

# A NEW GREEN REVOLUTION: A REVIEW OF AGRICULTURAL REFORM IN SUB-SAHARAN AFRICA

*Knut Tjensvoll Kitching*

**Abstract:** *The Green Revolution in Africa represents a set of agricultural reforms driven by technological innovations such as High Yield Varieties of seed, fertilizers and complex irrigation regimes. Though perceived as a panacea by major development banks and governments, the Green Revolution has not always enjoyed success in the Global South. This paper reviews some of the current agricultural reforms that form key dimensions of the Green Revolution policy regime, and considers some outstanding critiques of its application in sub-Saharan Africa. The paper opens with a consideration of the key reforms associated with the Green Revolution, and then moves to a discussion of seed technologies, land rights and tenure, and trade and social policy. Situating these debates within a larger regional context of shifting climate and ecological change, this paper aims to present a critical examination of some of the primary goals and projects of the Green Revolution in Africa and concludes that the way forward traces a line between Western techno-scientific reforms and uniquely African approaches to agriculture.*

## Introduction

The current vision of the Green Revolution as a development model is in many respects one that is based strongly in the vision that emerged in an Asian context beginning in the 1960s and 1970s. This 'original' model deemed agricultural practice in many 'third world' settings to be inefficient and in need of western expertise and technology. Technological innovations in agriculture were perceived as a panacea which would solve the problems of rampant poverty and hunger. However, since those early applications it has come to be understood that not only are problems of hunger often far more complex than simply a deficit of food (Devreux 118), they are also questions of agricultural 'inefficiency' that cannot be solved simply by the addition of fertilizers and pesticides and the use of new genetically engineered seeds.

This paper will consider several subtopics within the debate. It will begin with a brief consideration of the goals and key elements of the Green Revolution in agriculture and will then progress to a critique of its application in African contexts. It will conclude by attempting to tease out a few central factors which the author feels are vital reforms that must be implemented in African agriculture. Thus, the paper is grounded in recognition that certain reforms in African agriculture must occur (Matshe 485), but offers alternatives to the standard model for this Green Revolution.

## The African Iteration of the Green Revolution

The Green Revolution was originally reliant on advances that had been made in agricultural technology around seed engineering, fertilizers

and pesticides, and it is this background which still permeates its current iteration. In many cases this involves both special high yielding seeds and a whole package of chemical inputs, which boost the nutrient content of the soil and suppress pests. Not only are many of these inputs damaging and disruptive to local ecologies, they are also a cost that farmers in many third world countries cannot absorb on their own. Technology such as hybrid seeds often have to be purchased every year, and restrictions from large multinationals often make seed-saving illegal. Additionally, there are the necessary inputs of fertilizer and other additives that must be purchased on a yearly or seasonal basis (Mosley 700). These are not simply start-up costs, but long-term considerations that must be factored into plans for subsidies and assistance packages. In some cases these concerns can be solved by government assistance or else the capital can be gathered by organizing farming communities in a collective fashion.

The application of Green Revolution thinking in Africa has met with mixed success. Alan Terry points to assessments which have argued that the varying climatic and soil conditions as well as the low degree of development of institutions within Africa has created an environment where the degree of adoption of Green Revolution policies has been broadly low (1). Scholars such as Paul Mosley have suggested that the differential success with which programs have met relies strongly on the sorts of policy choices made by governments. In particular, Mosley discusses the cases of Uganda and Ethiopia as being examples of situations where, for example, arms budgets were cut in favour of pro-poor policies, focused on subsidizing farmers' equipment or education and assisting in land purchasing (Mosley 713). In addition Mosley makes an important distinction between countries that have attempted to intensify agricultural practices (for example Uganda, Malawi, Kenya and northern Nigeria) and those that have tried to increase the amount of land in produc-

tion (for example Ethiopia, Zambia and Lesotho), a process he labels "extensification" (Mosley 710). Of particular interest is the case of Uganda, where attempts were made at land use intensification coupled with pro-poor government policy that focused on education, healthcare, farming support and rural infrastructure (Mosley 713). Organizations such as the World Food Programme (WFP) have been very successful in progressing schemes in countries such as Malawi, which act to boost local smallholders by purchasing surplus crops, and feeding capital into local economies (World Food Programme). This approach allows organizations to target specific groups, such as women, by choosing which cooperatives or areas they purchase from (World Food Programme).

## **The Nature of Seed**

Seeds are a central part of the technology espoused by many of the organizations, major philanthropists, aid groups, governments and NGOs pushing for an African Green Revolution. Major agricultural multinational corporations such as Monsanto breed special High Yield Varieties of seed (HYV seeds), often designed to produce larger or more uniform fruit. However they pose a rather unique set of challenges in an African context. Land-race seeds are varieties of seeds that have been gradually bred and adapted for the highly specialized local conditions, often for growth regimes that demand drought or pest resistance. Due to their diverse genetic background, land-race seeds are generally more robust and can better withstand the local growing conditions as well as outbreaks of disease. HYV seeds are often hybrids, which means that it is only the first generation that will have the desired traits. Traditionally, this has meant that farmers using hybrid seed are forced to buy new seed every year, but for many farmers this process is prohibitively expensive. One project that has focused on the use of seeds that can be produced by farmers themselves is the New Rice for Africa project (NERICA). NERI-

CA seed was used in Uganda with varied success (Kijima, Otsuka and Sserunkuuma 78). The seed did not fare well in variable rainfall environments, and suffered from lack of exposure amongst farmers (Kijima, Otsuka and Sserunkuuma 78). This demonstrates why agricultural reform in Africa must have, at its heart, a local, genetically diverse complement of seeds which have been locally developed and are available, advertised and affordable for small-scale farmers, and which will not necessitate the inputs of fertilizers and irrigation that HYV varieties commonly do.

## **Land Rights, Tenure and Employment**

The organization of land tenure is another important consideration for agricultural reform in Africa. Central questions revolve around what is the most efficient model for the production of food and the mobilization of capital and labour. While the original Green Revolution may have pushed many farmers towards collectivization in order to muster enough capital (for the seed and fertilizer inputs), current programs for agricultural development seem to be largely oriented towards smallholder farming. In addition to these concerns over the ownership of the land, soils in Africa are often so poor that great caution must be taken not fall into an exhaustive pattern of land use. Traditional farming patterns have often involved a bush-fallow or swidden system, which has allowed the land to regenerate naturally without the unsustainable inputs of fertilizers and organized irrigation (Stock 198). The scale and degree to which agricultural reform is influenced by farm size and farming style is also an important consideration. In small-scale intervention, it may be easier to disseminate information to farmers, so that change and progress become more visible to donors and NGOs. However, it is also often easier to make large capital investments by creating larger groupings of farmers and land. Adding to these problems is the relative infancy of many

agricultural institutions for research and teaching, a problem which foreign expertise can certainly help (Ejeta 831). The central question in the debate around scale is the degree to which these styles of farming can address food security at the household or the aggregate level (Misselhorn 34).

## **The Place of Agriculture in Trade and Social Policy**

For some, trade may be the answer. Tibaijuka discusses incorporating export crops into African agricultural policy, as a way for farmers to access other markets and governments to try and draw foreign investment into agricultural and other related sectors (170). However, entry into cash crops and niche markets such as fair trade pose unique opportunities and challenges to African governments and farmers alike in terms of the foreign economic pressures they introduce. At this point African markets are in many cases relatively closed. Due in part to the unequal nature of global trade balances and the inadequacies of many African tariff protections and agricultural industry subsidies, and also due to trade policies often advocated by major international financial institutions such as the World Bank which often favour the Global North, Africa has struggled with enabling positive Foreign Direct Investment (FDI) that encourages domestic growth (Tibaijuka 172) and pushes food prices up (Xiao, Headey and Johnson 539). For this reason, the Alliance for a Green Revolution in Africa (AGRA) has focused on the removal of intra-regional trade barriers as a key goal for an African Green Revolution (Alliance). By expanding access to more local markets and increasing the abilities of African farmers to trade more widely within the continent, AGRA and others hope to involve greater numbers of producers and consumers (AGRA). By encouraging intra-regional, as opposed to international trade, it is hoped that the two goals of mobilizing investment and consumers will be achieved while dealing with local entities and regional gov-

ernments that are on more equal footings (Xiao, Headey and Johnson 539).

Agricultural reforms and policies such as the Green Revolution that push for increased efficiency in production are important for increasing the amount of food available, however problems of hunger are more complex (Misselhorn 34). Inter-connected concerns such as disease (in particular HIV/AIDS), conflict and rural to urban migration are central to the discussions of the challenges of hunger or poverty (Tibaijuka 170). Migration in Africa is often caused by conflict, particularly in certain parts of Sub-Saharan Africa where there are large numbers of people semi-constantly in motion as refugees or internally displaced people. Furthermore, rural to urban migration is also a major concern in the rapidly urbanizing continent. The depopulation of the countryside is of concern to cities as they struggle with their blooming populations, and to the countryside that faces the next generation of farmers drawn away by the hope of better prospects elsewhere, or forced out by worsening rainfall and soil conditions (Annez, Buckley, and Kalarickal 228). This process will only be exacerbated by changes in climate and rainfall in the future (Annez, Buckley, and Kalarickal 228).

## **The Green Revolution and Aid Dependence**

The Green Revolution is not only being endorsed by governments, but also by major donor organizations and philanthropists (Sanchez, Denning and Nziguheba 37). This model of philanthropy is often referred to as 'philanthropy 3.0' as it represents the latest iteration of the model of charity funding (Barrali). This model focuses on adaptive philanthropy, with emphasis on greater research, with money often being invested abroad in development schemes that target local people directly through smaller organizations. Support for philanthropy 3.0 is split in between the huge or-

ganizations and trust funds controlled by wealthy donors and the small scale micro-initiatives that rely on social media to boost awareness (Saunders). Leverage of both donors and governments is key, as charities and fundraisers struggle with donor-fatigue, so they are increasingly aiming to accomplish more with less (Barrali). This model is commendable, but also problematic since regardless of intent, it continues a colonial era flow of resources and expertise from the first world to the third. In many cases this 'third sector' (the NGO's and aid organizations) is often called upon to act as a temporary solution when governments find themselves unable to provide key services, which only acts to increase dependence on foreign aid (Saunders). While funds from philanthropists and other donors are vital to many projects, there is a need for appropriate avenues for donation, so that donors do not feel that they must act outside of governments, but rather that they are able to pursue social entrepreneurship or other schemes and contribute to development through government programs. This acts to allow a degree of domestic control, and also creates a platform for greater transparency and accountability. AGRA is one of the most prominent organizations in this field, and is uniquely placed to fulfill a similar function. AGRA focuses its resources on smallholder farmers with the stated aims of improving food security, increasing the family incomes of farmers, and achieving a sustainable agricultural revolution in Africa which will both support and protect farmers in the face of climate change (Alliance). The role of philanthropy must be carefully considered in the context of agricultural reform, in particular by the African governments who are the recipients of aid.

## **Changing Climates and Ecologies: Paths Towards Sustainable Agriculture**

Finally, African agriculture needs to adopt a new perspective on sustainability. While the al-

leviation of poverty must remain a priority, governments must make sure that ecological concerns and changes are accounted for in policy and legislation around agri-development. Climate change promises to have tremendous impacts across Africa in terms of future rainfalls (Annez, Buckley and Kalarickal 228) and changes in temperature. While some Sahel regions of sub-Saharan Africa will be increasingly drought prone, other localities in the Great Lakes region of Africa will find that monsoon rains are worse than in the past, potentially leading to flooding, soil erosion and salinity problems. Sustainability needs to be approached on both environmental and economic levels, and definitions in policy rewritten to reflect a concern for both livelihoods and agricultural practices that do not contribute to the degradation of the land (Matshe 486).

## **Conclusion**

Agriculture has a long tradition in Africa, which must be carefully considered. The imposition of strategies and technologies from outside must take careful notice of the practices of local indigenous agriculturalists. Authors such as Vandana Shiva have long cautioned that local knowledge and indigenous techniques and approaches are just as valid and important and must be considered on an equal footing with western techno-science. African indigenous agriculture represents a unique knowledge set, acquired over long periods of time, which is specially designed to encompass the local conditions (whether drought or high rainfall), and which represents a connection to local soils and seeds (Stock 195). Recognizing this body of knowledge as uniquely local and indigenous, not simply traditional, without the negative connotations of archaic and inefficient practice is a vitally important first step.

Agricultural reform should encompass both government subsidization and pro-poor spending regimes (Sanchez, Denning and Nziguheba 43). It

also needs to look beyond simply being a solution to hunger by creating more food. Undoubtedly more food must be created on less land in order to solve the hunger problem in Africa, however, access to and the distribution of food are also logistical questions that must be addressed through greater government spending on trade and transport (Misselhorn 37; Matshe 486). Additionally, agricultural reform must be considered as part of a wider government strategy around issues of conflict, mobility and demographic change. Questions of conflict are certainly challenging to solve through agricultural policy, but policies could be put in place to help with the provision of employment and food for refugees and displaced people. In a similar vein, Africa's young people, as another mobile population, could also be targeted by policy driven by agricultural reform to offer them education, land and farming support in their rural villages. Additionally, there remains the problem of feeding huge urban populations in African cities. This demands new approaches to zoning and agricultural production in the city's environs, as well as an accompanying focus on transportation and logistical links from rural to urban centres and marketplaces. There is a need to find a middle path, which addresses the lessons of the Green Revolution, but incorporates more of the indigenous knowledge and technology of the region. It will be necessary to incorporate all of these elements in order to develop practical, workable solutions to the problem of hunger.

*Acknowledgements: The author would like to thank the editorial staff of Trail Six, his anonymous reviewers, and Associate Professor Philippe LeBillon for their invaluable input and advice.*

## **WORKS CITED**

- Alliance for a Green Revolution in Africa. 2011. Web. 20 Nov. 2011. <<http://www.agra-alliance.org/>>.
- Annez, Patricia, Buckley, Robert and Kalarickal, Jerry. "African Urbanization as Flight? Some Policy Implications of Geography." *Urban Forum* 21 (2010): 221-234.
- Barrali, Kristin. "Nonprofit Newswire: Philanthropy 3.0." *The Nonprofit Quarterly* 5 March 2010. Print.
- Devreux, Stephen. "Famine in Africa." in Stephen Devreux and S. Maxwell eds. (2001). *Food Security in Africa*. London: ITDG Publishing, 2001. Print.
- Diao, Xinshen, Headey, Derek and Johnson, Michael. "Toward a green revolution in Africa: what would it achieve, and what would it require?" *Agricultural Economics* 39 (2008): Supplement 539-550.
- Ejeta, Gebisa. "African Green Revolution needn't be a mirage." *Science* 327 (2010): 831-832.
- Kijima, Yoko, Otsuka, Keijiro and Sserunkuuma, Dick. "An inquiry into Constraints on a Green Revolution in Sub-Saharan Africa: the Case of NERICA Rice in Uganda." *World Development* 39.1 (2011): 77-86.
- Matshe, I. "Boosting Smallholder Production for Food Security: Some Approaches and Evidence from Studies in Sub-Sahara Africa" *Agrekon* 48.4 (2009): 483-511.
- Misselhorn, Alison A. "What Drives Food Insecurity in Southern Africa? A Meta-Analysis of Household Economy Studies." *Global Environmental Change* 15 (2005): 33-43.
- Mosley, Paul. "The African Green Revolution as a Pro-Poor Policy Instrument." *Journal of International Development* 14.6 (2002): 695-724.
- Sanchez, Pedro A., Denning, Glenn L., and Nziguheba, Generose. "The African Green Revolution Moves Forward." *Food Security* 1 (2009): 37-44. Print.
- Saunders, Doug. "Welcome to the Next Generation of Philanthropy." *The Globe and Mail* 28 Oct. 2011. 12 November 2011. <<http://www.theglobeandmail.com/life/giving/giving-news/welcome-to-the-next-generation-of-philanthropy/article2218223/>>.
- Shiva, Vandana. (1991) *The Violence of the Green Revolution: Third World Agriculture, Ecology and Politics*. London: Zed Books, 1991.
- Stock, Robert. "Indigenous Food Production Systems." *Africa South of the Sahara: A Geographical*

Interpretation. New York: The Guilford Press, 2004. 195-209. Print.

Terry, Alan. "Evaluating the Green Revolution after a Decade: a Swaziland Case Study." *International Journal of Agricultural Sustainability* (2011): 1-13.

Tibaijuka, Anna Kajumulo. "Food Security in Africa: Agriculture, Trade and the Environment." *New Economy* (2004): 170-173.

World Food Programme. "Malawi: P4P Raising Income for Woman Farmers." 2010. Web. 10 Nov. 2011. <<http://www.wfp.org/countries/Malawi/News/Malawi--P4P-raising-income-for-women-farmers>>.