

# Organic agriculture as a roadmap for sustainable agricultural productivity and food security: Evidences from sub-Saharan Africa

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## Abstract

In sub-Saharan Africa (SSA), agricultural production is largely rain-fed and dominated by smallholder farmers. Amongst the attempts made towards improving the productivity of these smallholders are the introduction and use of synthetic fertilizers to enhance soil fertility, the use of chemical herbicides, cultivation of improved crop varieties, and provision of irrigation facilities to augment rain water, particularly during off season. Although most of these technologies are unaffordable to the SSA small farmers (e.g. fertilisers), Africa continues to rely heavily on the importation of agro-chemicals. The lop-sided political economy and ecology of the African economies have thus made them totally dependent on Western agricultural technologies and foreign aids. Given the current scenarios, the resultant adverse effects of the excessive use of agro-chemicals have continued to have impact on the environment and human health. Nonetheless, the potentials of organic agriculture, which emphasizes the need to promote low-external input agriculture (LEIA) has not been properly and fully harnessed. Organic agriculture is a holistic system that promotes a healthy agri-food system right from production to distribution. It employs a number of strategies in maintaining as well as improving land productivity. It is a sustainable, environmentally friendly production system which can offer Africa and other developing countries a wide range of economic, environmental, social and cultural benefits, amongst which are enhanced food security; protection of natural resources, including soil and water quality; less dependency on foreign inputs and price volatility related to external inputs; and reduced illness and death associated with agro-chemical exposure. This paper employs a critical discourse analysis to review literature on the importance of LEIA on agricultural sustainability and food security. Amongst others, the write-up contested issues relating to harvest declines of agricultural crops due to lack of inorganic fertilizers; reduced income for small holder farmers as a result of decline in harvest of agricultural crop yields and the reasons why smallholder farmers need to adopt organic farming. By providing examples of success stories (case studies), the paper also makes an advocacy for organic agriculture as a panacea for enhanced agricultural productivity and food security in the SSA region.

**Keywords:** Rain-fed agriculture, agri-food system, political economy, low-external inputs, organic farming, food security, sustainability, smallholders

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## Introduction

The African continent is confronted by a number of critical challenges. Prominent amongst these are widespread of food insecurity and hunger particularly in sub-Saharan Africa (SSA). The chronic food insecurity in SSA has been directly linked with the nature of agricultural system prevalent in the region. In other words, African agriculture, which is 85.0 – 90.0 per cent rain-fed, has not been able to match the current demand for food supply to its teeming population. It accounts for about 35.0 per cent of the region's gross national product (GNP), 40.0 per cent of exports and 70.0 per cent of employment (World Bank, 2000). Arising from the effects of the fluctuations in rainfall patterns on agricultural production, year-to-year variations in GDP can be as high as 15-20 per cent. Indeed, about one-third of the region has a mean annual rainfall of less than 700 mm, which is too little to sustainably support rain-fed crop production (UNEP 2002: 289). In the SSA, where domestic food production, which is largely dependent on smallholder farmers, is accounted for by about 80.0 per cent of consumption, an inevitable outcome, given this scenario, is a significant decline in agricultural production, poverty and food insecurity. Paradoxically, human population of the SSA countries, in the recent times, has continually been on the increase. Projections on food production estimate suggests that Africa as a whole would need to increase its grain production by almost four times and its animal production by seven times, given a population of 2,200 million in the year 2050 (Mc-Granahan *et al.*, 1999:104). The need, therefore, to ensure sustained increase in agricultural productivity is imperative if only to forestall an unending food crisis situation in the region. One of the earlier attempts made towards improving smallholders' productivity is the introduction of high external inputs (HEI) agricultural system approach that advocates heavy reliance on use of synthetic fertilizers to enhance soil fertility, use of chemical herbicides, cultivation of improved crop varieties, and provision of irrigation facilities to augment rain water. Although most of these technologies (e.g. fertilizers) are unaffordable to the SSA small farmers, Africa continues to rely heavily on the importation of agro-chemicals. The lop-sided political economy and ecology of the African economies have thus made them totally dependent on Western agricultural technologies and foreign

aids. Even though food production worldwide is reported to have risen in the past 50 years; with the World Bank estimates attributing about 70.0 to 90.0 per cent of these increases to conventional agriculture, the long-term viability of current food production system is being called to question just as food insecurity in the sub-region is becoming pervasive by the day. The attendant negative consequences of conventional farming system on both the environment and human health are worrisome, too. In spite of all the given scenarios, organic agriculture, which emphasizes the need to promote low-external input agriculture (LEIA), is yet to be accorded the right priority. This paper, amongst others, gives an overview on the state of food insecurity in the SSA [section 2], examines the concept of sustainable agriculture [section 3], highlights the negative impact of modern agricultural system on the environment and human health [section 4], and employs discourse analysis to debate the significance of LEIA on agricultural sustainability and food security. By providing examples of success stories (case studies) [section 5], the paper also makes an advocacy for organic agriculture as a panacea for enhanced agricultural productivity and food security in the SSA sub-region [section 6].

### **State of food insecurity in the SSA**

Food security exists when all people, at all times, have physical and economic access to enough safe and nutritious food to meet their dietary needs and food preferences for an active and healthy lifestyle (FAO, 1996). Indicators of food insecurity in a given region can include the number of hungry or underfed people in a locality. The situation of food security on the Africa continent has exacerbated since 1970 and the proportion of the malnourished population has remained within the 33.0 to 35.0 per cent range in sub-Saharan Africa (Rosegrant *et al.*, 2005). In addition, of 852 million people that go hungry globally, there are 126 million under weight children and over 2 billion people suffering from some form of micro nutrient deficiency, while about 50.0 per cent of pregnant women are affected by iron deficiency anaemia in SSA. Unfortunately, progress in the drive to reduce hunger has been slow and since 1990, the number of hungry people has increased by 20.0 per cent in SSA. For example, in the period between 2000 and 2002, the proportion of undernourished people in Kenya was 33.0 per cent, 19.0 per cent in Uganda,

and 44.0 per cent in the United Republic of Tanzania (FAO, 2005).

As a result of the frantic efforts by several agencies (international, local, governmental and non-governmental) to address the situation, the FAO (2005) reported a remarkable growth in agricultural productivity with per capita world food production growing by 17.0 per cent and aggregate world food production growing by 145.0 per cent. However, the rising world population reported to have increased from 3 to 6 billion within the past forty years (UN report, 2008), has not led to any significant reduction in the incidence of hunger for all, the recent advances in aggregate productivity notwithstanding. The state of food insecurity, judging from the figures above, is not only appalling but requires urgent attention. Thus, a radical approach is needed to address the situation. There is, therefore, the need for sufficient access to agricultural inputs, knowledge and skills. But then, majority of the chronically hungry are small farmers who are naturally subsistent and are often poor and unable to afford modern agricultural inputs. Given that most of these foreign technologies are not even appropriate in specific contexts, a weak political economy of agricultural production in African economies would not allow poor farmers have access to them (e.g. imported fertilizers). Instead, rent-seeking politicians and their cronies capitalize on African weak institutions by colluding together to corner inputs meant for small farmers. They in turn use these inputs on their farms or sell the products at exorbitant prices to the few hapless ones who have the wherewithal to purchase them. The situation has thus become dismal. Worst still, the structural adjustment programmes (SAP) of the Bretton Woods in the 1980s and 1990s stipulating that farmers in developing economies should no longer be subsidized has become problematic ever since. Given the current scenario, therefore, it is important for African governments to look inwards and seek for alternative measures to the HEI agriculture approach. It must be said here that Western economies are beginning to see the importance of organic agriculture and as such have been promoting same within their own contexts. One would then wonder why Europe and America keep pushing chemical agriculture in Africa. Organic agriculture, on the other hand, allows farmers to use endogenous resources, which are affordable, environment friendly and sustainable in all ramifications.

## What is sustainable agriculture?

The concept of sustainability cannot be defined in a simplistic manner. It means different things to different people. Nonetheless, the verb 'sustain' derives from the Latin word *sustinere* (sus-, from below and tenere, to hold), meaning to keep in existence or maintain, implies long-term support or permanence. As it pertains to agriculture, it describes farming systems that are capable of maintaining their productivity and usefulness to society indefinitely (Gold, 2007). Such systems, according to Duesterhaus (1990:4) must be resource-conserving, socially supportive, commercially competitive, and environmentally sound. It is a way of practising agriculture, which seeks to optimize skills and technology to achieve long-term stability of the agricultural enterprise, environmental protection, and consumer safety. Francis and Youngberg (1990:8) described sustainable agriculture as a system based on human goals and on understanding the long-term impact of human activities on the environment and on other species within the environment. The major objective of sustainable agriculture is to increase food production in a sustainable way and enhance food security. Just as Kolawole and Laogun (2005) write elsewhere that sustainable development is all about environmental protection, economic growth and good resource management. Sustainable agriculture integrates three main goals - environmental health, economic profitability, and social and economic equity. Despite the diversity of people and their perspectives, what is common through most definitions of sustainable agriculture is that sustainability rests on the principle that we must meet the needs of the present without compromising the ability of future generations to meet their own needs (Feenstra, *et al.*, 1997). Therefore, *preservation of both natural and human resources* is of prime importance in sustainable agriculture. Maintenance of human resources includes consideration of the needs of rural communities and consumer health and safety both in the present and the future. Preservation of land and natural resources involves maintaining or enhancing this vital resource base for long term use. The feature of sustainable agriculture extracted from *NGO Sustainable Agriculture Treaty* Global Forum at Rio de Janeiro in 1992 is summarized in box 1.

## Box 1: Features of sustainable agriculture

Agriculture is sustainable when it:

- is ecologically sound, economically viable, socially just, culturally appropriate and based on a holistic scientific approach,
- preserves biodiversity, maintains soil fertility and water purity, conserves and improves the chemical, physical and biological qualities of the soil, recycles natural resources and conserves energy.
- uses locally available renewable resources, appropriate and affordable technologies and minimizes the use of external and purchased inputs, thereby increasing local independence and self sufficiency and insuring a source of stable income for peasants, family and small farmers and rural communities. This allows more people to stay on the land, strengthens rural communities and integrates humans with their environment,
- respects the ecological principles of diversity and interdependence and uses the insights of modern science to improve rather than displace the traditional wisdom accumulated over centuries by innumerable farmers around the world.

*Source: Cited from the Special Reference Brief Series, compiled by Mary V. Gold of the 'Alternative Farming Systems Information Center' National Agricultural Library Agricultural Research Service U.S. Department of Agriculture [2007.]*

From the foregoing, a vital question begging for answer at this juncture is whether the conventional agriculture system with its characteristics feature involving reliance on external input can guarantee sustainable agriculture?

## Modern agriculture, the environment and human health

Through mechanization, modern agriculture has continued to undermine the environment and people's health by threatening poor people's land tenure system and by destroying the equilibrium and dynamic of flora and fauna; wild resources are continuously being degraded. All efforts to reduce them notwithstanding, many environmental and health-related impacts have increased in recent years, whilst others have persisted. Many of the environmental problems associated with agriculture are a direct result of intensive and specialized farming. Intensification of agriculture implies greater use of pesticides, fertilizers and water inputs, and a tendency to specialise operations. Some 30.0 to 80.0 per cent of applied nitrogen, and significant but smaller amounts of applied pesticides are lost to the environment where they contaminate water, food and fodder as well as the atmosphere (McGranahan *et al.* 1999: 115).

Pesticides are by nature hazardous since their value lies in their ability to kill unwanted organisms and they rarely do this selectively. Most act by interfering with fundamental biochemical and physiological processes that are common to a wide range of organisms. Not only pests and weeds are affected as a result of this but humans, too. Nitrate

and phosphates from fertilizers and pesticides damage populations of wildlife and the predators that help keep pest populations under control, whilst inducing resistance in target pests. Thus, the costs of environmental damage are growing, and are dispersed throughout many environments and sectors of national economies. Recent analyses, reported by Boon (2010) have been characterized by the recognition that farmers themselves are suffering declining incomes or health-related effects as a result of these modern approaches to agriculture.

More pathetic is the danger to the final consumer who eats food contaminated by pesticides residues, nitrates and antibiotics. The major hazard lies in locally marketed food. Leafy vegetables are often sprayed twice a week and may come to market with a high degree of contamination, especially in the dry season. In Africa, vegetables have been found to contain organophosphates many times in excess of human tolerance limits (McGrnham et al 1999: 116). Box 2 provides a recap of the worrisome situations of adverse effect of pesticide use, which occurred in some part of southwestern Nigeria. The information was directly obtained from people who are eye witnesses to some of these unwholesome incidences.

**Box 2: Example of harzadous effect of consumption of food contaminated with storage chemicals.**

Consumption of yam powder (*elubo*) produced from yam sprayed with storage chemicals but not properly dried before being released into the market, led to the death of several people in Ede and Ile-Ife area of Osun State, and Ajah area in Lagos state, South-western, Nigeria. The unfortunate incidence coincided with the *Ramadhan* period (month of fasting) of Muslim faithful; a period when Muslims gather together to host one another. The case in Ajah was pathetic, where unwary citizens fell victim as a result of eating yam powder from the residence of a rich and influential personality in the community. Several speculations were made to castigate the host who, however, became exonerated as evidences later revealed that the victims were only those who ate yam powder, while others who ate other varieties of food served were not affected. Further investigations revealed that the contaminated yam flour was not yet due to be released into the market for consumption (after spraying with storage chemicals) at the time it was released!

**Source:** Interview conducted amongst community people (April 2010)

**Low-external input agricultural systems**

This is a system of agriculture that relies minimally on external or imported inputs. The main aim is to create integrated, humane, environmentally and economically viable agri-food systems in which maximum reliance is placed on locally or farm-derived renewable resources, and the management of ecological and biological processes. The use

of external inputs is reduced as far as possible. An example of LEIA is organic agriculture. Organic agriculture is a holistic system that promotes a healthy agri-food system right from production, marketing, consumption to distribution. It employs a number of strategies in maintaining as well as improving land productivity. Organic agriculture represents a system of agriculture rather than simply a set of technologies. The primary aim is to find ways to grow food in harmony with nature. The term 'organic' is best thought of as referring not to the type of inputs used, but to the concept of the farm as an organism, in which the component parts – the soil minerals, organic matter, micro-organisms, insects, plants, animals and humans – interact to create a coherent and stable whole (FAO 2002:141). It is a sustainable, environmentally friendly production system which can offer African and other developing countries a wide range of economic, environmental, social and cultural benefits, amongst which are enhanced food security; protection of natural resources, including soil and water quality; less dependency on foreign inputs and price volatility related to external inputs; and reduced illness and death associated with agro-chemical exposure. The fastest growing food sector is the organic agriculture sector. Growth rates in organic food sales range from 20.0 - 25.0 per cent per year for over a decade. Also, growth rates of organic lands are impressive in Europe, Latin America and the United States with the total area of organic land tripled in Europe and the United States between 1995 and 2000. In Argentina alone, the organic land area increased by 1,280 per cent in the last 5 years, (FAO 2002:5). As earlier noted, it then becomes ironical that the SSA is still being encouraged by the West to push chemical agriculture.

Organic agriculture is based on the principles of health, ecology, fairness and care (IFOAM, 2009). These principles are summarized in Box 3. The principles emphasize that increase in food production, while very important, should not be attained at the detriment of the future generation. Hence, sustainability is a paramount consideration in organic agriculture. If the potentials of organic agriculture is properly harnessed, it could serve as desirable better alternative to the HEIA system. This will not only be affordable to smallholder farmers, but in long term, would provide sustainable increase in agricultural productivity thereby enhancing the food security in the entire SSA region.

While many agree that organic agriculture is desirable from environmental and



social point of view, there remains the fear that organic agriculture is slow in response and produces low yields. Organic farming has thus often been disparaged for having lower yields than conventional farming and less efficient in land use. The question as to whether organic agriculture is efficient enough to meet the world's food needs, therefore, arises. As such, attempt is made in the next sub section to demystify the productivity debate and then demonstrate that organic agriculture is indeed productive, especially so in developing countries.

### **Box 3: Principles of organic agriculture**

#### **Principle of health**

*Organic agriculture should sustain and enhance the health of soil, plant, animal, human and planet as one and indivisible.*

This principle points out that the health of individuals and communities cannot be separated from the health of the ecosystems - healthy soils produce healthy crops that foster the health of animals and people. The role of organic agriculture, whether in farming, processing, distribution, or consumption, is to sustain and enhance the health of the ecosystems and organisms from the smallest in the soil to human beings. In particular, organic agriculture is intended to produce high quality, nutritious food that contributes to preventive health care and well-being. In view of this, it should avoid the use of fertilizers, pesticides, animal drugs and food additives that may have adverse health effects.

#### **Principle of ecology**

*Organic agriculture should be based on living ecological systems and cycles, work with them, emulate them and help sustain them.*

This principle is rooted in the view that organic agriculture is situated within living ecological systems. It states that production is to be based on ecological processes and recycling. Organic management must be adapted to local conditions, ecology, culture and scale. Inputs should be reduced by reuse, recycling and efficient management of materials and energy in order to maintain and improve environmental quality and conserve resources.

#### **Principle of fairness**

*Organic agriculture should build on relationships that ensure fairness with regard to the common environment and life opportunities*

Fairness is characterised by equity, respect, justice and stewardship of the shared world, both among people and in their relations to other living beings. This principle emphasises that those involved in organic agriculture should conduct human relationships in a manner that ensures fairness at all levels and to all parties - farmers, workers, processors, distributors, traders and consumers. Organic agriculture should provide everyone involved with a good quality of life, and contribute to food sovereignty and reduction of poverty. Natural and environmental resources that are used for production and consumption should be managed in a way that is socially and ecologically just and should be held in trust for future generations.

#### **Principle of care**

*Organic agriculture should be managed in a precautionary and responsible manner to protect the health and well-being of current and future generations and the environment.*

Organic agriculture is a living and dynamic system that responds to internal and external demands and conditions. Practitioners of organic agriculture can enhance efficiency and increase productivity, but this should not be at the risk of jeopardising eco-system's health and well-being. Consequently, new technologies need to be assessed and existing methods reviewed. This principle states that precaution and responsibility are the key concerns in management, development and technology choices in organic agriculture. Science is necessary to ensure that organic agriculture is healthy, safe and ecologically sound. However, scientific knowledge alone is not sufficient. Practical experience, accumulated wisdom and traditional and indigenous knowledge offer valid solution tested by time and space.

Source: IFOAM (2009).

### ***The superiority of organic agriculture***

In general, yields from organic agriculture are broadly comparable to conventional yields in both developed and developing countries. A recent study reported by Badgley *et al.* (2007) and cited from Ching (2008), examined a global dataset of 293 examples and estimated the average yield ratio (organic: non-organic) of different food categories for the developed and developing world. For most of the food categories examined, the results revealed that the average yield ratio was slightly less than 1.0 for studies in the developed world, but more than 1.0 for studies in developing countries. That is, in developed countries, organic systems produced as much as 92.0 per cent of the yield produced by conventional agriculture, whereas in developing countries, organic systems produced 80.0 per cent more than conventional farms. From the results obtained, the researchers modeled the global food supply that could be grown organically on the current agricultural land base. The modeling result revealed that organic methods could hypothetically produce enough food on a global per capita basis to sustain the current human population, and potentially an even larger population, without putting more farmland into production. In addition, contrary to fear that there are insufficient quantities of organically acceptable fertilizers, the data suggest that leguminous cover crops could fix enough nitrogen to replace the amount of synthetic fertilizer currently in use. This model suggests that organic agriculture could potentially provide enough food globally, but without the negative environmental impacts of conventional agriculture.

In a review of 286 projects in 57 countries reported by Pretty *et al.* (2006), farmers were found to have increased agricultural productivity by an average of 79.0 per cent by adopting “resource-conserving” or ecological agriculture. A variety of resource conserving technologies and practices were used, including integrated pest management, integrated nutrient management, conservation tillage, agro-forestry, water harvesting in dry-land areas, and livestock and aquaculture integration into farming systems. These practices not only increased yields, but also reduced adverse effects on the environment and contributed to important environmental goods and services (e.g., climate change mitigation), as evidenced by increased water use efficiency and carbon sequestration, and reduced pesticide use

Data from the Tigray project in the Tigray region in Ethiopia, where a project on ecological agriculture has been carried out since 1996, concretely demonstrates the benefits of compost on productivity. Preliminary data collected in 1998 showed that using compost gave similar yield increases as chemical fertilisers. Data collected between 2002 and 2004 showed that, on the average, composted fields gave higher yields, sometimes double, than those treated with chemical fertilisers (Araya and Edwards, 2006). In a paper written for the FAO, statistical analysis on a larger data set covering the period between 2000 to 2006 confirms that compost use in Tigray has increased yields in all the crops analyzed (Edwards *et al.*, 2008). As a result of these excellent performances, the Bureau of Agriculture and Rural Development of Tigray Region, since 1998 has adopted the making of compost as part of its extension package and by 2007, at least 25.0 per cent of the farmers had started making and using compost. A reflection on the success of this approach is that between 2003 and 2006, grain yield for the region almost doubled from 714 to 1,354 thousand tones (Ching, 2008)

The above reveals that the query against the productive potential of organic agriculture is misleading. Such criticism is usually put forward by proponents of the conventional agricultural system, who incidentally are major stakeholders in the industries manufacturing the synthetic inputs being canvassed for. The reason for this is clear: they have not been able to figure out how to benefit from organic agriculture, since basically the necessary resources required are found within local environment. Simply put: continuous patronage of LEIA is detrimental to huge profit they make from sales of these synthetic inputs. The activities of Monsanto and Syngenta cannot go without mention here (See Kolawole, 2008). In the following section, specific examples of success stories (case studies) of LEIA system of agriculture in some part of SSA are provided.

#### **Case study 1: Example from the Manor Agricultural Centre, Kitale, Kenya**

The Manor house agricultural centre was founded in 1984 in response to a three-year drought. The centre's training and research complex includes demonstration gardens and livestock facilities that provide a working model of bio-intensive agricultural system for trainees, visitors and members of local communities. The centre provides practical training to young people, farmers and staff of government agencies and NGOs. In 1999,

the centre had trained some 6,000 farmers in 185 community groups, of whom 3000 are known to have adopted bio-intensive agriculture (BIA). The main impact has been on vegetable production. Many have doubled their yields by adopting double digging and composting, using local natural methods of pest and disease control. There have been big savings on pesticides, as farmers have cut off their use. Farmers found phosphorus to be limiting over periods of six years of composting, and so bone meal is brought in to add to the compost (UN report, 2008).

Key benefits in the first case study is that bio-intensive agriculture has led to increase yields of food crops, increase income to farmers without being detrimental to the natural environment. So, this approach is not only sustainable but can also ensure food security. Box 4 below provides the account of a former pupil at Manor house on how learning to use bio-intensive farming methods has impacted her life:

#### **Box 4: Participant's account of her success due to partaking in bio intensive agriculture**

The lessons I had from manor house ... have moved my household from misery to normal rich life comparatively. My small "shamba" is producing surplus which I sell for income. Last season, April to June, I earned Ksh. 15,000 (\$ 268) from sales of Sukuma Wiki (similar to tree collards). My 0.3 acres of land is producing plenty of healthy vegetables that bring money to knock at my door in the wee hours of the day. I mean, people come knocking at the door of my house before 6:00am wanting to buy vegetables. Apart from food and money for my family, I am able to fertilize my soil from material that it produces and supports. BIA has created hope in me and my household. I can now face the future proudly

Source: (UN report, 2008)

The example in the second case study (see Box 5 below) illustrates the efficacy of organic agriculture in the enhancement of smallholder farmer's agricultural productivity in Malawi, while at the same time reducing the production cost by expending the money that would have hitherto been put to purchase fertilisers for other purposes.

The third example is about an integrated rural development projects in *Cheha*, Ethiopia (see Box 6). This case study provides clues about the potential of organic agriculture in enhancing regional food security in Malawi.

### **Box 5: Example of LOMADEF, Lipangwe, Malawi**

The Lipangwe Organic Manure Demonstration Farm (LOMADEF) was established in 1993 by a group of determined Malawian smallholder farmers in response to challenges of poor crop productivity far below subsistence levels, soils with deteriorating fertility and escalating prices of essential farm inputs. The objectives were to demonstrate the benefits of organic agriculture, reduce dependence of smallholder subsistence farmers on artificial fertilizers, nurture a sense of self reliance among farmers and use the demonstration farm for smallholder farmers from all over the country to come and learn about organic agriculture techniques and establish further sustainable agricultural demonstration farms for smallholder farmers. After kick off, the results showed that while surrounding farmers suffered wilted and stunted crops, LOMADEF gave very conspicuous yields which encouraged more farmers, other agricultural NGOs and the Government to take an interest. Over 1,200 farmers have since been brought in to observe the benefits of organic agriculture and to learn some simple organic agricultural practices. The LOMADEF experience which has now grown from one club to thirteen and membership increased from 13 to 200, illustrates that smallholder-managed demonstration farms that show affordable technologies are very attractive to smallholder farmers.

**Sources:** Kajanga, 2002; UN report, 2008.

The Lipangwe success story above is a classical example of how people are willing to embrace an approach that provides a practical solution to daunting problems. Informed by their peculiar challenges, SSA farmers stand at a good vantage point in utilizing endogenous resources to achieve food security and environmental health. The following case study (as provided in Box 6) is another success story of organic agriculture in Ethiopia. It is a veritable proof that organic farming is realistic and profitable wherever and whenever it is used to advance sustainable development. Not only has it increased farm families nutrition levels. It has enhanced improved outputs and more income for those who utilized the technology.

### **Box 6: Integrated rural development projects in Cheha, Ethiopia**

The *Cheha* project which has been implemented in Ethiopia since the 1984 drought is an example of an integrated and relatively small-scale project making a substantial impact on regional food security. It has introduced new varieties of vegetable crops and has promoted the use of organic manures for soil fertility and botanical pest control. Some 12,500 farm households have adopted sustainable agriculture on 5,000 ha, resulting in a 70.0 per cent improvement of overall nutrition levels within the project area, along with a 60.0 per cent increase in crop yield. Some farmers have begun to produce excess crops which they sell in local markets, earning much needed income for their families. Thus, an area once entirely reliant on emergency food aid has now become able to feed itself and has enough left over to contribute to surplus.

**Source:** UN report, (2008)

All the cases cited in this paper are indeed a prove that Africa holds the ace in agricultural productivity if only there is a purposeful intention to do this. The onus rests on African governments to work within the framework of the Comprehensive Africa's Agriculture Development Programme (CAADP) of the New Partnership for Africa's Development (NEPAD) to achieve this ultimate goal. Africa cannot continue to rely on the West for everything if it must be relevant in a globalised world (See Kolawole 2009).

### **Concluding reflections**

This paper has provided an overview on the state of food insecurity in the SSA [section 2].

It has also examined the concept of sustainable agriculture [section 3], highlighted the

negative impact of modern agricultural system on the environment and human health [section 4], and presented some of the debates on the significance of LEIA on agricultural sustainability and food security. Providing examples of success stories (case studies) [section 5], the paper argued that organic agriculture serves as the road-map for enhanced agricultural productivity and food security in the SSA sub-region [section 6]

Although acknowledged, the successes attributed to the conventional/high external inputs agricultural system in the fight against food insecurity, have always had some consequential aftermath on the ecosystem. Thus, examples of adverse effects on both human health and the environment provide the ground to query the capability of conventional agricultural system to guarantee sustainable agriculture and food security.

As such, organic agriculture, which is a low external input agricultural (LEIA) system was advocated as a way out of the food insecurity malaise plaguing the SSA. Somehow, there is need to demystify the low productivity debate used to vilify organic agriculture. Examples of success stories (with empirical evidences) provided in this discourse are enough to re-direct a new thinking amongst policy makers and other stakeholders in the 21<sup>st</sup> Century Africa.

In conclusion, the provision of institutional support and a suitable framework, will surely guarantee an organic agriculture that would ensure food security and enhanced sustainable agricultural productivity in the sub-Saharan African region.

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