An Assessment of Technical, Economic and Social Gaps and Information Needs for Smallholder Farmers in Practice of Ecological Organic Agriculture in Kenya

By

Justus Ombati, Agnes Nkurumwa, Margaret Ngigi and David Amudavi

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Background Information

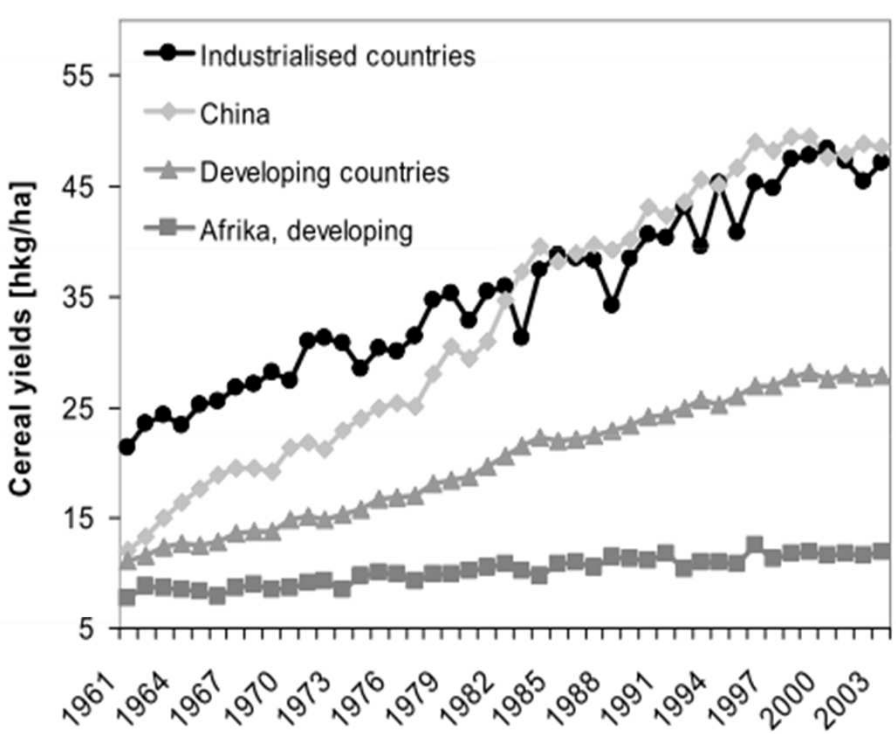
What are the challenges for Food & Agriculture Systems in Africa?

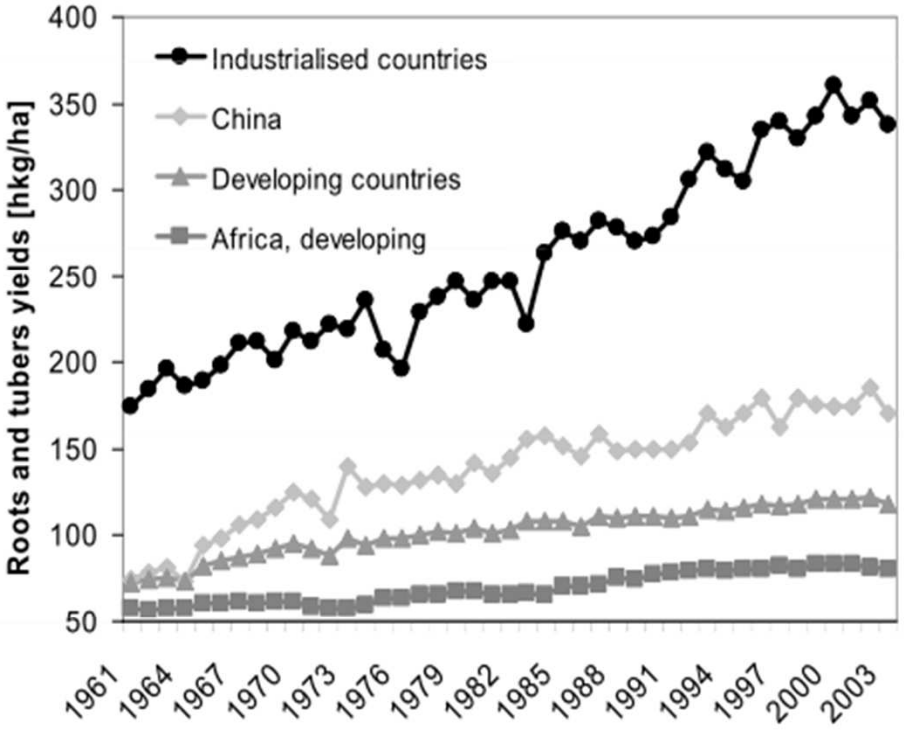
- Hunger and poverty, particularly amongst the small-scale farmers
- Poor trade capacities against huge market potential on local, regional and global level
- Soil degradation and huge fertile land losses; climate change
- Land and people to be at the centre of interest of stakeholders

- Need for more robust science (see more in: IAASTD, UNCCD, IFOAM, AU, etc.)
- Health of people, of environment and soil, of plants and animals
- How to implement the One-Health approach?
- Move from knowledge to action (institutions to create, organizations to empower, linking conservation with business)
- Local sustainable development; nation building.
- Women rights, minority rights, human rights

Global trends in agriculture I: World yields of cereals and roots and tubers from 1961-2003 (hkg/ha)

Extracted from Halberg and Andreasen 2009 (1st African organic Conference, Uganda)





Yields have not grown significantly in Africa south of Sahara for 45 years

(FAOSTAT, 2004)

Context

- The current agricultural and food supply systems rely greatly on non renewable external inputs, impact negatively on soils, water and biodiversity and lack resilience against external shocks. Related policies and institutions are inadequate.
- There is need for new arrangements to transform agricultural and food supply systems to ensure food and livelihood security in a stable environment.
- Agro-ecologically based production systems are capable of ensuring local food security and sovereignty, ecosystem services for rural welfare and biodiversity conservation.

- Evidence presented by the UN Special Rapporteur reveals that smallholder farmers can double food production within 3-10 years in critical regions when **ecological methods** are applied.

- In 2011 the AU decided to provide guidance in establishing an African organic farming platform and to recognise EOA as a viable production system.

High Level Decision

- Based on the Decision of the African Union (2011) on organic farming, the Ecological Organic Agriculture (EOA) Initiative has been established under the leadership of the AU Commission and initiative of a continent wide network of organic stakeholders.

- The African Union Commission and its New Partnership for Africa's Development (NEPAD) Planning and Coordinating Agency (NPCA) was requested to:

- Provide guidance for an African Union (AU)-led coalition of international partners on the establishment of an **African organic farming platform**;
- Provide guidance in the development of sustainable organic farming systems and **improve seed quality;**
- CALLED UPON development partners to provide the **necessary technical and financial support** for the implementation of this Decision;

- REQUESTED the Commission to **report regularly** on the implementation of this Decision.

Conceptualization & Development of EOA Initiative

- In response to the AU Heads' of States and Governments Decision on Organic Farming, an inception planning workshop by SIDA through the Swedish Society for Nature Conservation (SSNC) was organized by PELUM-Kenya, African Union Commission, Biovision Africa Trust, NOAMs and other partners in Thika, Kenya 2-3 May 2011.

The aim was to develop a **roadmap of a regional initiative** to implement the AU Decision on organic agriculture.

The team adopted the concept **Ecological Organic Agriculture (EOA)**

Ecological Organic Agriculture (EOA)

EOA is a production management system that considers the agro-ecosystem in all its diversity, focusing on biological diversity, healthy use of soils, air and water and relying on renewable resources in locally organized agricultural systems while minimizing the addition of external inputs like agrochemicals and inorganic fertilizers that may have adverse effects on these systems.

- EOA combines modern science, innovative practices and traditional knowledge.
- Examples of farming practices in EOA include Organic farming, Sustainable agriculture, Bio-intensive agriculture, Permaculture and Ecological farming.

- EOA is less input intensive and therefore more accessible for resource-limited rural people and has therefore a high potential for improving the livelihoods of a large group of rural poor and particularly women.

The study

- Biovision Africa Trust one of the partners implementing the EOA Initiative contracted our team to undertake a study on the ***Technical, Economic and Social Gaps and Information Needs for Smallholder Farmers in Practice of Ecological Organic Agriculture in Kenya.***
- The aim was to describe the current situation with respect to EOA and come up implications for future research, education and training.

- The study was premised on the conceptualization of EOA as any production system that is designed to sustain the health of soils, ecosystems, and the people.

- Such systems mainly rely on ecological processes, biodiversity, and cycles adapted to local conditions, rather than the use of inputs with adverse effects.

- Further, the study took cognizance of the fact that the smallholder farm is a complex institution often with many interrelated enterprises.
- Accordingly, the study adopted the farming systems approach.
- The approach provided a useful entry point for understanding smallholders' knowledge and practice of ecological organic farming.

Methodology

- Guided by the conceptualization of farming system, the study set out to collect farm-level data on the four sub-systems characteristic of smallholder farms.
- This included data on household-specific socio-economic data; data on priority crops produced and animals reared on the farms; data on bio-physical production problems facing the farmer and how the farmers dealt with them; and data on socio-economic constraints hampering farmers from accessing EOA services.

- The study used a farm household sample survey method, with the farm household as the sampling unit. The sample was drawn from six counties, namely Embu, Homa Bay, Kajiado, Kisii, Meru, and Nakuru.

- The choice of the study area was informed by the need to ensure a good representation of various parts of the country where arable agriculture form the major livelihood for smallholders.

- Meru and Embu were purposively selected to represent the Eastern part of the country, Kajiado and Nakuru represented the expansive Rift Valley, while Kisii and Homa Bay represented the western part and the lake region.

- A multi-stage sample selection method was used in selecting a sample of 75 farm households from each of the selected counties, making up a total sample of 450.

- The decision to use transects sampling method in selecting farm households from the sub-locations was informed by lack of comprehensive lists of farmers that would serve as a sampling frame.
- Data were collected through personal interviews using a pre-coded questionnaire. The questionnaire was designed by the consultancy team and an electronic copy forwarded to the client as a basis for consultation and arrival at a common agreement on the content of the data to collect.

- It was then pre-tested to ensure its efficiency in eliciting the required data, after which it was administered by trained enumerators through personal interviews.

- The questionnaire explored several aspects of smallholder farming including: the farm enterprises regarded a important by the farmers, the farmer's perceived severity of common crop and livestock production problems

- their knowledge and use of a select pesticidal plants and soil amendment methods, and the sources of knowledge for organic methods that they identified as using.

- In order to characterize the study area in terms of major crops grown, each of the respondents was asked to indicate, by order of importance, four principal crops the household produced on its farm.

- A four-point scale was used to capture the respondent's perception of the relative importance of the crops to the household. Accordingly, the crops were ranked 1st, 2nd, 3rd and 4th, with 1st being the most important.

- To determine the seriousness of common problems faced by smallholder farmers in the study area, the respondents were asked to rate the severity of a number of crop production problems, on a scale of 1 to 5, with 5 being the most severe.

- The scores were used to compute weighted mean scores for use in making comparison of severity across the problems, as well as within and across the counties.

- The weighted scores were computed such that the higher the score, the higher the severity of the problem relative to all other problems with lower weighted scores.

- Data analysis was largely descriptive and involved data summarizing and display of summary statistics.

Results and Discussions

General characteristic of sampled households

- Important socio-economic attributes of the sampled households showed that, overall about 2 out of every 5 farm households were female-headed.
- There was, however, significant (χ^2=93.76); p<0.001) county differentiation. The results also show that the percentage of female-headed households was relatively lower in Meru (13%), Embu (19%), and Kajiado(22%) counties. Nakuru County had the highest percent (67%) followed by Homa Bay (60).

- Overall, the average age of the head of the farm household was 44years, and they had had about 17 years of farming experience.

- Further examination using one-way analysis of variance showed significant variations across the counties. Heads of households in Kisii had the lowest mean age, while those in Kajiado had the highest.

- Majority of the heads of farm households had gone through some formal education, with about 50% having gone beyond primary school level.
- There was, however, significant (χ^2=125.04); p<0.001) county differentiation. Kajiado County had the highest percentage (37%) of heads of without formal education, followed by Homa Bay County (21%). Conversely, Embu County had the highest percentage (31%) of heads of households with tertiary level education, followed by Meru County (27%).

- Overall, farm holding averaged 10.25 hectare, with a significant ($F=41.58$; $\rho>0.0000$) variation across the counties. Furthermore, the standard deviations within the counties were substantially higher implying that the overall means masked important details about the distribution.
- Dominance of smallholder farming in all the six counties was evident.
- Overall, 56% of the households had a mean land holding of about 2.64 acre.

Major agricultural crops in the study area

- Results suggested that maize, beans and vegetables, in that order, were the most important crops among the sampled households.

- Overall, about 91%, 78% and 55% of the respondents identified maize, beans and vegetables, respectively, as among the top four major crops grown on their household's farm.

- Maize was rated the top most important crop in five (5) counties and second in the remaining one, while beans rated second or third most importance crop in 5 counties.
- Vegetable was among the five most important crops in 4 out of the 6 counties.
- This prominence of maize, beans and vegetable reflects the common eating habits in the area.
- Maize is a major staple that is eaten together with beans and/or vegetables.

Major crop production problems experienced in the study area

- Results indicated that overall, weeds, birds, aphids, cutworm, and moles (in that order) were the most severe problems rated at 3.70, 3.68, 3.63, 3.56, and 3.50, respectively.
- However, there were marked area differences both in problems rated high in severity, the order, and magnitude of severity.

- Water and cutworms rated highest in severity in Kisii at 4.59 and 4.04, respectively. Squirrels, aphids, and blight were rated the heaviest menace in Homa bay at 4.24, 4.1, and 4.06, respectively.
- Weeds and stem borers rated the highest in Embu at 4.46 and 4.10, respectively.
- These results are important in pointing at the problems that any agent promoting EOA in the area should place priority on.

Major methods used to address crop production problems

- To explain the different types of methods used by farmers in controlling crop production problems, the respondents were asked to state the major control method they used in controlling each of the problems they identified as major.

- Results showed that farmers used a mixture of methods to control each major problem.

- It was deduced that the farmers use a mixture of methods, but that there was clear distinctions in focus.

- Problems of rodents, birds and soil erosion were mainly addressed through natural/organic methods.

- On the other hand, problems associated with fungus, bacteria and insect pests were mainly controlled through use of chemicals.

- With respect to fungal, bacterial, and insect pests related problems, chemicals were the predominant means of control in all the counties.

- Overall, 90%, 92%, 84%, 92%, 86%, 92%, 88% of all households sampled reported that they used chemicals against fungus, aphids, cutworm, leaf rust, grain borer, spider mites, and white, respectively.

Farmers' knowledge and practice of ecological organic agriculture

- To assess farmers' knowledge and use of EOA, the respondents were asked whether they had ever used a number of known EOA cultural practices.

- These included use of a select pesticidal plant and ashes in controlling insect pest, and use of a select soil amendment practices.

- With respect to pesticidal plants, questions were posed on four plants including coriander, gallant solder and tephrosia.

- Overall, very few of the respondents had ever used the plants. Pepper, which showed better utilization level, had been used by only about 41% of the farmers. Ashes had been used by only 34% of the farmers.

- Concerning the use of soil amendments, the respondents were well-versed and had used many known soil and water conservation.

- It is however notable that, although the majority of the respondents reported they were using a number of soil fertility enhancing methods, the use was probably not well-informed. This is deduced from the fact that very few (4.46%) had had their soil tested.

- Also notable is the discrepancy between the number of respondents that indicated they limed their soil and the number that indicated they corrected their soil pH.

- Overall, 12.30% of the respondents indicated they had limed their soil but only 3.79% indicated they had corrected their soil pH. This may mean that most of those who limed did not know why they were liming.

Non-use of the EOA Cultural Practices

- Analysis of non-use of the methods suggested that lack of knowledge of the possible strategies was a major reason.
- Of the respondents who indicated that they had never used the pesticidal plants and ashes, over 70% stated that they had never heard that the plants could be utilized for pest control, while the rest said that they lacked practical skills on how to use it.

- Similarly, non use of soil amendment methods was attributed to lack of knowledge with the percentage of respondents who had never heard of the methods varying greatly.

- Of the respondents who had used the various methods, learning from other farmers was the most cited source of knowledge and skill.

Conclusions

- The study revealed that the smallholders in Kenya grow a wide variety of crops on their farms, which may comprise a valuable combination in the application of EOA strategies, especially with respect to controlling pest and diseases.
- Despite the wide diversity, farmers showed little knowledge of potential of the diversity in in controlling pests and diseases.

- Chemical control methods were the most common ways of controlling insects and pests.
- On the other hand the interviewed farmers seemed better informed about natural soil amendment methods, especially those that require manual labour.
- Methods requiring technical support such soil testing and pH correction were not well-known.

- The wide cropping mix and wide application of soil amendment practices imply that the current cultural practices incorporate aspects of EOA.
- While this may not be by design, it is nevertheless important and forms an important entry point.
- Practices requiring a higher technical knowledge are less well known.

Recommendations

- Ways and means should be sought to reinforce EOA already inbuilt in current smallholder farmer practices. This can be done through awareness creation of EOA that are compatible with currently prevailing practices so that farmers can enhance on them and apply them with better knowledge and guidance.

- Farmer-to-farmer extension should be used as one strategy of up-scaling and replicating EOA methods already in use among some farmers.
- Strategies should be designed of disseminating practices that require technical knowledge and skills.
- Processes to reinforce Farmer education: linking knowledge creation to dissemination.

- The promotion of EOA research implies a paradigm shift away from conventional reductionist methodologies.
- Need of more holistic research approaches and innovative partnerships that better capture eco-societal system dynamics

Acknowledgements

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"Few will have the greatness to make history itself; but each of us can work to change a small portion of events, and in the total of all those acts, history for this generation will be written" J. F. Kennedy

- THANK YOU