

Sustainable Agriculture for a Food Secure Third World.

Spring, 1999, by Ismail Serageldin

The centrality of the rural is often forgotten, particularly by policy makers in industrialized countries, where most people live in urban centers. Their developing country counterparts frequently follow this lead, exhibiting an urban bias in their approach to development. And yet, to ignore or play down the importance of the rural sector as a component in development is a tragic mistake, because most of the world's poor live off the land. I intend, therefore, to explore some crucial aspects of the rural: the need to rethink resource uses, the role of research, and the future contribution of the rural sector to sustainable agriculture as the basis of food security. Let's look at the current context--which is forbidding.

The world population increases at an average rate of three persons per second, every second of the day.(1) This amounts to an increase of 90 million people a year--an enormous expansion in many parts of the world in which population density is already severe. Over the next 30 years, the population of Indian cities will be increased by an amount that is more than twice the total population of France, Germany, and the UK combined.(2) Comprehending and preparing for such rates of growth globally is the first part of the challenge. The second part of the challenge is to ensure that this population has access to food in adequate quantities at adequate prices, everywhere, at all times, and to produce this food in a way that does not destroy the environment on which we all depend. This is the triple challenge we face, and my emphasis here is on the last two facets that combine to form the challenge of sustainable food security.

We cannot meet this challenge by producing less to keep the environment unaffected by agriculture. People must be fed, no less than the environment must be nurtured. This means that we have to produce differently, not less, while rethinking resource use. It is a given that we will have three billion more people on the planet before the population of the world stabilizes, and therefore it is a major challenge for us to figure out how food supplies to meet their needs are going to be provided. The problem is not going to be resolved by producing more in the industrialized countries and shipping it to where it is needed, because poverty inhibits trade. It will not be resolved unless we successfully transform agriculture at the smallholder level in the developing countries.

This is a formidable and complex task that involves policy, research, tools, and social and economic reality. And the realities are stunning. Today, 840 million people are going hungry, two billion people are malnourished in terms of iron deficiencies, and as many as 30% of the world's population are at risk of iodine deficiency (FAO, 1996). Such an incidence of malnutrition has profound effects on children as they grow up. It is unconscionable that we have a situation where enormous production and food surplus exists in different parts of the world and, at the same time, there are people who suffer the indignities of hunger.

In the last century, there were people who looked at the condition of slavery and said that it was unconscionable and unacceptable and that it must be abolished. They were known as the abolitionists. They did not argue from a position of economic self-interest or incentives; they argued from a sense of moral outrage. I believe that all of us privileged with abundance should look at the condition of world hunger and say that in this day and age, as we enter into the new millennium, it is unconscionable and unacceptable--indeed, obscene that millions should continue to be hungry. We must therefore all become the new abolitionists. It is not enough to accept halving the number of hungry people in the world as a target, and to consider ourselves successful if 420 million people in the human family are denied the most basic of basic rights, which is food. That is just not acceptable.

So how do we go about it? The abolition of hunger is a much more complex task than the abolition of slavery. Food security requires change along a number of different axes. We must consider not just production but access. That is not to say that production is not important--shortages in production lead

to increased prices and decreased access. We must consider not just output but the production process, which is where sustainability comes in. If we erode the soil, parch the land and, in the process of producing, destroy the forests, we cannot sustain production.

Then, again, the right technology while useful, has to be set in an effective policy framework. We must consider land reform, access to resources, access to water, and other issues that must be balanced not just globally but also within countries, by national policies, and not even just nationally but from community to community and household to household. Remember that in the United States, champion food producer of the world, there are still households and individuals suffering from hunger. We must also consider the rising phenomenon of urbanization and the urban poor, and finally the nutritional content of the food. As Nevin Scrimshaw reminded us, the quality of the food consumed is as important a factor in human development as the amount of food available (Scrimshaw, 1989).

Dealing with that complex array of issues takes us again, if we think of the context and face the complexity, back to the centrality of the rural. It is stunning to find that industrialized countries have farm policies and farm lobbies but that developing countries, which have a majority of their population in the rural areas, in fact destroy the rural areas. Their farmers are the weakest and most vulnerable people in the world. How ironical it is that so much hunger pervades rural areas that are the primary food producing areas. The challenge for us is to recognize that these poor farmers, who are producing the bulk of the food in the world, are the ones who have no voice and whom we have to reach.

We need to be reminded also of the inequities that exist between and within countries. The "champagne glass" representation of this situation (see diagram), made famous by the 1992 Human Development Report of the UNDP, shows that the richest 20% of the world receives 80% of the world's income. The remaining 80% of the world live on 17% of the world's income, and the poorest 20% live on less than 1.4%. That gap is growing. The richest 20% used to be 30 times as rich as the bottom 20% in the 1960s; they are now over 60 times as rich (UNDP, 1998).

Think about it. Think of the moral outrage that we should have about the issue of food, because the reality is that 1.3 billion people live on less than a dollar a day. If that is increased by a single dollar a day, we have three billion people living on less than two dollars a day(3) in conditions that are beneath any definition of human decency.

Despite the very rapid increase in urban populations, worldwide, rural populations will in fact still be the majority in absolute terms in the developing world until 2015. In terms of poverty, they represent a great deal more than just numbers. The bulk of the poor are still in rural areas, most of them in what is known as "less-favored" areas--areas without adequate rainfall, without irrigation, with less fertile soils, etc. It is very difficult to see how we can prime the pump to increase the income and improve the well-being of people in such landscapes, but if we don't reach them, we will not be able to cope with the problems of food insecurity.

Additionally, we need to remind ourselves that agriculture, the backbone of the rural world, is the primary interface between human beings and the environment. Some 70% of the land, 80 to 90% of the water in developing countries, and the biodiversity in them, is used by the farmers. This is the reality with which we deal. It is for this reason that agricultural transformation, if it will be fully effective, must take place at the smallholder level in the developing world. Policymakers and scientists must work in the closest possible partnership with such farmers--farmers with backbreaking work and very little output to show for their harrowing effort.

The full contributions of the rural sector to a proper agricultural design or strategy would result in poverty reduction and widely shared growth, and would bring about greater food security and sustainable national resource management. And yet because these small farmers do not have political voices, they are ignored and the policy dice are loaded against them.

Rethinking resource use is a major issue in terms of sustainability in the medium- to long term, because it is a given that population pressure is going to be there. Before population stabilizes, we will have three billion more people on the planet, all of them in the developing world. The population densities are enormous. Bangladesh has 120 million people in an area equivalent to the size of Arkansas. It will have 200 million people before the population stabilizes. Half of the country is being flooded; the other half suffers from frequent drought. This is the reality of the incredible poverty we deal with.

As population expands and agriculture expands, the forests are being chopped down in order to make space for land cultivation. This results in an appalling loss of habitat and biodiversity. There is relentless pressure on the land, but also on all the other resources that we don't immediately think of, such as fisheries. In parts of Bangladesh, the large number of people engaged in fishing has resulted in highly depleted fishing grounds.⁽⁴⁾ But that is a reality of the world that we are talking about. This expanding human presence is having an enormous impact on all the major ecosystems of the world.

This is a problem because people have not been thinking about the complexity of the ecosystem or the need of the farmers. They have looked at only one dimension of food production: yield, which is usually expressed in terms of tons of food produced per unit area of land. It is time we started thinking in terms of output per units of water, of energy, and of labor--this will make a major difference in how we think about the issue of the future.

If we look at land, the most precious of all resources in terms of what it contributes to life, we see that the manner in which we are mismanaging soil fertility and allowing soil erosion to occur, and then shifting cultivation to new locations to keep ahead of the damage, is not only destroying our biodiversity system, and our forest ecosystems, but is causing numerous problems by reducing the amount of arable land available. So intensification of agricultural production through such means as high-yielding crop varieties has great value beyond just the amount or the diversity of the food that it produces--it also saves land.

Unprecedented savings in land use have been made in many countries, including the US, through the application of high yielding technologies. Norman Borlaug, the "engineer" of the "green revolution," points out that China would have had to increase its land-use more than three-fold and India by about twofold to achieve the harvests of 1992, had the new high-yielding technologies not been available (see diagram).

The same situation exists with water. We tend to think of the earth as the "blue planet," but fresh water is a very scarce resource. Only 2.5% of the water available on the planet is fresh water; the rest is salt water. Of that 2.5%, two-thirds are glaciers, ice caps and deep aquifer; of the remaining one-third, two-thirds are lost to evapotranspiration and the remaining 47,000 or so cubic kilometers in the amount flowing toward the sea. People have tried to control it, but the amount saved with dams and so forth comes to only about 9,000 to 14,000 cubic kilometers annually (Seckler et al., 1998).

That is the amount of fresh water that the whole world has. Not only is it poorly distributed, but it is already being very widely used. So the available supply of fresh water, regardless of where it is in different parts of the world, is going to be a big problem if we have an increase of three billion people, and an increase in consumption, which is associated with rising incomes. So on a per capita basis, keeping in mind the continual population increase, the availability of water is dropping very rapidly. The figures differ widely among regions. In North America, it is approximately 10,000 cubic meters per person per year, but in a country like Egypt it is 1100, and in Jordan it is down to 260. That covers water use for all purposes--agriculture, industry, municipal, and so on. To put this in context, we generally tend to think of 1700 cubic meters per person per year as the threshold of water problems, and a thousand cubic meters as being the level of chronic water stress (Falkenmark et al., 1989). The bulk of that water is being used in agriculture, whether traditional or modern. It is there where water wastage needs to be stopped, though on the industrial side we also have to stop the pollution.

If we start to think a little bit differently about agriculture, we end up with an unusual result. Most people know that irrigated land produces more crops per unit of land than unirrigated or rainfed land. But if we think in terms of "crops per drop," we find that rainfed land produces 0.3 kilogram and irrigated land 0.8 kilogram per cubic meter, but supplemental irrigation produces 2.2 kilograms per cubic meter. Suddenly we have a totally different perspective than simply expanding irrigation at all times.

Now let us look at energy. When we examine the modernization of agriculture in the United States and other industrialized countries, we consider it a very efficient type of agriculture. But we have not really factored in all the energy costs. It is not just energy used by farm machinery that is part of the calculation, but also the sum of all the energy elements of agriculture: production, disposing of residues, energies in production, and energy content of fertilizers and other agro-chemicals. These are the things that have to be considered in the discussion and pursuit of sustainable agriculture.

The issue of inorganic fertilizer use is one that has been much debated, and that varies enormously among regions. In some African countries there is room for increase, but certainly in some other areas, such as parts of Asia, fertilizer use is already excessive, leading to nitrate contamination of water bodies and other environmental problems on the land. So rather than give a blanket condemnation of fertilizer use, as some do, I think it's important to look at it regionally.

If we add labor, then we get a totally different picture as well. In fact the bulk of the work in agriculture in the developing world, is backbreaking work, and usually done by women. It takes an enormous amount of labor, usually at the expense of the wellbeing of the mother and the child.

On top of looking at these different dimensions, we should look at the synergies that exist in agriculture, livestock, agroforestry and aquaculture, because many of the smallholder farmers are engaged in a farming system that integrates these activities. In dealing with this, we need a "doubly green revolution." A term coined by Gordon Conway, it involves the use of new but genetically diverse crop varieties, minimizing use of agro-chemicals through integrated pest management and other techniques, and improving on farm water use efficiency and land management. This is the challenge of rethinking the paradigm for sustainable agriculture and food security: to create integrated farms at the smallholder level that address all these issues, that reduce the use of chemicals, and that increase the output of food in a sustainable manner.

Such a system of agricultural production requires research, particularly publicly funded research as opposed to privately funded, commercially driven products, because the bulk of the people we want to reach have no purchasing power to speak of. What we need to do is contextualize crop research in the ecosystem, in the socioeconomic reality, and in the farming system. We cannot just do rice research or maize research; we must take into account the gender realities, the smallholder farmer, the land-tenure systems, the access to credit.

There is, as well, the genetic imperative, which has to be taken into account. The purpose of this work is to bring the best of science, the most cutting-edge of science, to serve the needs of that woman farmer, the smallholder farmer in the remote areas of Africa, who carries the baby on her back, who produces the food, who takes care of the family, and who is the custodian of the environment on which we all depend.

To make this happen, research is essential but not enough. We also need to help formulate appropriate policies. And the reality of the policy is very simple: Agriculture in the developing world is being plundered by direct and indirect taxation of the poorest farmers to subsidize urban spending. What we need is to remove the policy bias--we need macroeconomic and trade policies that do not discriminate against agriculture; sectoral policies in banking, industry, transport, and so on, that do not raise the costs of agriculture; agricultural policies that do not distort input-output markets; and above all policies that are pro-smallholder farms. So the major transformation that will be needed, is to be pro-small farmer, for as I noted earlier, it is the smallholder farmer who will make a difference in whether or not

the 21st century will see the abolition of hunger and the evolution of a food-secure world with sustainable agriculture.

This means that policy also needs to cover institutions overseeing the rule of credit, irrigation, drainage, marketing boards, and so forth. All of these institutions have tended in the past to be driven not so much by the private sector as by the public sector, by governments in developing countries. They have tended to be centralized, fragmented, bureaucratic, disempowering, insensitive, and inefficient. We need different kinds of institutions. We need bottom-up institutions, where people take charge of their own lives and their own destinies. We have seen many of them work. A user's cooperative of farmers has taken charge of the irrigation system in Mexico so that they, the farmers themselves, are managing their own irrigation system. There is an organization of women farmers in Africa managing rural credit, and there are many other examples of the empowering reality of solidarity groups working at the grassroots, enabling institutions to be much more responsive, accountable, and transparent about the conduct of their business.

And so, with these tools, which we now know something about, we can move forward. It is not beyond our ken to abolish hunger in our lifetime. We should not be satisfied with trying to reduce it by half. We should be determined to become the new abolitionists, and we should be doing it in a manner that creates a foodsecure world--partly by improving agriculture and working closely with small-holder farmer; partly by creating collaborations in science for the public good; partly through true collaboration on a global scale that recognizes that the rich cannot turn their backs on the poor within countries or between countries. Above all, we should keep in mind the smallholder farmer. She needs all the help that she can get in terms of policies, technology and support of institutions, for she is the one who is going to ensure that future generations will live in a food-secure world. By helping her, we will have not only helped future generations but we will also be acting as the stewards of the earth, this earth that--as the old truth tells us--we did not inherit from our parents, but borrowed from our children.

Notes

(1) Calculation based on UN population projections.

(2) Ibid.

(3) Calculation based on World Bank data.

(4) Data presented by the International Center for Living Aquatic Resources Management (ICLARM) at CGLAR International Centers Week, October 1998, Washington DC.

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