods for a much wider group of farmers while increasing access to food and nutrition. Engagement with the private sector and civil society organizations working in East Africa could help unlock their entrepreneurial potential for utilizing organic farming as a tool for green growth.

Recommendation 4: Form partnerships in East Africa for implementing organic agriculture based sustainable development to address hunger, rural poverty, climate change and land degradation.
The limited literature available clearly points to significant yield increases when organic agriculture practices are used to improve low-input conventional traditional agriculture in Africa. This is significant given that the great majority of farms in East Africa and in Africa are of this nature. Furthermore, cases from other parts of Africa demonstrate the effectiveness of organic agriculture in reversing land degradation and rebuilding livelihoods. Ecosystem based approaches to climate
change adaptation; land degradation and disaster risk reduction are gaining increased recognition. Partnerships with actors on the ground such as farmer’s organizations (e.g. EAFA), humanitarian organizations (e.g. IFRC, World Vision) and UN agencies such as UNDP, WFP and UNCCD who are working with rural farming communities could provide important channels for building the capacity of these farmers to enhance the productivity and resilience of their farms with organic agriculture practices and systems. Innovative distribution and marketing models could also be promoted to help further develop local rural economies on a sustainable footing.

**Recommendation 5: Expand the development of stable and diverse markets for smallholders.**
The study has shown that a connection to an organic buyer that offers stable prices and marketing possibilities contributes immensely to the financial security of farming households. Importantly it enables small family farms to plan ahead on a scale that was not previously possible. Such arrangements can be established in a variety of marketing models, which enable closer links between producers and consumers. Such arrangements can create stable markets, reduce or share risks and make organic food cheaper for consumers.
7. References


Annex 1. **Best Practice Comparative Research**

Comparative organic research can be of qualitative or quantitative nature and complex. Comparative organic research would ideally consider different types of farming with the same crop and cropping system and which are geographically close. Data would be expressed in similar units (e.g. per hectare, m² or tree), and be corrected where necessary for issues such as planting density, mixed cropping and intercropping. The comparison would consider plants or trees of the same or similar variety, and in the case of perennial crops, such as coffee and cocoa, the comparison would consider trees of similar age. Also, the farmers considered should ideally be from the same socio-economic group and position and have comparable access to resources. Data would ideally be disaggregated by sex in order to distinguish farming by women and men. In comparative research actually there is no end to the number of parameters to study and keep ‘constant’ in order to make relevant ‘ceteris paribus’ conclusions.

In all cases, however, the interpretation of data is crucial. It is often relevant, or more relevant, to improve *interpretation* of the data collected than to invest in ever more comparable, thus complex, data collection with ‘identical control groups’ and alike. Research designs with control groups (being measured before, during and after intervention) are often not able to adequately take into account the dynamics of relevant events over the research period (cultural, social, economic, political) as many events are unforeseen and beyond the influence of the targeted population. Proper interpretation of data therefore requires a participatory approach, in which the analysis established feeds back to the actors concerned and is discussed and commented by them before definite conclusions are drawn for policy and implementation.
Annex 2. Documentation encountered

The documents listed below have been considered for inclusion in this literature review at some stage of the process. Most documents were not considered in the review while they lack a sufficiently detailed comparative perspective on the productivity and the profitability of organic, “traditional” and conventional agriculture. They are listed here only for reference.

**Documents for comparative organic research:**


Ayuke, F.O. (2010), *Soil macrofauna functional groups and their effects on soil structure, as related to agricultural management practices across agro-ecological zones of Sub-Saharan Africa.* Wageningen University, Netherlands, 202p.


Grimsby, L.K. (2005), *Measurement of microbial numbers, activity, biomass and diversity as a response to different methods of treatment of Tanzanian soil.* Norwegian University of Life Sciences, As, Norway, 60p.


Speranza, C.I. (2010), Resilient adaptation to climate change in African agriculture. German Development Institute (DIE), Bonn, Germany, 311p.


Van der Mheen-Sluijer, J. & E.D. Innocenti (2012), Socio-economic impact of organic farming in East Africa. Agricultural Economics Research Institute (LEI), Wageningen University Research Centre, the Netherlands, 16p.


Wright, S. (2012), Trialling Organic and Fair Trade Berry Fruit Production in Uganda. Garden Organic & Coventry University, UK. (Research leaflet)

Organic research documents


IFOAM (2009), The contribution of Organic Agriculture to Climate Change Adaptation in Africa. IFOAM, Bonn, Germany, 12p.


Reckling, M. & S. Preißel (2009), Application of Internal Control Systems in Organic Export Companies: Two Case Studies from Uganda. Presentation at Tropentag (Hamburg, Germany, October 6-8, 2009). (Poster)


Sirieix, L, P. Kledal & L. Santiago de Abreu (2008), Consumers’ motivations for buying local and organic products in developing vs developed countries. Presentation at 16th IFOAM Organic World Congress (Modena, Italy, June 16-20, 2008).

Sogna, O. & E. Mellab (2007), Tanzanians’ interest in and access to organic food.


