

Organic agriculture in Kenya: Agro-ecosystem health and climate change

Leregger, F., Institute for Environment – Peace – Development, Vienna, Austria
Omollo, E., University of Nairobi, Kenya

Introduction

As global temperatures rise and weather patterns become more erratic, the intersection between climate change and agriculture is crucial to understand which role agriculture plays in contributing to and mitigating global warming. It is important to realize the global agriculture as cause and victim of climate change. “Ten to twelve percent of global greenhouse gas emissions are due to human food production. The intensive agriculture has led to deforestation, overgrazing and widespread use of practices that result in soil degradation” (UNCTAD/WTO and FiBL 2007).

Organic agriculture (OA) is a sustainable approach in food production. Carbon sequestration, recycling techniques, low-input of fossil fuel dependent resources and use of renewable energy present opportunities for OA to lead the way in terms of reducing energy consumption and mitigating the negative effects of energy emissions. OA provides management practices that can help farmers adapting to climate change through strengthening agro-ecosystems, diversifying crops, having livestock production, building capacity and knowledge base to prevent and confront changes in climate.

One global trend is the widespread use of synthetic chemicals and the intensive

industrialization of farming with long-run negative effects for humans and nature.

In general climate change is a complex global problem. A simple answer for solving the challenges cannot be given. This article gives a general overview of OA, agro-ecosystem health and the situation in Kenya. It is intended as a discussion paper about the potential of OA.

Organic agriculture and agro-ecosystem health

OA is “defined by the Codex Alimentarius Commission as a holistic production management system, which promotes and enhances agro-ecosystem health, including biodiversity, biological cycles and soil biological activity. It prohibits the use of synthetic inputs, such as drugs, fertilizers and pesticides” (UNEP 2014). OA includes the four principles of *health, ecology, fairness* and *care* (IFOAM 2014) and stands for the sustainment and enhancement of the health of plants, animals, soils, ecosystems and humans (UNEP and UNCTAD 2010). These resources are the key elements of an intact agro-ecosystem. OA also “aims to build on relationships that ensure fairness with regard to the common environment as well as livelihood opportunities”. OA “should be managed in a precautionary and responsible manner to protect the health and well-being of current

and future generations and the environment” (UNEP and UNCTAD 2010).

In consideration of these factors OA can contribute achieving agro-ecosystem health. In many cases all over the world numerous other aspects are more important than ecological elements in an agro-ecosystem (e.g. functional or organizational criteria). In terms of environmental protection OA should be an embedded part of agro-ecosystem health concerning a strong-sustainable agriculture and a long-living agro-ecosystem.

OA can achieve higher yields per hectare, high quality foods and improve food security in countries like Kenya. A further benefit is the growth of the profitable OA-market. OA offers employment opportunities for the local population (UNEP and UNCTAD 2010). To tap market opportunities is one of the main drivers to produce organic products. The practice of OA is triggered by diverse objectives: “securing a place on international markets, export promotion, economic self-reliance, finding alternatives to decreased access to agricultural inputs, natural resource conservation, food self-sufficiency, and rural and wider social development” (Scialabba 2000).

Two key factors of a successful contribution of OA to agro-ecosystem health are *political willing* (e.g. supporting framework, financial resources, programmes) and *agro-ecosystem health management*. In practise such a management comprises five steps:

“1) a description of the agroecosystem in systemic terms;
2) identification of decision-makers and/or stakeholders;

3) establishment of goals, that is, perceived attributes of a healthy system, operational objectives related to those goals at various scales and time horizons, and determination of measurable indicators which will give information about whether or not those objectives are being achieved;

4) identification and implementation of desirable and feasible changes, which often involves resolving conflicts among goals set by different decision-makers at different levels;

5) monitoring of the selected indicators, and adapting to changing circumstances or unexpected or undesirable outcomes. This may mean revisiting the description of the system, the objectives selected, and the management options chosen” (Nielsen and Waltner-Toews n.y.).

Principle criticism of organic agriculture

IFOAM (n.y.) has given 42 criticism and misconceptions about OA in seven different topic-parts. Here is a short overview:

- ❖ “There is no consistent evidence of a nutritional difference between organic and non-organic food.
- ❖ Organic farming increases the risk of food poisoning: organic food potentially contains more dangerous bacteria (such as E. coli because organic farming uses animal manure) and mycotoxins due to the absence of fungicide use.
- ❖ Some natural pest icides used in organic farming have been proven to have harmful effects on health.
- ❖ Organic farming uses pesticides that damage the environment: natural pesticides are more dangerous than conventional pesticides because they are less efficient and therefore require the application of huge quantities.
- ❖ Since yields are much lower in organic agriculture, widespread adoption of

organic agriculture would require farmers to expand farming into marginal and natural areas to grow the same amount of food, thus destroying more fragile ecosystems and reducing biodiversity.

- ❖ In tropical developing countries, the surplus of organic matter that can be returned to the soil is too small and mineralization of organic matter is too quick to provide sufficient nutrient inputs to the plants. Therefore, the only way to avoid depletion of agricultural soils is to provide them with regular synthetic fertilizer inputs.
- ❖ Organic food is too expensive.
- ❖ Organic certification is not reliable, since it is only based on a paper trail.
- ❖ Animal diseases, such as avian flu, are spread because animals are allowed to be outside. If they were all kept indoors, the diseases would not spread to animals in holdings.
- ❖ Today, conventional farm animals grow well and provide high milk yields. Industrial farm poultry produce a large numbers of eggs. Therefore, these animals cannot really be suffering.
- ❖ Organic farming yields are too low to feed the world's growing population.
- ❖ Organic Agriculture uses the primeval forest as the reference for good agro-ecosystem management for food crops, especially advocating for multi-cropping and biodiversity.
- ❖ Organic agriculture is labor intensive, which means that an increased burden is placed on families affected by HIV/AIDS or war in developing countries when they practice organic agriculture.
- ❖ Organic farmers can only survive because they get subsidies.
- ❖ Organic farming is not easy. Organic farmers are alienated by hours of work and work-related stress due to pest invasion and diseases that endanger their crops and income."

Regenerative organic agriculture

Regenerative OA is a specific path of OA. One of the main objectives of this approach is restoring soils in form of building soil health and increasing soil fertility. It "is marked by tendencies towards closed nutrient loops, greater diversity in the biological community, fewer annuals and more perennials, and greater reliance on internal rather than external resources" (Rodale Institute 2014). This practice of organic farming includes the support of a high percentage of organic matter in soils. In addition, it stands for composting, green manures, cover crops, mulching, crop rotation and a minimum of tillage (Rodale Institute 2014).

Regenerative OA for soil carbon sequestration is a successful strategy and it has been practiced by many farmers for a long time all over the world. Thus no aspect of this practice is really new and experimental. Rather new are the growing scientific verification of regenerative OA and the growing number of literature about it (Lynch 2009).

Researchers have demonstrated that these practices can comfortably feed the growing human population, not only in Kenya but in the whole world, while repairing our damaged ecosystem (Lynch 2009). If the management of all current cropland shifted to reflect the organic model we could potentially sequester more than 40% of annual emissions. Even if modest assumptions about soil's carbon sequestration potential are made, regenerative agriculture can easily keep annual emissions within a desirable range (Niggli et al. 2009).

Organic agriculture in Kenya

In 2011 the global land size of certified OA was estimated at 37.2 million hectares. In addition to this number around 32.5 million hectares were dedicated to organic wild collection. In Africa there were around one million hectares of certified OA-land and 11 million hectares of an area for wild collection and beekeeping at the same time. In Kenya the land size of certified OA is increasing, from 4,636 hectares in 2007 to 4,969 hectares in 2011 (IFOAM 2013). OA in Kenya is mainly driven by smallholder family farming with completely different demands and challenges as in other regions of the world. The main objective of the smallholder farmers is to meet the nutritional and financial needs of their families (EPOPA 2008).

A flashlight back in the history of Kenya shows, that “colonial land occupation was common, especially in areas of high productivity, and larger farms were developed with an emphasis on high input agriculture. As a result many of these inputs were made available to surrounding smallholder producers”. Today “a few large commercial farms have led the way in export-orientated organic production” (Taylor 2006). In Kenya formal OA started in the 1980s. At that time the initiative mainly came from NGOs and some private organizations (e.g. Kenya Institute of Organic Farming – KIOF). In the 1990s organizations were founded and several extension and training programmes were initiated (e.g. Kenya Organic Farmers Association – KOFA). One of the aims of such programmes was to shift OA from an individual level to a more cooperative level for gaining more relevance and importance. In 2005 the umbrella network Kenya Organic

Agriculture Network – KOAN was formed. It includes KOFA and KOPA (Kenya Organic Producers Association). Therefore it was possible to include a big number of Kenyan stakeholders such as larger companies and farmers in the process of developing the organic sector for local and international markets (FiBL et al. 2009). OA was seen as a low cost approach to mitigate challenges like poverty, declining productivity, food insecurity and low incomes for the farmers. At the beginning OA had a widespread “poor man image (...) and may have contributed to the low level of commercialization of the organic sector at the smallholder level” (Taylor 2006).

The organic sector is relatively small but fast growing (Taylor 2006) and “is organized around a minor number of large farm enterprises, or various supply organizations, based on purely commercial, community, faith or simply farmer cooperation involved in packaging, domestic or export sales” (FiBL et al. 2009). In the eight provinces of Kenya just a small number of farm enterprises and supply organizations cover the production (Status 2008: 35 organizations). The highest concentration is in the Central Province, where five out of the six major product categories (horticulture, fruits, nuts, coffee, and oil) are mainly produced, especially for the export. For instance bean, sweet corn, pea, tea, coffee, paprika, salad, several herbs, potato, mango, pepper, sweet banana, tomato, lemon, orange, milk and pineapple belong to the major organic products (FiBL et al. 2009). In Kenya 27 domestic OA-certification companies are located. In addition five international certification bodies

are involved to certify the products. In 2007 the East African Organic Products Standard (EAOPS) was launched as the official standard for OA-production in the East African countries by the East African Community (EAC). Kenya is one of the members of the EAC. The EAOPS label calls “Kilimohai” (OECD and WTO 2007).

Conclusion

In spite of the most common criticism it is unavoidable to promote OA as a future path of the global agriculture. “Changing farming practices to organic, regenerative and agroecological systems can increase soil organic carbon stocks, decrease greenhouse gas emissions, maintain yields, improve water retention and plant uptake, improve farm profitability, and revitalize traditional farming communities while ensuring biodiversity and resilience of ecosystem services. Regenerative organic agriculture is also integral to the climate solution” (Rodale Institute 2014). In consideration of the principles *health, ecology, fairness* and *care* OA is a win-win situation for nature and humans - not only in Kenya.

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