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Is Organic Farming an Unjustified Luxury in a World With Too Many Hungry People?

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The Real Food Problem

The soaring food prices on the global markets over the past one to two years have given proponents of classical Green Revolution thinking an opportunity to renew their claims that high input agriculture based on chemical fertilizer and pesticides is the blanket solution for poor countries and farmers. This situation has also led others to question whether we should abandon all the environmental considerations in agricultural policies over the last 25 years, and relieve the regulatory burden on agriculture, and put food production in full throttle like in the good old days in the 1970s.

However, as always, the solutions proposed depend on the perception of the problem. In fact, there is little evidence that just producing more food in the North will help solve the food insecurity in the South in a sustainable way. Nor is it evident that returning to subsidized artificial fertilizers in the South would make any significant contribution to addressing the food insecurity among those communities of the South that are currently food insecure. Why is that?

First, the so-called 'Food Crisis' is, unfortunately, not a new issue; it just hit the front pages more often in 2008. The reality is that there have been approximately 750 to 850 million food insecure people globally for the last two decades, the majority living in Sub-Saharan Africa and South Asia. At the same time, enough food has been produced in terms of calories and protein to feed everyone; it has just been divided unequally!

Second, the majority of the food insecure live in the rural areas of developing countries, and their biggest problem is that they lack access to basic health and social services that are necessary to sustain one's livelihood. They also often lack access to secure land tenure, and many are too poor to purchase enough food. Moreover, most smallholders are unable to influence markets for their products. Thus, national food security does not guarantee food for all, and this has been demonstrated by the fact that India has been a net food exporter for some years, while it remains home to approximately 212 million food insecure inhabitants (FAO, 2006).

Third, for decades surplus and subsidized production in the North have supplied cheap imported food for the urban populations in many developing countries, for example in Africa, and thus inhibited investment in food production by farmers and the private sector,

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while the political will to invest in agricultural development in these same countries has been almost non-existent.

Fourth, because global or national abundance of food is not a sufficient condition for food security for all families, the UN has adopted a broader definition that takes into account four important aspects: food availability, food access, food stability and food utilization (see box).

Fifth, while the “green revolution” of the 1970s helped boosting crop yields, especially in Asia, it has proven very difficult to replicate this model on the African continent, partly because of weaker infrastructure and marketing systems, lower population density, low investments in agricultural development, poor extension services and higher variation in agroecological conditions. Thus, use of synthetic fertilizers has remained low and the crop yields per hectare have barely increased over the last 40 to 50 years in Africa as a whole, and remain very low (less than one metric ton per hectares for most crops according to FAOSTAT, 2007). Moreover, the yield successes of the ‘green revolution’ in Asia come with considerable environmental and socio-economic costs that are no longer tenable (Shiva 1991).

Therefore, it is unlikely that the chronic food crisis in parts of the south can be solved easily by returning to the intensification paradigm in the North or by increasing the use of high cost external inputs in the agriculture systems of the South. A more flexible approach is needed that takes into consideration the multiple functions of agriculture, which include enhancing environmental and natural resource sustainability and maintenance of livelihood and the social and cultural traditions of the people (Markwei et al., 2008). In this paper, we review some of the available evidence on the potential contribution of organic farming to food security in the south.

The potential of organic agriculture to alleviate food insecurity

Modern organic agriculture contributes positively to food security by – ideally - improving smallholder farmers’ conditions on all four dimensions as outlined in Table 19. In low input areas in Africa and Asia, agroecological techniques such as application of compost and other methods of soil improvement and diversity of crops and crop mixtures increase the yields

Definition of food security

“Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life” (World Food Summit, 1996).

Food security dimensions used by the World Food Summit and the Food and Agriculture Organization (FAO)

- Food Availability: sufficient quantities of food of appropriate quality
- Food Access: Access, by individuals, to adequate resources and entitlements for acquiring appropriate foods for a nutritious diet
- Food Stability: access to adequate food at all times, resilience to economic and climatic shocks
- Food Utilization: ways in which food contributes to an adequate diet, clean water, sanitation and health care, and in turn, to a state of nutritional well-being where all physiological needs are met

In a report on organic agriculture and food security published by FAO in 2007, it is stated that “the multidimensional nature of food security can be improved by organic agriculture.” (Scialabba 2007).

and the stability of yields and overall resistance towards pests and diseases (Parrot and Marsden 2002). This again improves the stability of food access for the smallholder farmers in times of changing climate including erratic rainfall patterns.

Table 19: Food security: Different ways how organic agriculture can lead to improved food security for smallholder farmers

- Schematic outline of differences in organic agriculture projects in Uganda: Two extreme ends of a continuum of organic farming schemes-

Food security dimension	Focus on cash crop production	Focus on diversified informal organic production for the local market
Food availability	Focus on cash crops Moderate change in management and food crop yields	Focus on food crops Changed management, intensified land use Yield increase.
Access to food	Price premium Increased household income reinvested in food	More food produced home or locally No price premium Sometimes increased income from local market
Food stability	Higher income and reduced debts leads to capital building and secures purchasing power Increased resilience towards economic shocks in the family	Diversity in crops and improved soil fertility increases resilience towards pest and diseases, climatic changes and erratic rainfall Little capital building, so still economically vulnerable
Food utilization	Diversified food purchases	More diverse food crops

After Walaga and Hauser, 2005

This overall picture is also supported by evidence contained in a new report on organic agriculture and food security published by the United Nations Environment Program (UNEP) and the United Nations Conference on Trade and Development (UNCTAD) in 2008 in which Supachai Panitchpakdi, Secretary-General of UNCTAD and Achim Steiner, executive director of UNEP conclude that "... organic agriculture can be more conducive to food security than most conventional systems, and that it is more likely to be sustainable in the long term." (UNEP-UNCTAD, 2008). The study found that out of the 114 projects studied, promoting organic methods in African countries there was a self-reported yield increase of 116 percent compared with the local yields at the beginning of the projects. The International Fund for Agricultural Development (IFAD) (2007) evaluated case studies on organic agriculture and poverty alleviation from China and India, and concluded that organic agriculture showed potential to alleviate poverty for smallholder farmers.

Impact on food security from wide scale conversion to organic farming

The International Center for Research in Organic Food Systems (ICROFS), together with International Food Policy Research Institute (IFPRI), modeled the potential impacts of large-scale conversion to organic farming on food availability and world market prices at

regional and global levels to the year 2020 using IFPRI's IMPACT model (Halberg et al., 2006). Two main scenarios were established, respectively organic conversion in high-input agricultural systems in Europe and North America and conversion of the low-input agricultural systems in sub-Saharan Africa (all African countries in south of the Sahara desert). This is a region where the majority of food-insecure people is localized partly due to the decline in per capita food production over the last four decades.

The scenarios of the two regions were both compared to a baseline scenario, which is a series of assumptions on yield growth rates under current and expected conventional agricultural practices, basic economic development, population growth and food demand trends by regions given that no major political, economic or technological changes occur (Halberg et al., 2006). The main assumptions in the alternative scenarios were that organic yields in the high input agricultural systems would be only 50 to 85 percent of conventional yields, while they would be 90 to 150 percent of conventional yields in low input agricultural systems. This rather conservative estimate was then tested with different assumptions of how the yields will grow over time due to technological and managerial improvements in organic agriculture.

1) The scenario of the conversion of the high input agricultural systems showed that conversion to organic farming of large parts of Europe and North America would not raise global food prices significantly compared to the baseline IMPACT scenario - but only under an assumption of higher productivity gains (yearly yield increase) in organic compared with conventional crops. This is a real challenge for the further development of organic agricultural systems, and will probably only be possible with increased investments in research into eco-functional intensification, better nutrient recycling and plant breeding partly using new smart techniques.

2) Regarding the conversion of the low input agricultural systems, the baseline IMPACT scenario projected that the area with cereals in Sub-Saharan Africa would increase by 20 percent, and the yields per hectare would grow by almost two percent per year. But still, due to a high population growth, there would be an increasing dependence on food imports to Sub-Saharan Africa and food security would be compromised, with an increasing number of malnourished children (18 percent more in 2020 compared with 1997). The projected

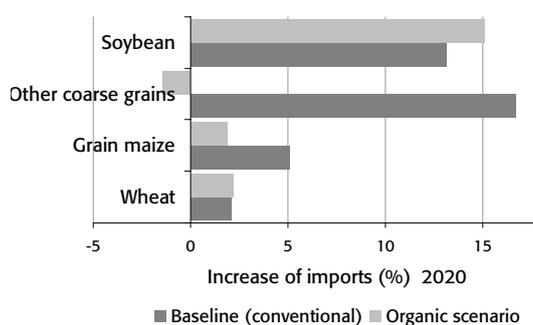


Figure 20: Changes in net trade in important food crops for sub-Saharan Africa

Projected for scenarios of large-scale conversion to organic farming until 2020 (Percent increase in import until 2020 in the baseline and in an organic scenario)

Source: ICROFS and IFPRI 2006

increase in food imports in sub-Saharan Africa over the next twenty years is illustrated, for example, by a five percent increase in corn imports and a 17 percent increase in the import of small grains such as sorghum and millet (Figure 20).

Large-scale conversion to modern, organic agriculture could significantly reduce the needs for food import, thus making the countries less dependent on fluctuating world market prices. This is shown in Figure 20, where the import in “Other coarse grain” was projected to decrease 2 to 3 percent by 2020 in the organic low input scenario compared with the expected 17 percent increase in imports in the baseline scenario. Thus, in the organic scenario, where an increased yield growth rate was assumed, the import would possibly be replaced by a small surplus (shown in Figure 20 as negative import) if the expected yields of organic crops could be realized. At the same time, food access among the rural poor would improve because of (the assumption of) increased yields in traditional food crops such as cassava and sweet potatoes.

The results presented constitute a first attempt to modeling consequences of large-scale conversion. They are not unrealistic, as the assumptions of improved yields under the organic scenarios were conservative in comparison with the actual higher organic yields reported in the UNEP-UNCTAD report mentioned above. ICROFS and IFPRI presently collaborate on improving the use of the IMPACT model to predict the conditions under which organic agriculture may benefit food security among rural and urban poor in food-insecure regions. Unfortunately, the model does not distinguish between people in rural areas and people in the countryside. However, since most of the population that is food insecure in the South is located in rural areas and is dependent on farming for their livelihoods, it can be safely assumed that widespread conversion to organic farming would result in positive food security outcomes. Certified organic agriculture would also create jobs and result into higher returns from marketing of organic products hence generating positive food security outcome for the urban poor.

Badgley et al. (2007) compared the present food production at global level with a 100 percent organic scenario using relative yields deduced from a large number of yield comparisons from the literature. They assumed that organic yields in developed countries would be 96 percent of the present conventional yields, while in developing countries organic yields would be more than twice as high as conventional (213 percent on average). With these assumptions, a 100 percent organic scenario would yield more food than is currently being produced (2785 kilocalories per capita in present food availability versus 4878 kilo calories per capita in organic scenario). They also concluded that nitrogen supply would not be a limiting factor on the general level if the full potential of using legumes and livestock manure is realized.

The challenges for realizing the potential of organic agriculture in developing countries

Evidence from projects and modeling shows that promoting organic agriculture does not increase the food security problems, but is part of the solution - especially because it leads to improvement in productivity of local food systems and access to food. But realizing this potential on a larger scale is presently hampered by major challenges that include lack of

significant research and technical support. Organic agriculture and the agroecological methods are knowledge intensive, requiring training and continuous access to information and extension services. The majority of smallholder farmers have little formal training and lack access to information and extension services. Luckily, there are signs that major donors are beginning to refocus development aid and are beginning to support organic agriculture initiatives. Thus, the initiatives by private donor foundations, as well as the Swedish International Development Cooperation Agency (SIDA), the Food and Agriculture Organization of the United Nations (FAO), the German Society for Technical Cooperation and Development (GTZ), the International Fund for Agricultural Development (IFAD), UNEP and UNCTAD, other international bodies and some governments are supporting the development of organic agriculture and are helping to overcome some of the challenges faced in developing organic agriculture in the South.

Even though there is evidence that organic agriculture can improve food security for smallholders, the degree of success may vary between the different types of organic projects (Walaga and Hauser, 2005). Table 19 shows how two ends of a continuum of organic farming schemes may influence the different dimensions of food security. If a project focuses solely on developing an organic cash crop, the smallholder farmers may become vulnerable to fluctuating market conditions. In projects focusing on informal (non-certified) organic production, there are often positive developments in terms of natural and social capital, but not necessarily higher incomes from the marketing of products. Therefore, when NGOs or companies introduce new organic projects among smallholders, they should take precautions to train the farm family to adopt a broad range of agroecological practices.

If organic agriculture is to be a sustainable alternative on a large scale in the developed world, we need to continuously improve the output per unit of land, while at the same time contributing to social and environmental goods. The output from organic farms will be multifunctional, and it is not the goal to mimic conventional agriculture's focus on maximizing yields in mono-cropping systems. Organic farm outputs are a combination of multiple crops and maintenance of eco-functions in soil, water and biodiversity, but we need to take this to the next level in order to be sustainable in light of the global needs for food, fiber, bioenergy and climate mitigation. This eco-functional intensification is the future challenge for the organic sector. Thus, there is a need for significant input of resources for research and for applying classical agronomic disciplines with modern biological, chemical and molecular methods in combination to improve the use of organic principles for self regulation and inducing health at all levels of the food system.

Conclusion

Organic agriculture can contribute significantly to improving food security among smallholder farmers in developing countries, and a large-scale conversion has the potential to reduce the future dependence of food imports in Sub Saharan Africa. However, such a positive scenario depends on well-designed training and extension focusing on building human, natural and financial capital. There is also a huge need for more research and innovation to improve local farming systems and adaptation of agroecological principles.

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