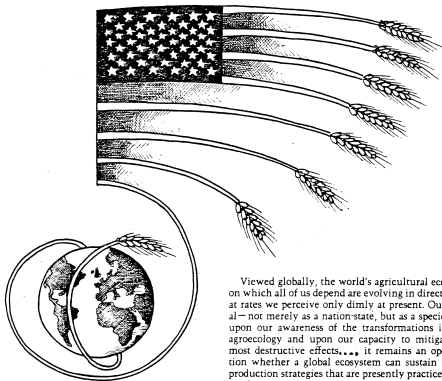


food, famine, and the frontier mentality

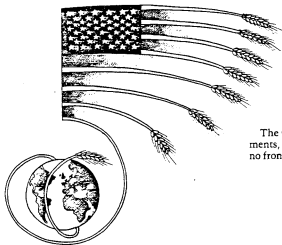
Timothy C. Weiskel



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However man organizes himself in communities or nation-states, he needs to eat to live and he needs food to eat. These common-sense facts at first seem unrelated to the complex political problems of today, but such banalities may form the fundamental reality of intercommunal and interstate relations in the very near future. To cite just two examples: Drought and famine in localized regions of the African Sahel became world issues in the mid-1970s, and the three-year production shortfall in Soviet wheat harvests currently places demands on United States food production systems that have yet to be fully appreciated in the political arena.

Viewed globally, the world's agricultural ecosystems on which all of us depend are evolving in directions and at rates we perceive only dimly at present. Our survival—not merely as a nation-state, but as a species—rests upon our awareness of the transformations in global agroecology and upon our capacity to mitigate their most destructive effects. For it remains an open question whether a global ecosystem can sustain the food production strategies that are presently practiced or currently proposed.

Since many of us consider the "food problem" only in times of crisis such as the periodic or localized famines in Third World countries, the "issue" may appear essentially one of underproduction. It seems that people in some parts of the world don't produce enough food to eat. Perhaps more ominous is that these localized and

occasional famines seem to occur with increasing frequency and to involve greater numbers of people. Some observers regard these regional crises as premonitions of worldwide crises. As one recent study has pointed out:

...economists at the International Food Policy Research Institute predict that by the year 1990 production of staple food crops in developing countries will fall short of food demands by from 120 to 145 million metric tons (t), 3 times the 37 t shortfall of 1975. Hardest hit will be the poorest countries with per capita gross national product (GNP) in 1973 of less than \$300. Their food deficit will be 75 to 80 million t/year.

An obvious response to the problem of imminent underproduction is to give full support to all programs that promise to increase food production. Two broad strategies seem possible: bring more arable land into full use under available cropping systems or transform and intensify production on existing agricultural land.

The first alternative is, of course, the classic solution. Much of the history of conquest and imperial expansion—reflected most typically in "frontier" societies like the United States, South Africa, and Australia—has been entwined with the processes of extending existing agrarian systems to previously "underutilized" or purportedly "vacant" territory. This historically rooted experience has generated in these societies deep-seated cultural beliefs that, as we shall see, have limited

the scope of the imagination in coping with problems of an ecosystem.

In our current global ecosystem there is not much more land to be expanded upon profitably. While in particular cases wide new expanses of territory may be brought under cultivation, in global terms enormous amounts of cropland are being withdrawn from cultivation each year as urban and suburban areas convert former farms into housing projects, industrial zones, and shanty towns. The important figure in this double-ended process of land-use conversion, then, is the total net increase in land under cultivation.

But even where expansion is possible, the costs may prove prohibitive. When marginal lands farther and farther from population centers are brought into cultivation, major infrastructure and transport investments are required, adding to the price of production in these areas. The result is that even the most optimistic projections of increasing surface area under cultivation do not really address the issue of producing *affordable* food for the world's hungry people.

The other alternative that suggests itself is to increase the intensity of cultivation on existing cropland. Here, at least superficially, there appears cause for optimism. The systematic application of scientific technology to agriculture in Western countries since World War II has led to dramatic increases in total production on existing or even reduced areas of cropland. This has been accomplished by the development of mechanized techniques for planting and harvesting and the application of chemical pesticides and herbicides to reduce environmental constraints on the growth of desired foodstuffs. Perhaps most significant have been the systematic experimental breeding programs to foster the growth of usable portions of the plant or to increase the plant's overall responsiveness to particular kinds of growth-stimulating fertilizers. These new "high-yield varieties" (HYVs) virtually have displaced previous varieties of food crops in the Western world.

So successful have been these techniques in terms of total volume of production that to some observers they constitute a veritable "Green Revolution," comparable in scope to the "agricultural revolution" that transformed human societies when plants were domesticated some ten thousand years ago. The application of recombinant DNA research to plant species promises even greater changes. Journalists already speak of a "Second Green Revolution" in describing such experimental developments as the genetically engineered "pomato" (a potato-tomato fusion) or the prospect of a "meatato" (a hypothetical fusion of animal cells and the potato). It would seem that "thanks to science" human food production is on an entirely new plane.

Good Intentions

According to some observers, then, the overall productive potential of the Earth's ecosystem is assured with the breakthroughs afforded by the successive Green revolutions. Enormous surpluses can be generated where scientific techniques are applied; thus the "problem" becomes one of distributing these surpluses to the areas of food production shortfall.

Ideally, of course, this might work, and much of the

activity of well-intentioned food-relief programs in the West can be understood as attempts to implement this kind of "solution" to current and foreseeable food crises in Third World areas. The difficulty is that even if sharing surpluses is possible theoretically, it is all too often subject to bottlenecks and blockages that leave millions of people vulnerable to starvation. And quite simply, our technical capacity for agricultural production has outstripped our cultural capacity for sharing.

For this reason many Third World nations, along with sensitive observers in the relief organizations themselves, have sought to focus the attention of the world community again upon the problem of production rather than on distribution alone. They assert that relief programs will not solve problems of food shortage, at best they can only postpone them. What is worse, by providing cheap or free alternative food sources that compete with weak production systems already in place, relief programs may actually cripple and destroy local systems, thus creating ever larger food demands over time.

Third World nations that have experienced this kind of famine relief or whose food-import bills are mounting are beginning to address these problems with increasing urgency. Their goal is national food self-sufficiency. In many cases the amount of new land available for cultivation is small, and in fact the fertility of existing cropland is often rapidly deteriorating through soil erosion, leaching, waterlogging, and salinization.

Faced with the demand to increase total food production on available or diminishing land surfaces, it is not surprising that agricultural experts and government planners look increasingly to Green Revolution technology. In this process, agricultural planners in the Third World are actively encouraged by a host of well-meaning Western experts. It is as if the ethical impulse behind much of the well-intentioned relief work to distribute surplus food during the 1950s and '60s is now translated into an equally strong moral imperative to export the Green Revolution technology.

Ingrained Metaphors

The technology of the Green Revolution is, of course, designed to facilitate greater intensity of production on existing land surfaces; and in this respect it might be expected to foster a new outlook on global agroecology, totally different from the one that characterized the period of agrarian frontier expansion in the Western world. Ironically, this does not seem to be the case. On the contrary, newly developed technologies seem only to fuel the culturally ingrained metaphors of expansion and domination. Here again we may be witnessing a situation in which technological advances have outstripped the culture's capacity to cope with them. Thus the Green Revolution is said to have opened up new "frontiers" of production worldwide that beckon to us with the possibilities—indeed the imperative—of conquest. Sterling Wortman of the Rockefeller Foundation is quite explicit about it:

Needed now are concerted campaigns to move into the countryside not only with knowledge of new techniques and new varieties of crops and animals but also with roads

and power systems, with inputs such as fertilizers, pesticides and vaccines for animal diseases and with arrangements for credit and for marketing agricultural products.

This "move into the countryside" is a huge task, but Green Revolution advocates express nearly unbounded optimism that now whole technological packages can be exported instead of just food surpluses.

As in the initial stages of frontier expansion onto open land, so too with technological expansion onto the new tropical frontiers. In 1976 agricultural development expert W. David Hopper phrased it in these terms: "As one considers the tropical farming world and the technology now available or soon to be available, there can be no grounds for pessimism about the latent potential of the world to feed increasing numbers of people for a long period ahead." Writing in a special issue of *Scientific American*, he went on to suggest that no longer is it nature that exercises significant constraints on production, but only men.

It is important to recognize that the world's food problem does not arise from any physical limitation on potential output or any danger of unduly stressing the "environment." The limitations on abundance are to be found in the social and political structures of nations and in the economic relations among them. The unexploited global food resource is there, between Cancer and Capricorn.

Such a confident vision is compelling but somehow unconvincing. On a technical level alone, agronomists warn that the tropics are not quite the "unexploited global food resource" that the technological optimists seem to think they are. Soils are generally poor in these regions, and the torrents of rainy seasons can impoverish them even further if extensive surface areas are exposed by mechanical manipulation. In addition, pests and competing vegetation can reproduce themselves very rapidly in tropical conditions, leaving large-scale monocrop systems particularly vulnerable to predation or blight. Some of these problems can be checked temporarily with the coordinate use of pesticides and herbicides, but the "co-evolutionary race" between host and pest takes place rapidly under tropical conditions.

These kinds of impacts, as well as irrigation systems and inmechanical farm equipment, cost considerable money. It is becoming clear that only the larger farmers with access to capital can afford the Green Revolution.

It is here, perhaps, that Green Revolution optimists

make their most serious oversight. Even where the production figures of the newly endowed enterprises show dramatic expansion, the food problem is not thereby solved. Displaced farmers crowd into sprawling urban areas, where they continue to reproduce themselves at staggering rates—in part, it has been suggested, to cope with the increased economic insecurity they experience after being uprooted from the land. With a large family there is always a chance that at least one child will find employment to support parents in old age.

In terms of the long-run impact upon global ecology, it is also apparent that there are real dangers in exporting the Green Revolution as a solution to the food problem. What is occurring is a radical reduction in the genetic variability of the world's crop systems as single strains of HYVs replace indigenous varieties of rice, wheat, corn, sorghum, millet, and others around the world. This "genetic collapse" leaves particular systems, and potentially the world's agroecosystem, vulnerable to climatic or pest problems on a scale previously unknown. Research scientists may well be able to keep one step ahead of these crises, but increasing reliance upon them to do so generates a dependency by Third World countries upon the centers of scientific research in the developed world.

In short, far from solving the food problem, exporting the Green Revolution may in fact work to heighten disparities between rich and poor in the Third World, increase the vulnerability of particular countries to pests and climatic irregularity, and further aggravate dependency upon the West for farm machinery, petrochemicals, capital, and scientific research.

The Green Revolution, with all its stunning achievements, does not open up "frontiers"—because there are no frontiers in a cyclical system. This point underscores a sobering fact: In the final analysis, *man cannot produce food; he can only facilitate the processes necessary for a plant to produce it.*

In short, the food problem will be solved only if it is reformulated within the framework of a global ecosystem, with metaphors of cyclical interchange replacing those of pyramidical production or frontier expansion. To survive as a species in our ecosystem requires that we subordinate ourselves to it, accepting our role as servant of exchange, not master of production.

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