Assessing the Prospects and Challenges of Greening Agriculture in Africa: A Case Study of Organic Agriculture

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Abstract

A global development challenge that still awaits effective redress is the fact that while world food production has increased substantially over the years, most developing countries, especially in Africa, are still food insecure. In 2008, the number of people suffering from chronic food insecurity, hunger, malnutrition and food related illnesses was about 923 million (FAO, 2008), but the number increased to 1.02 billion people in 2009 (FAO, 2009). This paper argues that greening agriculture, especially through organic agriculture (OA), is one of the most feasible sustainable ways that can be used to address food insecurity in Africa. Based on a comprehensive bibliographical search and field research, the potential of OA to promote food security and the challenges of OA in Sub-Saharan Africa (SSA) are analysed using Uganda as the study location. A number of recommendations are provided for popularising OA in SSA.

Keywords*:* Food Security, Greening Agriculture, Organic Agriculture

1. Introduction

Food security is not simply a function of production or supply, but of availability, accessibility, stability of supply, affordability, the provision of adequate quantity and quality of food and safe nutritious food at all times (Boon E.K., 2007; IAASTD, 2009a). Thus, improving food security in SSA requires an economically viable, environmentally friendly, socially acceptable and appropriate agricultural system based on local people's needs. Organic agriculture (OA) is one of the most feasible sustainable agriculture systems, which has important inherent intrinsic multi-functionalities for promoting both sustainable food security and nutritional security in SSA. OA is the only holistic agricultural production system in the world based on international standards and guided by the principles of health (i.e. sustaining ecosystem health and human health), ecology (i.e. enhancing living ecological systems, ecological balances and cycles), fairness (i.e. ensuring equity, respect, justice and stewardship of the shared world) and care (i.e. taking precaution and responsibility) (Jimenez, 2006; IFOAM, 2006). However, many scholars do not research on OA, thus knowledge on its technical details is often scarce (Kilcher, 2007). Additionally, OA is not specifically supported by agricultural policies in most countries, especially in SSA. In some cases, it is hindered by policies advocating the use of high-input farming management practices (UNCTAD-UNEP, 2008). This paper analyses the prospects of OA for promoting food security and the challenges of OA in rural areas of Wakiso district[1] in Uganda.

2 Statement of the Problem

Uganda has the biggest number of organic farmers in the world, with about 200,000 certified farmers and over 85% of the farmers engaged in non-certified OA (Tumushabe, *et al.,* 2006; Helga and Yussefi, 2006). Other SSA countries with great numbers of certified organic farmers include Ethiopia and Tanzania with over 160,000 and 100,000 certified farmers respectively (Helga and Yussefi, 2006). However, with all its potential for OA, Uganda's population still faces problems of malnutrition, famine, and hunger. In Uganda, like many other SSA countries, most households consume foods that are deficient in proteins, oils, vitamins, energy and micronutrients, especially among the poor. In 2006, over 4.6 million people in Uganda were undernourished compared to 4.2 million in 1999 (FAO, 2009). In 2001, about 10% of adult women in Uganda were undernourished and 40% of deaths among children were attributed to malnutrition (UBOS and ORC Macro, 2001). About 1 million people (5% of the total rural population in Uganda) are food insecure and over 6.75

[1] The district lies in the central region of Uganda bordering the districts of Luwero and Nakeseke in the north, Mukono and Kampala in the east, Mpigi and Mityana in the west, and Kalangala lying along Lake Victoria to the south. It is the second populated district in Uganda with a population density of 400 per km^2, a population growth rate of 4.1% and a total population of 907,988 (NEMA, 2007).

million people (31% of the rural population) are highly vulnerable to food insecurity (WFP, 2006). However, the potential of OA for ensuring sustainable household food security has not been adequately recognised by politicians, donors, policy-makers, and development agencies, especially in rural areas of Uganda (Walaga *et al.*, 2005) and SSA in general. This has been attributed to inadequate technical details, knowledge, information and empirical data on OA. The consequent information vacuum has created a poor perception, negative attitudes and indifference among policy-makers, government bureaucrats and development partners about the potential of OA in promoting sustainable food security. This paper is based on a comprehensive bibliographical[2] search and a field research[3] that was conducted among organic farmers in rural areas of Wakiso district to provide a detailed contextual analysis of green agricultural practices utilised and the relationships between OA and the components of household food security.

3. Discussion of Results

3.1 Organic Agriculture and Household Food Availability

Food availability is about food production, distribution and exchange (FOA, 2003). It reflects the sufficiency and qualitative nutritive availability of food within the vicinity or proximity of people at all times. The paper establishes that OA contributed significantly to food availability (i.e. increased yields, crop diversity, crop production both spatial and temporal, and food supply stability in the study location. Organic farmers grew a diversity of adequate vegetables to feed their families and these included onions and tomatoes (64.1%), nightshades (74.6%) and pigweeds (80%). About 29.4% of the respondents grew beans organically, 34.6% grew maize, and 17.4% grew groundnuts organically. As regards organic fruits, 25.3% cultivated passion fruits, 21.3% pineapples and 36% sufficient pawpaws for their families. Out of the 75 organic farmers covered in this study, 95.9% had sufficient bananas for their families. As regards organic root tubers, 33.3% of the respondents grew cassava and 26.7% grew winged yams organically. Some of the crops, especially vegetables and fruits, were grown in sacks, verandas, kitchen back yards and compounds. Food production within the vicinity of households facilitated access to food at all times and in sufficient quantities (spatial food distribution). Food availability was attributed to the application of compost, liquid manure and the use of leguminous plants to control pests and enhance soil fertility.

Compost was made from pig, poultry and cow dung together with ash, water, and plant residues. Liquid manure, with high concentrations of nutrients (nitrogen, phosphorus and potassium), was made from soft and succulent plants like tithornia and pumpkins leaves, animal and human urine together with ash and water. Organic farmers also use leguminous plants to enhance soil fertility. The most common plants used included jack beans, velvet beans and calliandra, which were inter-planted with other crops. Some organic farmers also planted neem trees, which are rich in nitrogen, phosphorus, potassium and various micronutrients essential for plants. The application of these manures also led to food supply stability throughout the year on the farms of organic farmers. The farmers succeeded in improving water retention, cation exchange capacity, soil structure and texture, soil fertility and resilience and water use efficiency, especially during long drought periods. OA practices enabled farmers to grow a variety of crops at different periods of the year near their homesteads. They were also able to harvest different crops at different times of the year (temporal food distribution). The IAASTD report of 2009 also indicates that growing several crops or intercrops in sequence within a year offers the possibility to intensify land use in time. Locating farms near homes enabled farmers to pay adequate attention and care to the crops as regards tendering crops, pruning, small-scale irrigation, pests and disease control and the application of manure.

Management of pests and diseases, both organically and physically, also helped to ensure sufficient food availability. Organic farmers used poisonous plants ranging from phytolacca, tobacco, tephrosia spp, chilli/red pepper, African marigolds and lantana camara to kill or repel away pests like termites, mealy bugs, aphids,

[2] Secondary data from 1998 to 2009 were obtained from textbooks, scientific journals, conference papers, international and national reports as well as internet sources

[3] Primary data was obtained from organic farmers and key respondents (i.e. Ministry of Agriculture Animal Industry and Fisheries, Environmental Alert, Agency For Integrated Rural Development, National Organic Agricultural Movement of Uganda and Kulika Uganda) using questionnaires, interview guides and observation schedules between July and September 2009. Seventy-five households were randomly selected, while 8 key informants were selected purposively. A combination of qualitative and quantitative methods was used to analyse the collected data.

sucking mites and black ants. The farmers also used a mixture of ash and paraffin to kill aphids. Physical methods of pest management included physical guarding against monkeys, use of scarecrows, traps and domesticated dogs to chase away animals. These local organic agricultural technologies tally well with the Push-Pull strategy, which has been used extensively by Kenyan farmers to enhance agricultural productivity and sustainable use of natural resources (Amudavi *et al.*, 2007).

In the study location, an effective use of various organic agricultural methods significantly helped to sustain and enhance household food production and availability. These research findings are consistent with the arguments presented in UNCTAD-UNEP report of 2008 on OA and food security in Africa. The report provides significant evidence where OA has made remarkable contribution to food security in Africa, for example, in Nyanza and Kakamega regions of Western Kenya, Malawi, south-west Ethiopia, and Mkuranga District of Tanzania among others.

3.2 Organic Agriculture and Household Food Access

Food access is about food affordability, possession, allocation and preferences (FAO, 2003; 2006). This reflects the ability of households to purchase, produce, possess or obtain sufficient and nutritive food for their needs. Thus, all households at all times should be able to mobilise adequate resources (e.g. physical, natural, human, social and financial) to obtain appropriate foods for a preferable nutritious diet in sufficient quantities and quality. The availability of adequate quantities of various nutritive food types produced by organic farmers in the study location improved access to enough preferred food, including fruits, cereals, root tubers and vegetables compared to those households which did not practise organic agriculture. The results of the field survey indicate that despite the long drought that hit the study location for over 4 months between February and June 2009, OA contributed significantly to household food access in various ways. During the said period, about 80% of the female respondents never reduced food served to their husbands, 76% did not reduce food they ate, 77% did not reduce food served to their children and over 96% of respondents said their households never skipped meals for a whole day or some days. As regards household food possession, over 76% of the respondents had adequate food during the long drought period. This was attributed to adequate organic food processing, preservation and storage techniques possessed by the organic agricultural farmers. Similar observations have been noted among the organic farmers of Kakamega, western Kenya, where food access has improved from one month to six months for most households (UNCTAD-UNEP, 2008).

However, the relationship between OA and household food allocation in the district should not be over-emphasised because it is largely dependant on the prevailing cultural values in the area. For example, the head of households are usually allocated relatively bigger shares of available food compared to the other members. The results of the survey also show that about 18.6% of the respondents were able to sell off surplus passion fruits in the local markets, 25.3% sold off surplus bananas and 10.6% sold off surplus pawpaws. The income generated was either used to buy other essential foods for their households or to develop and improve their organic farms. However, organic crops sold did not fetch higher incomes than conventionally grown crops and their prices were virtually the same and in some cases even less, yet per unit production costs (i.e. time and energy) of organically grown crops were relative higher than those of conventionally grown ones.

3.3 Organic Agriculture and Household Food Utilisation

Food utilisation refers to food nutrition, food safety and uptake or consumption (FAO, 2003; 2006). This essentially translates to the proper use of nutritious and safe food to be free from diseases as well as to gain good health; that is, physical, mental and spiritual health. Studies have shown that organically grown foods are more nutritious, safe and of high quality. They are therefore more important in ensuring human health compared to foods grown under convectional methods (Bavec, 2006; Worthington, 2001).

The results of the field research indicate that OA contributed significantly to household food utilisation in various ways. First, it enabled farmers to grow and consume a variety of nutritious crops ranging from cereals (beans, groundnuts and maize), fruits (avocado, papaya, passion fruits and bananas, vegetables (nightshades, pigweeds, and spider plants) to root tubers (cassava and winged yams). These foods are the cheapest and important sources of vitamins, starch, minerals, carbohydrates and proteins to the rural households and provide balanced and varied safe diets that contribute to improved health and well-being. As Bavec, (2006); Elson and Buck (2006); Balch, (2006) and Worthington (2001) suggest, organically grown foods (i.e. cereals, fruits and

vegetables) contain more essential amino acids, vitamins, minerals, secondary metabolites, high dry matter content, fewer heavy metals and mycotoxins. When organic foods are consumed, they enhance immunity, protect cells against cancer, prevent heart diseases, stroke, diabetes, lowers cholesterol levels, aid in nervous system functioning and hormone production, ensure healthy bones and muscle growth, boost brain function and nerve coordination, catalyse enzyme activities, regulate body water balance and haemoglobin among others (Balch, 2006). It was noted that organic farmers were free from visible food insufficient related symptoms like malnutrition since they had nutritive food at their disposal. Finally, some organically grown crops such as onions, tomatoes, ginger and other spices were used as condiments to improve food quality and made meals more palatable. Similar observations are indicated in the UNCTAD-UNEP report of 2008 on OA and food security in Africa. For example, in southwest Ethiopia, there has been an overall 70 % improvement in the nutrition levels among organic farmers. In Malawi, organic vegetable growing and fish farming have contributed significantly to high vitamin-protein foods for most households, while in Kakamega, western Kenya, an improvement in health and nutritional status has been observed among organic farmers.

4 Key Challenges Facing Organic Agriculture

The challenges confronting OA in the study location are policy, social-cultural, economic, and institutional in character. With regard to ***policy challenges***, like most SSA countries, Uganda has no OA policy to guide decision-makers, farmers and development stakeholders. OA is not even mentioned in the existing agricultural policy documents such as the National Agricultural Research Policy and the Plan for the Modernisation of Agriculture (PMA). To make matters worse, policy-makers have continued to draft and pass policies such as those encouraging the importation and use of cheap agro-chemicals and fertilizers. As such, organic farmers are tempted to introduce these cheap chemicals to their organic farms and this is likely to affect the future international demand for organic products from Uganda. Moreover, there is no marketing policy for organic agricultural products. Organically grown crops virtually sell at the same price as the conventionally grown crops and in some cases even less. The Indoor Residual Spraying Policy for malaria control (DDT) has also been a very big constraint to OA because it poses a potential threat of chemicals drifting to organically managed farms and may ultimately affect the quality of organically grown crops and the health of consumers and community members.

Institutional challenges include the fact that there are very few institutions in Uganda that teach OA methods. Moreover, they are not facilitated or supported by the government. The Ministry of Agriculture, Animal Industry and Fisheries pays very little attention to this important emerging sub-sector. Furthermore, there are no defined syllabuses on OA in institutions of higher education, which essentially teach and promote only conventional types of agricultural technologies. This practice has hampered the building of sufficient capacity for leveraging and institutionalising OA in Uganda and SSA in general. The IAASTD report of 2009 echoes similar arguments affecting agriculture in general. The report indicates that local, provincial and national governments, as well as agencies, departments and ministries devoted to agriculture, environment, education, health, trade and finance among others, constrain agricultural knowledge and science and technological initiatives that are crucial for designing policies effective in reaching integrated goals of productivity, environmental sustainability, social equity and inclusion.

In ***social terms***, agriculture is largely regarded in Uganda and many SSA countries as an activity for women; and so is OA. Unfortunately, it is very difficult for women to make a significant contribution to this sector principally because they do not own land; they only have access to it and this prevents them from investing in lands and introducing long-term OA technologies. The IAASTD report of 2009 provides similar arguments. It indicates that women have a key role in agricultural work, yet they have often limited access to, or control over, the resource base such as land. Another social-cultural challenge relates to the perception that OA inputs like human urine and pig faeces are culturally and religiously unacceptable. In most communities in Uganda, the use of human urine or faeces as fertilizers is a taboo and any person applying them stands to be cursed.

Economic challenges facing organically grown crops include the limited domestic market, and the significant amounts of inputs, time and financial resources required by OA. Moreover, organic crops fetch the same prices as conventionally grown crops and in some cases, they are even sold at lower prices. For example, the field survey revealed that 2 kg of organically grown passion fruits were sold at 4,000 Ugandan shillings (exchange rate: 1US dollars = 1,800 Ugandan shillings) which was the price at which conventionally cultivated passion

fruits were purchased. Furthermore, organic inputs such as seeds, fertilizers and pesticides tend to be relatively more expensive than the conventional ones. For example, 1kg of Neem organic fertilizer costs between 7,000 and 10,000 Ugandan shillings; 1 kg of Nimbecidine costs 10,000 Ugandan shillings; I kg of Bio-catch costs 12,000 Ugandan shillings; while I kg of Stanes Bio-Dewcon and Bio-Power costs between 20,000-30,000 Ugandan shillings. Consequently, the majority of organic farmers cannot afford organic inputs. In addition, the existence of other quick paying jobs like motorcycling transport, brick making and sand mining continue to attract the youth at the expense of organic agriculture, which is mainly left in the hands of the elderly and women.

The key ***environmental challenge*** affecting the development of OA in the study location and in SSA is the severe impact of long droughts. About 98% of the respondents reported that a long drought between February and June 2009 caused water sources to dry up in Wakiso district and this made it practically impossible to prepare organic manures, which need significant quantities of water. The drought also impeded the collection and cultivation of most of the soft vegetations required for producing liquid manure. This research finding is in line with the arguments presented in the IAASTD report of 2009, which indicate that severe droughts and floods attributed to climate change make millions of people in resource poor areas particularly vulnerable when they depend on agriculture for their livelihoods and food. Moreover, animals also did not have sufficient food to eat and water to drink and could not therefore produce significant amounts of dung and urine for producing compost and liquid manure. It was also noted that during the long drought spell, organically grown crops were not affected severely compared to those crops that were not organically grown. This was attributed to the high water holding potential of organically managed land. Similar observations have been noted among Kenyan farmers who use the Push-Pull strategy that is directly related to OA (Amudavi *et al.,* 2007).

5. Conclusion and Recommendations

Besides water, having adequate and safe nutritive food is one of the most important machinery or engine of life industry. When sufficient and nutritive food is consumed, it affects the body's development, health, reproduction, immunity, metabolism, cognitive functioning, cell and organ growth as well as providing energy that facilitates work. Thus, the rapid population growth rate (i.e. 3.4% per annum), widespread hunger and mal-nutrition in Uganda and SSA oblige that the promotion of agriculture should be based on green approaches and sustainable farming methods like organic agriculture that consciously integrate existing local farming knowledge and innovations. This paper has demonstrated that despite the challenges facing the greening of agriculture through organic farming in the study location in particular and Uganda in general, this method of farming has a great potential to ensure sustainable household food security since it is based on the principles of health, care, fairness and ecology. OA can enhance rural household food reliance and sufficiency and has the ability to significantly improve agricultural productivity without harming the environment. It offers a viable visible outlet for protecting and enhancing human health compared to conventionally grown crops. It is also in line with the aims of the Millennium Development Goals (MDGs) and can be used to facilitate their achievement, especially in SSA. It is therefore important that policy-makers and sustainable development stakeholders intensify advocacy for greening agriculture in the region through the promotion of OA. An effective implementation of the below strategies will significantly contribute to greening agriculture and popularising organic farming in Uganda and SSA in general:

- Institutionalising and mainstreaming OA in development, health and environmental policies, and other sectors of the economy like education.
- There is a need for SSA Governments to formulate policies that support organic production, processing and trade (i.e. local, regional and international).
- Strategic focus on research on organic friendly technologies and solutions.
- Supporting NGOs to arouse awareness and capacity building of people in various organic farming methods.
- Provide incentives such as subsidised equipment and loans to organic farmers.
- Promoting composting of biodegradable urban solid wastes instead of land filling. This approach could be used as a way to recover and recycle harvested nutrients.
- Promoting rainwater harvesting in order to encourage small-scale irrigation.
- Encourage innovation and invention in machinery, which make compost and liquid manures.

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