Africa Action Special Guest Paper Series

August 2008

Africa Action presents the first in a series of occasional Special Guest Papers, offered to highlight the analysis of civil society activists and academic researchers writing about Africa.

Human Need and Corporate Greed*

Understanding the Call for a New Green Revolution in Africa

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* A shorter version of this report was originally published by Foreign Policy in Focus at **http://www.fpif.org/fpiftxt/5324**

Human Need and Corporate Greed: Understanding the Call for a New Green Revolution in Africa

In 2005, the Bill and Melinda Gates Foundation and the Rockefeller Foundation announced a plan to "help millions of small-scale farmers lift themselves out of poverty and hunger."[1] In the years since, those foundations have been joined in their efforts by a number of other organizations and have founded the Alliance for a Green Revolution in Africa (AGRA).

According to AGRA's website:

> *AGRA programs develop practical solutions to significantly boost farm productivity and incomes for the poor while safeguarding the environment. AGRA advocates for policies that support its work across all key aspects of the African agricultural "value chain"—from seeds, soil health, and water to markets and agricultural education.... A root cause of... entrenched and deepening poverty is the fact that millions of small-scale farmers—the majority of them women working farms smaller than one hectare—cannot grow enough food to sustain their families, their communities, or their countries.*

In 2007, two new major players came on as heavy backers – directly or indirectly – of this project. The first is former U.N. Secretary General Kofi Annan, who accepted the post of chairman of AGRA in 2007. The second is the World Bank, whose flagship publication – the "World Development Report" – had as its theme for 2008 "Agriculture for Development."

While AGRA's goals seem laudable (who could be against eliminating poverty?) the proposals have sparked an uproar. Some have pointed out that the green revolution techniques of the 1960s and 1970s relied on heavy chemical fertilizer inputs, large-scale mono-cropping resulting in the elimination of biodiversity, and heavy use of ground water reserves leading to the dropping of the water table. Others have added that the net result of the green revolution in places like India, or even the U.S., has been to put small farmers out of business – the economies of scale that the green revolution technique require are often beyond the reach of small farmers. Still others point out that to the extent that the "new green revolution" will include the latest agricultural technologies, these are likely to include untested and potentially dangerous genetically modified crops, many of which are not allowed in commercial food production in the U.S. or in Europe.

All of these concerns are valid, but both the concerns and the proposals themselves overlook some obvious questions. These include the following:

1) Why are poor farmers in Africa poor? Is it really because they are not producing enough? To what extent are chronic hunger and seasonal famine in Africa a result of food shortages and to what extent is it a result of pricing policies, lack of distribution mechanisms, or other factors?

2) What kinds of societies would African countries (or a given African country) like to build? Assuming the status quo is undesirable, would a country prefer to be an exporter of natural

[1] Alliance for a Green Revolution in Africa, 2008. http://www.agra-alliance.org

resources including agricultural resources, or would it prefer to be an exporter of processed goods of some kind? In ten years time, how much of a country's economic activity should be in the small farming sector, compared to the large farming sector, industry, or services?

3) What is the role of food sovereignty and food security in an African country? Is self sufficiency in certain staple crops a priority? What is the best way to ensure the safety of the food supply to prevent seasonal famine on the one hand and chronic malnutrition on the other?

Though seldom asked by researchers and economists, these questions are crucial to understanding agriculture (or any "crisis" of agriculture) in African countries. The latter two questions can only be answered by governments and their citizens through democratic processes, flawed as the existing processes may be. These questions also presuppose that the World Bank's "Washington Consensus" policies of free market fundamentalism are illogical. Nation states – not markets – can and will determine agriculture policy, if necessary implementing protectionist tools to see that policy through. The U.S. and the EU, both of whom have been unable or unwilling to decrease their agricultural subsidies in the current round of WTO negotiations, are the clearest examples of this truism.

While trade and agricultural policies will also be touched on, most of this paper focuses on issues raised by the first of the above questions. What is really behind the push for a Green Revolution in Africa? What are some criticisms of that push based on experience with the failures and successes of green revolution policies in Asia and Latin America? And what does the World Bank, an institution that has played a leading role in creating policy in Africa, have in mind for the continent's agricultural policies, especially given that their 2008 World Development Report is entitled *Agriculture for Development*?

Defining Terms

Washington Consensus: The name applied to a set of policies promoted by the World Bank, the International Monetary Fund, the U.S. government and a variety of private sector interests. These policies include: privatization (the idea that governments should sell off their assets and services to the private sector); fiscal liberalization (the removal of currency controls); budget austerity measures (severe restrictions on the amount of money governments can spend); and trade liberalization (the removal of subsidies and tariffs on all exports and imports). Trade liberalization with regard to food and the privatization of agricultural boards are the two most relevant aspects of the Washington Consensus policies for the current discussion.

Green Revolution: First used by then head of the U.S. Agency for International Development (USAID) William Gaud, this term is used to describe a high input, high yield approach to agricultural production. In this model, increased inputs – including fertilizers, pesticides, and irrigated water – combined with "improved" hybrid varieties of grain, lead to significant increases in yield.

The World Bank, Agriculture and the 2008 World Development Report

Of all the institutions involved in the agricultural sector in Africa, perhaps none is more influential than the World Bank. In 1981 the famous World Bank study entitled *Accelerated Development in Sub-Saharan Africa: An Agenda for Action*, also known as the Berg Report,

paved the way for World Bank involvement in the African agriculture sectors. The Berg Report prescriptions represented the first iteration of market fundamentalist policies that have been dominant in the African agricultural sector thereafter.

World Bank intervention in African agriculture was possible in large part because the oil crises of the 1970s had left non-oil exporting African countries deeply indebted. World Bank and International Monetary Fund loans were made available to repay other creditors (often former colonial masters) on the condition that countries follow the World Bank policy prescriptions.

The Berg report is notable for what it leaves out.[2] While much attention is given to the supposed failure of African states to develop agricultural policy that plays to Africa's "comparative advantage" in having huge amounts of sparsely populated arable land, improvements in maize and other crop yields in the 1960s and 1970s are largely overlooked,[3] as are the external factors that led to the economic crises of the 1970s and 1980s, especially the huge rise in oil prices.

Since the Berg report, the World Bank has been insisting on market liberalization and privatization of Africa's agricultural markets. Subsidies of all kinds have decreased since 1981 and most state marketing boards and crop authorities have been greatly weakened or eliminated. No one – including the World Bank – denies that the net result of this policy is to expose small farmers to increased risk of shocks.[4] But the World Bank argues that shocks may be beneficial, in that exposure to actual market fluctuations will lead small farmers to grow high-value export crops instead of low value crops for local consumption. This "rational peasant" theory, as it was known in the 1980s, argued that small farmers shifting to high value exports such as coffee, sugar, cut flowers, etc. would ultimately bring in more money to the domestic economy, enabling rapid growth and development.

This theory – that the market can conquer all and that states should get out of the way so that the market can do its job of "getting the prices right" – underlines World Bank thinking not only in the 1981 Berg report but also in the 2008 World Development Report (WDR). Indeed, on reading the 2008 WDR, one is astonished by how little they have learned in over twenty years. In the chapter "Reforming Trade, Price and Subsidy Policies" the WDR argues that further market liberalization is necessary both in developing countries and in developed countries, where market liberalization would "increase international commodity prices by 5% on average."[5] The report does not state that commodity prices have dropped so significantly since 1980 – over 55% in the case of coffee[6] – that a 5% increase (some of which has already been actualized in the recent commodity boom) would merely repair some of the damage that has already been done.[7]

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[2] Jeff Grischow, "Structural adjustment: neoliberalism and the African reaction." http://science.jrank.org/pages/8526/Capitalism-Africa-Neoliberalism-Structural-Adjustment-African-Reaction.html

[3] See for example, Carl Eicher, 1995. "Zimbabwe's maize-based Green Revolution: preconditions for replication," *World Development,* Vol. 23, No. 5, p. 805-818.

[4] Shock risk can increase, for example, when a farmer plants a crop with little knowledge of what she or he will be able to sell it for, or when input costs rise but the commodity price stays level.

[5] World Bank, 2008. "World Development Report 2008," p. 117.

[6] United Nations Conference on Trade and Development (UNCTAD), 2004. "Economic development in Africa: trade performance and commodity dependence," http://www.unctad.org/Templates/webflyer.asp?docid=4375&intItemID=1528&lang=1

[7] Since the 2008 WDR, commodity prices have indeed shot up, stemming from the fall of the U.S. dollar, the rise in oil prices, and the crash of speculative bubbles, such as the U.S. mortgage market. While the long-term results of

The continued market fundamentalism of the World Bank is difficult to understand, especially in light of the fact that after more than 25 years of imposing these policies in Africa and Latin America, success stories are few and far between. Those countries that do have productive agricultural sectors (almost none of whom are in Africa) either rely on huge landholders to be productive (Brazil, Argentina, Chile) or on massive subsidies (India) or both (U.S., E.U.). The countries that have eliminated their subsidies and privatized their grain boards, including many in Africa, are those that are doing the poorest.[8]

In fairness, two changes can be seen in the World Bank's thinking between 1981 and today. The first can be seen as an admission of failure – migration to more developed countries and the subsequent flow of remittances to families left behind is now mentioned as part of a strategy for reducing rural poverty.[9] While this is certainly true in the current global economy, there are few who would argue that forced migration is a path to development. Anecdotal evidence suggests that remittances may have a slightly greater correlation to development than the correlation between aid and development, but this is hardly high praise considering the failures of the aid programs of the last thirty years.[10]

The second concession that the 2008 WDR makes to the reality of the last twenty years (as opposed to the market fundamentalist ideology of the World Bank) is an allowance for targeted subsidies. While historically treating subsidies as anathema, in recent years the Bank has come under fire for insisting upon market liberalization in developing countries while acknowledging that wealthy countries maintain much higher subsides than those poor nations being asked to liberalize. The World Bank's answer to this has been to continue to emphasize the need to stay away from those many types of subsidies that distort trade, while simultaneously allowing for the possibility of targeted subsidies to help the poorest of farmers who may be the most vulnerable to price shocks. While talk of such "targeted subsidies" can be seen as a step forward, it is a small one and does little to relieve the burden of over twenty years of lost African development for which the World Bank bears a large share of responsibility.

Leaving the Religion – Market Fundamentalism and the Real World

The events of the last thirty years (or, for that matter, the last 300 years) belie the quasi-religious belief that free markets lead to development and growth. In his groundbreaking work *Kicking Away the Ladder* (2003), Ha Joon Chang documents the development of every industrialized country, showing that protectionist policies were a fundamental part of development strategy in

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this are as yet unknown, anecdotal evidence suggests that governments may be enjoying short-term windfalls. I would argue that the fall and rise of the commodities market is all the more reason for governments to have a meaningful development strategy, and not trust everything to the whims of the market.

[8] If one rejects the World Bank's rhetoric of being a force for eliminating poverty and instead assumes that the World Bank is interested in maximizing profit for corporations headquartered in the U.S. or in Europe, then these actions begin to make some sense. Liberalization has given companies both a steady supply of cheap raw materials and access to small but affluent domestic markets in ways that echo the colonial economies of the 19th and early 20th centuries. See 50 Years Is Enough, 2003. *Empty Promises: The IMF, the World Bank and the Planned Failures of Global Capitalism*.

[9] "Migration can offer a pathway out of poverty for those who leave and for those who stay behind." World Bank, 2008. "World Development Report 2008," p. 73.

[10] For a long discussion of the issue see OECD, 2005. *Migration, Remittances and Development.*

nearly every case. The process of development that emerges from this story is not maximizing comparative advantage (for if so, the U.S. would be a sparsely populated country of fur traders and fisher people) but rather shifting comparative advantage to high value goods through market distortions. In the case of the U.K. and the U.S., those market distortions originally came in the form of colonialism and slavery. Market distortions continue in the U.S. today in the form of agriculture and steel subsidies, as well as indirectly through tremendous government spending on biotechnology and defense.

In light of these fundamentals of developmental economics, the WDR 2008 can be seen as an ideological continuation of the failed agricultural policies of the last twenty years, without an adequate analysis of why that period has been a failure for countries who rely on agricultural exports as a path to development. The WDR does point out that a few countries (Brazil and Chile are the examples given) have successfully used agriculture to increase growth, but in Brazil, and to a lesser extent Chile, small farmers are all but extinct, and agriculture is big business. Given the preoccupation with small farmers and poverty alleviation in other parts of the document, these examples are odd.

Chile's Green Revolution and Small Farmers[11]

Chile has long been hailed as a developing country that has managed to create a viable and lucrative agricultural sector. While land reform is part of this story, large scale farmers have been the most successful in taking full advantage of the export-oriented agricultural production.

As Chile restructured its agrarian sector in the 1970s, companies took advantage of a lack of environmental safeguards to invest in Chilean fruit production. Many rivers in Chile are now practically dead due to industrial and urban wastes and agricultural chemical runoff.[12] Pesticide use increased by about 100%, while the demand for imported and domestic fertilizers rose by 50% from 1990-2000.

The expansion of irrigation in semi arid regions has led to an increased rate of salinization. In the Valley of Copiapo, about 65% of the arable land under irrigation is exhibiting some degree of salinization. 3,300 hectares of vineyards under sprinkler irrigation are also affected, meaning a 40% reduction in productive potential.

Green revolution practices including monoculture and pesticide overuse have also led to increased risk of pesticide resistant pests over-running crops, some of which were never pest species at all until pesticide use killed animals such as spiders that would prey on them. There are at least eight known cases of insect and mite species that reached pest status due to the elimination of their natural enemies with pesticides.

[11] This section draws heavily on M. Altieri and A. Rojas, 1999. "Ecological impacts of Chile's neoliberal policies, with special emphasis on agro ecosystem." *Environment, Development and Sustainability*, Vol. 1, p. 55-72.
[12] W. Foster and A. Valdez, 2006. "Chilean agriculture and major economic reforms: growth, trade, poverty and the environment." *Région et Développement,* No. 23, p. 188-213.

In the few instances where peasant farmers did manage to engage in fruit production, they found it too capital intensive and had to sell part or all of their land to bigger farmers or large fruit companies as they could not repay their debts.[13]

On a macro level, Chile's agricultural gains have not translated into benefits for those at the bottom of the income distribution scale. Measures of inequality including the Gini coefficient have remained stable for much of the past 30 years.[14] Rural poverty has been on the rise at precisely the same time that the agrarian sector has been booming in Chile.[15]

The experiences of Brazil, Chile and other countries with revenue earning agricultural sectors invite the question of what kinds of agricultural policies are actually effective. A good starting point is to consider what are (or what should be) the aims of agricultural policies? World Bank documents such as the WDR 2008 mask what they consider to be their actual objective – economic growth and development – with talk of hunger-related illness and death in Africa: issues of food security. These two aims are distinct – and not necessarily congruent. Which goal – economic growth or food security – should be prioritized, and what agricultural policies should be pursued to that end?

Much hinges on the answers to these questions, yet the answers provided both by the World Bank and by the Alliance for a Green Revolution in Africa (AGRA) are oversimplified. Good agricultural policies, they claim, are those that use the latest technology to maximize yield and minimize cost. Those good agricultural policies will yield both increased economic growth in the agricultural sector and food security through increased income to purchase food regardless of where that food may have been grown. This miracle win-win, zero-tradeoff solution also has a fabulous brand name: the green revolution. While the World Bank's position on trade and privatization can be traced to obsolete policy advice from the 1980s, the position on agricultural policies and the green revolution can be traced back even further – to obsolete policy advice from the 1960s.

The Revolution is Green: Part I

There is a standard version of recent agricultural history which goes something like this: In the 1950s and 1960s, the United Nations and some in the U.S. became concerned that food supplies were unlikely to keep pace with population growth in the post-World War II world. The U.S. especially had invested a lot of money in developing better seed varieties, and in 1970 the U.S. agronomist Norman Borlaug was awarded the Nobel Peace Prize for his work in developing new high yield varieties of wheat. This new strain of wheat, together with other improvements in biotechnology, the widespread use of irrigation, and more efficient mono-cropping techniques staved off the threats of mass starvation that were predicted. Today, we have more than enough food to feed the world, thanks in large part to the green revolution.

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[13] Bellisario A., 2006. :The Chilean agrarian transformation: the pre-agrarian reform period (1955–1965)." *Journal Agrarian Change*, Vol. 6, No. 2, p. 167-204.
[14] C. Kay, 2002. "Chile's neoliberal agrarian transformation and the peasantry." *Journal of Agrarian Change*, Vol. 2, No. 4, p. 464-501.
[15] D. Liverman and S.Vilas, 2006. "Neoliberalism and the environment in Latin America*." Annual Review of Environment and Resources*, Vol. 31, No. 1. p. 327–63.

As stories go, it is a fairly simple one. There is a problem (potential mass starvation), and science presents a solution (better kinds of food and better ways to grow more of it). As with most standard versions of history, it is only partly true. The real history is far more complicated and the real results of the green revolution have been far less – and far more – than what was expected.

While many are willing to acknowledge problems relating to the results of green revolution policies, few doubt that the individuals and institutions involved acted out of altruistic motives. However, in his new 2007 book *Seeds of Destruction,* William Engdahl paints quite a different picture of the motivations behind the endeavor. Citing an impressive list of sources, Engdahl claims that the Rockefeller family, and in particular Nelson Rockefeller, saw themselves to be on a quest for a kind of *pax Americana* in the aftermath of World War II. Using the tools of international business and philanthropy, Nelson Rockefeller saw himself as opening the door for U.S. agribusiness to have unhindered access to international markets. Recall that this is at a time before the World Bank and the IMF would ensure unhindered access through their market fundamentalist conditions. Interestingly, the buzz around the "green revolution" died off around the time that countries were forced to liberalize in the early 1980s.

Engdahl's work is an important part of an increasing body of knowledge indicating that much of the U.S.'s post war "charitable" efforts – including government and private sector charities – were in fact in the service of unilateral foreign policy objectives. As more evidence becomes available through the declassification of documents, the legacy of the green revolution is likely to be seen in even more damaging terms. In terms of results, while global food stocks have increased dramatically, global hunger has only seen a marginal decline.[16] Scientists have argued that the green revolution represents a net loss in energy flows, with energy expended in inputs rivaling energy produced in foodstuffs when measured in caloric terms (traditional farming sees as much as ten times more calories produced than consumed in production).[17] This is clearly seen in American agriculture, which is highly efficient in terms of yield per hectare yet is grossly inefficient in energy use since it consumes 10 to 15 calories for every calorie of food produced.[18] While the global agricultural industry now sees most of its wealth generated by a few big corporations,[19] income for most of the world's small farmers has been on the decline prior to

[16] While the number of undernourished people is less than the approximately 900 million living in 1970, it is not significantly less. Here it is worth quoting in full a paragraph from the latest report of the UN Report on the Right to Food: "The Special Rapporteur is outraged to report that global hunger is still on the rise. According to the United Nations Food and Agriculture Organization (FAO)'s latest report on "The State of Food Insecurity in the World 2006," there has been virtually no progress made on reducing hunger, despite the commitments made by Governments in 1996 and again at the Millennium Summit in 2000. While in 1996, the number of people suffering from undernourishment was estimated to be about 800 million people, FAO's latest estimate suggests that there are now 854 million people who do not get enough to eat every day. More than 6 million children die from hunger-related illness every year before their fifth birthday." http://www.righttofood.org/new/PDF/A62289.pdf

[17] Tim Bayliss-Smith, 1984. "Energy flows and agrarian change in Karnataka: the Green Revolution at micro-scale," in Bayliss-Smith and Sudhr Wanmali, eds. *Understanding Green Revolutions: Agrarian Change and Development Planning in South Asia.*

[18] A. Mushita and C. Thompson 2007. *Biopiracy of Biodiversity: Global Exchange as Enclosure*.

[19] The concentration ratio of the top four (CR4) companies in agribusiness is acknowledged to be high and getting higher. For details, see World Bank, 2008. "World Development Report 2008," p. 135-137.

2008,[20] in part due to the fall in prices caused by plentiful supply, which in turn is partly due to green revolution (high input, high yield) technology.

Furthermore, the widespread use of these technologies has been a cause for concern for many scientists. In most places staple grains, which were previously available in the form of dozens or hundreds of subspecies, are now only available in a few high yield varieties, thus increasing the threat of widespread crop failure due to disease or infestation.[21] Water tables in the most fertile places in China and India are stretched to the breaking point, in part because of reliance on irrigation-intense farming.[22] Reliance on chemical fertilizers has in some cases lessened the fertility of the soil, and exposed populations to harmful toxins. This, coupled with accessing water from lower and lower in the water table is presumed to have led to widespread arsenic poisoning in Bangladesh.

In short, the promises of the green revolution – increased productivity to feed a growing world – have not been met while the unintended adverse consequences from it far outweigh the negative effects that could have been foreseen at the time. In light of the history, one is left to wonder why most of the literature – especially most of the non-academic literature – seems to paint these technologies in such a good light.

The answer as to why that may be the case is revealed when we think about the beneficiaries, many of which are transnational corporations. Companies such as Archer Daniels Midland (ADM) and Cargill have been able to use the economies of scale which they can command – due in both cases at least in part to patronage by the U.S. government[23] – to corner the market in certain foodstuffs.[24] Meanwhile, companies like Monsanto have attempted – and occasionally succeeded – to make money from the patenting of new hybrid, genetically modified (GM) and conventional seeds. The most controversial of Monsanto's GM patents include a "terminator gene" that ensures that farmers must buy their seed from the company every season. Some have expressed concern that if the "terminator gene" were to, for some reason, infect non GM populations – as has been the case with transgenic corn, for example – there would be a risk of widespread crop failure.

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[20] For a detailed discussion, see Food and Agriculture Organization (FAO), 2001. "Protecting small farmers and the rural poor in the context of globalization." http://www.fao.org/worldfoodsummit/msd/Y1743e.pdf

[21] For example, in the U.S., "95 percent of the cabbage, 91 percent of the field maize, 94 percent of the pea and 81 percent of the tomato varieties apparently no longer exist." Food and Agriculture Organization (FAO), United Nations, 1996. *Report on the State of the World's Plant Genetic Resources for Food and Agriculture*, prepared for the International Technical Conference on Plant Genetic Resources, p. 13-14.

[22] The Yangtze River in China, which once reached the sea nearly year round, now only reaches the sea for about one third of the year, or 138 days. See Erling Hoh, 2002. "Red Alert for Yellow River," *San Francisco Chronicle Foreign Service*.

[23] A 1995 Cato Institute report claims that over 40% of ADM's profits come from products which are "heavily subsidized" by the U.S. government. See James Bovard, 1995. "Archer Daniels Midland: A Case Study In Corporate Welfare." http://www.cato.org/pubs/pas/pa-241.html

[24] While overall estimates are hard to come by, the NGO GRAIN estimates that for the biofuel crops – maize, sugar, palm and soy – big agribusiness can control between 25-80% of the global market, depending on the commodity. See GRAIN, 2007. "Corporate Power: Agrofuels and the expansion of Agribusiness." http://www.grain.org/seedling_files/seed-07-07-3-en.pdf

India – "Success story?"

Many discussions about agriculture in Africa bemoan the fact that Africa has never had access to the green revolution technologies that have led to a boom in agricultural production in Asia and especially in India. For example in Jeffrey Sachs' *The End of Poverty*, the author laments that "donors have woefully underfunded the scientific efforts towards improved [high-yield] varieties appropriate for African conditions," whereas with donor support "Asian farmers were able to adopt high-yield crop varieties that produced the famous Green Revolution…."[25]

While the numbers in terms of food production and economic growth may look promising from a distance, a closer look reveals that the Asian agricultural sector is nothing to aspire towards. Take the example of India – about which most has been written. In the years prior to the advent of the Green Revolution, land reform and the end of the *zamindar* system (a landlord-serf property scheme implemented by the British) began a shift towards small scale localized food production systems that may have been able to meet the demands of a growing Indian population. Those developments were nipped in the bud as India adopted green revolution policies at the behest of USAID, the Rockefeller foundation and others. [26]

After a few years of these programs, 10% of India's arable land was taken up by one crop – wheat. Fifty per cent of that wheat was of the high-yield varieties brought to India by U.S. scientists. This wheat produced on average a 40% greater yield than the indigenous varieties, but required three times as much water, and extremely high levels of chemical and organic fertilizer as well as chemical pesticides. This increased yield of staple crops did not decrease food insecurity, as thousands died of hunger in the early part of this decade (a phenomenon unheard of since the 1960s) at the same time as the government debated dumping thousands of tons of grain into the sea to make room for future surpluses.[27] Sustained use of these practices has led to considerable soil erosion and desertification in some areas.

Today, numbers tell a troubling story with regard to Indian agriculture. Fluctuating prices mean that small farmers often go into debt at the beginning of a season in order to buy inputs (fertilizer, pumps for irrigation, seed, etc.). Whereas in years past, farmers' fortunes depended in large part on the weather conditions, now a small farmer can usually be assured that his or her fate will be poor. If the crop is good, supply will be plentiful and the market value will be so little as to barely allow the farmer to break even. If the crop is bad, the farmer will either be ruined or will still be forced to undersell his or her crops in order to compete with larger farmers who can afford to have smaller margins. In this way, life for small Indian farmers has been a cycle of debt since India adopted liberalization policies in the 1990s.

To the extent that there has been growth in the agricultural sector, it has been large farmers who, in places like the state of Punjab, have prospered. Using high yield varieties, mono cropping, irrigation, and fertilizers, they have been able to apply green revolution techniques for huge profits. Like their analogues in the U.S. – Cargill and ADM – they are also the ones who

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[25] Jeffrey Sachs, 2005. *The End of Poverty: Economic Possibilities for Our Time*, p. 70.
[26] Vandana Shiva, 1991."The Green Revolution in the Punjab," *The Ecologist*, vol. 21, no.2
[27] Bryan Newman, "Indian Farmer Suicides – A Lesson for African Farmers," Food First, http://www.foodfirst.org/backgrounders/winter2006. One reason for this phenomenon, in addition to over-reliance on market mechanisms, is inadequate infrastructure to transfer food from one region to another.

understand best how to use input subsidies and other government agricultural incentives, and therefore also receive the lion's share of government patronage.

For economists and academics, the Indian green revolution engenders much debate. Were there other less harmful methods for increasing food production? Have the net impacts of consistent grain surpluses been a net benefit or a net harm to the Indian population? Academics can argue *ad nauseum* in favor or against any position on these subjects.

But for those who have lived through it, the Green Revolution is not an academic debate. Between 1997-2005, the Madras Institute of Development Studies estimates that over 150,000 Indian farmers committed suicide because of the cycle of indebtedness in which they found themselves.[28]

The Revolution is Green (Millennium Remix)

It is frightening to think that AGRA is proposing to follow a path that has led to such dire straits for small Indian agriculture. Yet to judge by the rhetoric, that is exactly the coalition's plan. Prominent global figures associated with AGRA including Bill Gates, Jeffrey Sachs, Kofi Annan, and others announced in grandiose terms that "the problem" in Africa is the fact that Africa never went through a green revolution.

In the context of the modern agro-science, any green revolution in Africa would be likely to include two extremely controversial and potentially dangerous aspects: the patenting of seeds and use of genetically modified plants. Although Kofi Annan, head of AGRA's board, has publicly denied it,[29] early indications are that these technologies will be part of the push for a new African Green Revolution.[30]

Though AGRA has been careful to sidestep the issue as much as possible, the current push for a new green revolution in Africa is almost certain to include a push for Genetically Modified Organisms (GMOs). Under fire from scientists and the general public who are concerned about unforeseen ramifications of injecting frog genes into tomatoes, multinational biotech companies and the U.S. government have invested time and money attempting to make the case for biotechnology. The U.S. has been an avid supporter of GM crops and has exercised its influence through the World Food Program and other NGOs by supplying GM grains in food aid and has even gone as far as diplomatically pressuring countries like Zambia that refused GM food aid.[31]

Most farmers in sub-Saharan Africa lack access to natural resources, credit, information and external inputs. Though they produce lower yields than hybrid varieties, traditional farming

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[28] P. Sainath, 2007. "Farmer Suicides Rising, Most intense in four states," *The Hindu*.
[29] Annan's exact words in 2007 were: "We in the alliance will not incorporate GMOs in our programmes. We shall work with farmers using traditional seeds known to them." Cited in *Business Daily Africa*, July 17, 2007. http://www.bdafrica.com/index.php?option=com_content&task=view&id=1955&itemid=5811
[30] It is worth noting that about ten days after Kofi Annan made this statement, agribusiness interests in Africa issued a statement welcoming AGRA's "clarfication that the GM technology has an important role to play." Africa Bio et. al. 2007. http://www.africabio.com/pdf/Africa%20welcomes%20AGRA%20clarification.pdf
[31] Anuradha Mousseau, 2005. "Food aid or food sovereignty? Ending world hunger in our time." http://www.oaklandinstitute.org/?q=node/view/224

techniques have been successful in feeding Africa for millennia.[32] The informal modes of farmer interaction and exchange of plant material like seeds are a critical component of this system and crucial to its survival.[33]

Biotech companies and the armies of scientists that benefit from them have long argued that GM crops will reduce the use of pesticide on the African continent. Since the advent of structural adjustment, pesticides and fertilizers have largely been too costly for small African farmers to afford. As there is not the kind of dependence on inputs present in places like India, this argument for the use of GMOs makes little sense. The claim itself that GM crops will reduce inputs is also highly contested. A February 2008 Center for Food Safety/Friends of the Earth Study argues just the opposite, calculating that GM crops actually increase pesticide use.[34]

Unlike those plants modified to produce their own "natural pesticides," some GM crops are designed to be resistant to herbicides, allowing farmers the freedom to spray weed killer without concern for damaging their crops. In most cases, the same company that designed the herbicide resistant crop produces these chemicals. Therefore, a growth in the number of people that plant these varieties should result in a rise in the amount of pesticide and herbicide sold.[35] This reflects the business model of large agricultural corporations – replacing traditionally locally produced fertilizer (manure) and pesticides (sometimes predatory insects) with a cocktail of inputs that farmers must purchase. Even GM crops proponents admit that this may drive the cost of planting GM crops out of the reach of poor farmers.[36] Nearly all the GM crops developed for the African agricultural market are not oriented towards the need of Africa's small-scale farmers and (perhaps fortunately) only 1% of GM research is aimed at crops used by poor farmers in poor countries.[37]

Science vs. Nature – GM Sorghum in Africa

One example of the controversies likely to crop up during the push for a green revolution in Africa can be seen in the development of hybrid and genetically modified varieties of sorghum.

Sorghum is a staple crop in much of Africa and is used in the making of breads, porridge, beer and as fodder. In its raw form, the protein in sorghum cannot be digested by humans, and many sorghum recipes therefore involve some level of fermentation, after which the proteins are digestible.

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[32] A. Van Huis and F. Meerman, 1997. "Can we make IPM work for resource-poor farmers in Sub Saharan Africa?" *International Journal of Pest Management*. Vol. 43, No. 4, p. 313-320.
[33] A. Goldman, 1995. "Threats to sustainability in African agriculture: searching for appropriate paradigms." *Human Ecology*, Vol. 23, No 3.
[34] Center for Food Safety and Friends of the Earth, 2008. "Who benefits from GM crops?" http://www.foe.co.uk/resource/briefings/who_benefits.pdf
[35] S. Rix and R. Dennis, 2003. "GM crops in Australia: A critique of the economic modeling," *Journal of the Australian Political Economy*, No .52.
[36] D. Delmer, 2005. "Agriculture in the developing world: connecting innovations in plant research to downstream applications," *Proceedings of the national academic of sciences of the United States of America*. Vol. 102, No. 44, p. 15739-15746.
[37] T. Egziabher, 2003. "US challenge on GMOs threatens Africa." *Business Day (New Zealand)*. http://www.mindfully.org/GE/2003/Tewolde-Egziabher-GMOs12sep03.htm

Varieties of sorghum are found on all continents, but the biodiversity in Africa is perhaps unparalleled.

> *During thousands of years, farmers have selected varieties to match their local conditions and food preferences. These traditional types are already remarkable for their diversity. In Sukumaland in Tanzania, for instance, a single researcher once counted 109 named cultivars—all of them in common use. In Samaru, Nigeria, more than 100 local types have been identified. And in the Lake Turkana area of Kenya there is such a variety of distinctly colored sorghums that just by looking at a grain, farmers claim that they can identify who grew it—a form of "natural bar-coding" that is said to ensure against theft. For Africa as a whole, the number of distinct sorghums must range into the many thousands.*[38]

Furthermore, sorghum seeds are dried, treated and traded through informal social networks that serve not only to ensure continued biodiversity but also act as a kind of insurance against disease.[39] Might a deepening of this existing culture of trade within Africa (where farmers trade seeds at "weddings and funerals")[40] represent an alternative path to liberalization to achieving food sovereignty and food security?

The approach pursued by the Consultative Group on International Agricultural Research (CGIAR, which was originally established by the World Bank), the Gates Foundation and biotech companies dismisses such a scenario in favor of technologically driven solutions. These institutions and others are working on a set of "super sorghum" projects, also known as the "African Biofortified Sorghum" project.[41] While money from the Gates Foundation and the "generous" donation of the seeds by Pioneer Hi-Bred International (which they value at $4.8 million in potential intellectual property earnings) mean that the African countries in which the project is taking place pay very little, some have questioned the commercial implications of the project itself. Future patents would undoubtedly be held by private interests (with Pioneer taking the lead), and sorghum has huge potential not only in the U.S. and China, where it is used as a feed crop, but also in India and other parts of Asia, where it is a potential biofuel.[42] The commercial implications of these projects are troubling because they imply a conflict of interest (why are agrofuels being discussed if the goal is expanded food supply?) and because the realization of these plans may lead to a loss of the amazing genetic wealth of Africa.

Growing food may be a good business for some, but agriculture is fundamentally different from other businesses. Questions of supply and demand, while important, should be secondary to questions of life and death. Where trade in food is involved, it is not just food security but food sovereignty that is at issue, for food can be a tool of political leverage. Many countries and many communities want to see food production as something other than the use of the latest technologies to maximize comparative advantage in order to compete in an open market.

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[38] Board on Science and Technology for International Development, Office of International Affairs, National Research Council, 1996. *Lost Crops of Africa*, *Volume 1; Grains,* p. 146.
[39] GRAIN, 2007. "Sorghum: a crop to feed the world." http://www.grain.org/seedling/?id=468#_13
[40] Ibid.
[41] ABS Project, 2008. http://www.supersorghum.org
[42] Pioneer is also associated with ICRISAT, which is already involved in biofuel production in India and plans to use sorghum in future endeavors, possibly in Africa. See http://www.icrisat.org/Investors/wit_5/wit_5.htm

Yet this is exactly the view taken by a broad spectrum of actors – from the World Bank to the Gates Foundation to Monsanto – who are advocating a "new green revolution" in Africa. These groups, some of whom may be approaching the issue with altruistic motives and some of whom are clearly involved for profit, assume that certain market fundamentalist policies will be in place and propose solutions to either mitigate the damage that those policies will cause or to generate profits for elites (whether in Africa or outside Africa).

Admitting Our Ignorance: the Hubris of Western Science

While the biotech companies' choice to use the push for a green revolution to maximize their own profits may be reprehensible, there is at least some intellectual honesty about it. After all, corporations do not pursue altruistic motives, they maximize profit and market share, and in the U.S. this is a principle of corporate law.

What of the various NGOs, foundations and other "altruistic" actors in this story? Some of them represent the same interests as the private sector, and many of the foundations hold considerable investments in biotechnology companies. Still, others undoubtedly believe that they are actually "saving Africa" by funding much needed technology.

The hubris that is needed to hold such a position might be hard to fathom if it were not so common. The human species is estimated to have started farming more than ten thousand years ago. While not all cultures have such a long agrarian history, farmers the world over are the inheritors of agricultural practices that are both technologically advanced and specifically suited to local conditions. While traditional farmers have a knowledge base dating back thousands of years, the modern agricultural sciences trace their origin to the work of Gregor Mendel, who lived about 150 years ago, and whose work was popularized about 100 years ago. While there have no doubt been important discoveries during this time, there is an inherent bias both within the agricultural sciences and in the larger, non-farming community to disregard traditional knowledge that does not conform to a Western conception of science.