

The So-Called Green Revolution

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Several weeks ago Gerald Klingaman, a gardening columnist for the *Morning News of Northwest Arkansas*, wrote this:

Economies of scale require that farmers get large or get out...

The basic business model that drives all of these [agribusiness] enterprises is the notion of doing things en mass. Mass production, mass marketing, mass consumption – all are staples of the modern economy. The margins might be small, but if you turn the crank enough times, you can make a living, and, if you really rev it up, you might become rich.

The farmers' market movement, which is gaining strength across the nation, is a backlash against the impersonal corporate structure of modern agriculture. But it still represents just a small portion of what we eat. The inherent market inefficiencies of small volume, diverse crop production probably will keep it on the sidelines as a major source of food for American tables.

Don't take this as a lament because I enjoy being able to go to the store to buy fresh fruit and vegetables in any season. And don't expect to see me smashing windows and burning cars over global trade issues. We live in a world marketplace, and to sustain long-term peace and stability of the world, rich nations like ourselves must give some of our largess to poorer places.

Klingaman is a retired horticulture teacher, so as much as I enjoy his gardening column, this is the kind of thing I'd expect to see: corporate agribusiness is inherently more efficient than small farming, America is a net exporter whose generosity "feeds the world," the Green Revolution is the solution to world hunger, etc. I had a conversation several years earlier with a retired agri professor who likewise repeated the party line of the agribusiness establishment. He started out making bald assertions to the effect that "the world would starve" without synthetic fertilizers and pesticides, mechanization, and Green Revolution seeds. But when confronted with labor-intensive techniques like deep digging in raised beds, that make intensive use of the land, he conceded that "oh, well, that's *different*; if those techniques were widely adopted it might work..."

Once we get beneath the surface, we find that none of the tenets of the official USDA/Cargill ideology can survive much scrutiny. As Frances Moore Lappé suggested in *Food First: Beyond*

the Myth of Scarcity (N.Y.: Ballantine, 1978), it's natural for Americans to infer superior efficiency from success:

But haven't big farmers proved themselves to be more efficient and resourceful than small ones? How else could they have gotten on top?

But that's a bit like asking how else that turtle could have gotten on top of the fencepost. We may be in a "world marketplace," but it sure isn't a free market. Agribusiness is a sector of the economy as state-subsidized and state-cartelized as Big Pharma and the military contractors. In the words of ADM's Dwayne Andreas, that patron saint of the world marketplace in agriculture:

There isn't one grain of anything in the world that is sold in a free market. Not one! The only place you see a free market is in the speeches of politicians.

Even in conventional, mechanized row-crop farming, economies of scale tend to max out when a single set of basic equipment is fully utilized—that is, at the level of a one- or two-farmer operation [W.R. Bailey, *The One-Man Farm* (USDA, 1973)]. The real difference in profitability comes from the channeling of state-subsidized inputs to large-scale agribusiness. As one farmer said, the only thing the agribusiness interests are more efficient at farming is the government. Dan Sullivan's seminar on "The Myth of Corporate Efficiency" at Saving Communities includes a discussion of family farms and corporate agribusiness, finding that while big corporate farms have somewhat higher output per man-hour, their output per acre is actually less than that of small farms. Ralph Borsodi did a study several decades ago, adding up the cost of all the inputs into home-grown and home-canned vegetables (including canning supplies and the prevailing wage for the gardener's labor), and found that they were still cheaper than vegetables from the supermarket. Home-grown and -canned tomatoes were 20–30% cheaper than the canned tomatoes at the grocery store [*Flight From the City*, pp. 10ff].

More recently, a post by Diane Warth at Karmalized raised many of the same issues about the Green Revolution in the Third World. She linked to a story about a wave of mass-suicides in Western Vidarbha province, India, by farmers who had adopted bt cotton.

As many as 212 farmers in Vidarbha had committed suicide during the period of whom 182 were from Western Vidarbha, VJAS president Kishore Tiwari said in a statement here today. Among the 182 suicides in Western Vidarbha, 170 were by Bt cotton growers, the statement alleged.

Over six lakh farmers from Vidarbha had sown Bt cotton on the assurance that the minimum yeild would be 20 quintals per acre, the statement said. However, the average yield per acre was only two to three quintals per acre, the statement alleged.

Also linked at Karmalized, this ZNet article by Vandana Shiva adds:

Monocultures and uniformity increase the risks of crop failure as diverse seeds adapted to diverse ecosystems are replaced by rushed introduction of unadapted and often untested seeds into the market. When Monsanto first introduced Bt Cotton in India in 2002, the farmers lost Rs. 1 billion due to crop failure. Instead of 1,500 Kg / acre as promised by the company, the harvest was as low as 200 kg.

Instead of increased incomes of Rs. 10,000 / acre, farmers ran into losses of Rs. 6400 / acre.

In the state of Bihar, when farm saved corn seed was displaced by Monsanto's hybrid corn, the entire crop failed creating Rs. 4 billion losses and increased poverty for already desperately poor farmers.

(On why the "Green Revolution" might not have panned out for small farmers, and on the misleading nature of the term "high-yield varieties," more below.)

Coming across that post was serendipitous, because I was in the middle of reading Frances Moore Lappé's *Food First*. I mentioned it in the comments, prompting Diane to write another post linking to a Lappé article in *The Nation*. It's subscriber only, so I'm waiting for the issue to show up at the public library. But Diane includes a quote contrasting the deadly results of the Green Revolution's top-down approach in India to the success of grassroots networks in Bangladesh:

With a living democracy frame for understanding hunger, it's possible to grasp at least some of the reasons Bangladesh is making faster progress in saving lives than is India, despite its greater hunger and deeper income poverty: Citizen action networks have spread to almost 80 percent of Bangladesh's villages, providing basic health training, schools and capital. Through the two biggest, the largely self-financing Grameen Bank and the Bangladesh Rural Advancement Committee, peer-backed micro-loans have gone to about 9 million poor people, mainly women, enabling many to birth their own village-level enterprises. Grameen reports that more than half of the families of its borrowers—the vast majority of the bank's owners—have "crossed the poverty line." Assuming BRAC's comparable impact, these rural Bangladeshis' self-directed enterprises have freed more than twice as many from poverty as the number employed in export garment factories. There, insecure jobs offer wages of 8 to 18 cents an hour. Yet the dominant frame doesn't differentiate these two paths; to Sachs, both place Bangladeshis on the economic "ladder."

In India hunger is being uprooted as well, but the real story isn't high-tech progress, so far creating only a million jobs in a country of a billion. The most meaningful breakthroughs are less flashy. In Kerala hunger is being conquered by participatory approaches that have achieved fairer access to land and education. And the People's Campaign of Decentralized Planning has trained hundreds of thousands of Kerala's citizens in budgeting and planning to create rural improvements. Throughout India women have built a network of cooperative dairies that in only three decades has lifted the incomes of more than 11 million households and benefited more than 100 million.

Similarly, Brazil's Landless Workers Movement has secured legal title to more than 20 million acres for a quarter of a million formerly landless families, creating self-governing communities whose enterprises and farms serve community-sustaining values. Infant mortality has fallen, and wages for members are many times higher than their former day-labor pay.

Third World agriculture today exists in the context of a colonial history where peasant cultivators were pushed off of the best land and onto marginal land, and the most fertile, level land was used for plantation farming of cash crops. It is a myth that Third World hunger results mainly from primitive farming techniques, or that the solution is a technocratic fix. Hunger results from the fact that land once used to grow staple foods for the people working it is now used to grow cash crops for urban elites or for the export markets, while the former peasant proprietors are without a livelihood.

And given the maldistribution of land through state-abetted land theft (either by colonial regimes or by landed oligarchies in collusion with Western agribusiness interests), the state naturally diverts inputs like subsidized irrigation systems (and most forms of technical support, infrastructure, and other development aid) disproportionately to the large plantations. The state's direct subsidies and loan programs are set up so that only large holdings, with access to preferential benefits like state-subsidized irrigation, can qualify.

Heavily state-subsidized agricultural R&D, likewise, is channelled in directions geared to increasing the profits of cash crop agriculture on the big plantations, rather than to increasing the productivity of small peasant holdings. (The following material relies heavily on Lappé.) The "high-yielding variety" (HYV) seeds associated with the so-called Green Revolution are normally productive only under the most favorable conditions, like those prevailing on the big agribusiness plantations. They are deliberately designed to be productive, in other words, under precisely the conditions provided by corporate agribusiness. They are not "high-yielding" in any generic sense, but rather high-response: highly responsive to certain inputs like irrigation and expensive chemical fertilizer. And they are also most responsive on the kind of especially fertile, well-watered land that just happened to be stolen by landed elites under the colonial regimes or post-colonial landed oligarchies. For that reason, Lappé prefers to call them "High-Response Varieties" (HRV).

The administration of Lazaro Cardenas in Mexico, during the 1930s, is a good example of the result when state policy is less one-sided. His agrarian reform, starting in a country where two percent of the population owned 97% of the land, resulted in 42% of the agricultural population owning 47% of the land and producing 52% of agricultural output. Under Cardenas, state loans and technical support were aimed primarily at the needs of small-scale agriculture. The result was an explosive increase in the rural standard of living. As for state-funded agricultural R&D,

The purpose... was not to "modernize" agriculture in imitation of United States agriculture but to improve on traditional farming methods. Researchers began to develop improved varieties of wheat and especially corn, the main staple of the rural population, always concentrating on what could be utilized by small farmers who had little money and less than ideal farm conditions.

Social and economic progress was being achieved not through dependence on foreign expertise or costly imported agricultural inputs but rather with the abundant, underutilized resources of local peasants... Freed from the fear of landlords, bosses, and moneylenders, peasants were motivated to produce, knowing that at last they would benefit from their own labor. [pp. 123–24]

The groups alienated by Cardenas—the great rural landowners, the urban commercial elites, and (as you might expect) the U.S. government—reasserted their political control under Cardenas'

post-1940 successor, Avila Camacho. Rather than small farms and cooperatives, development spending was directed, on the American model, toward

electric power, highways, dams, airports, telecommunications, and urban services that would serve privately owned, commercial agriculture and urban industrialization... [p. 124]

The Camacho administration, naturally, was heavily involved in the postwar Green Revolution. The direction of the new big research program was diametrically opposite to that under Cardenas.

Policy choices systematically discarded research alternatives oriented toward the nonirrigated, subsistence sector of Mexican agriculture. Instead, all effort went to the development of a capital-intensive technology applicable only to the relatively best-endowed areas or those that could be created by massive irrigation projects. [pp. 125-26]

Under Camacho, huge irrigation projects were developed for favorably situated land owned by big landed elites, and massive state subsidies were provided for the importation of mechanized equipment.

As Lappé writes, the Camacho approach could not coexist with that of Cardenas. The Cardenas agenda of increasing the productivity of peasant proprietors would have increased their standard of living; in so doing, it would have reduced the surplus going to urban and export markets rather than domestic consumption, and also reduced the flow of landless refugees to the cities. In other words, the Cardenas policies threatened the supply of cheap wage labor for industrialization, and the supply of cheap food to feed it.

The point to all this is not that Cardenas' version of state intervention was desirable, but 1) that the present system touted by neoliberals as the "free market" involves *at least* as much state intervention; and 2) that there is no such thing as neutral, politically immaculate technology that can be divorced from questions of power relationships. Criteria of technical "efficiency" depend on the nature of the organizational structures which will be adopting a technology. And the forms of state R&D subsidy and other development aid entailed in the Green Revolution artificially promoted capital-intensive plantation agriculture, despite

overwhelming evidence from around the world that small, carefully farmed plots are more productive per acre than large estates and use fewer costly inputs... [p. 127]

What's more, the high-response varieties developed by the Green Revolution crowded out equally viable alternatives that were more appropriate to traditional smallholder agriculture. HRVs are actually less hardy and durable under the conditions prevailing on subsistence farms—less drought-resistant, for example. Hence, the bad experience of those Indian farmers with genetically-modified cotton and corn varieties.

Locally improved varieties, in contrast, were specifically adapted to be productive under conditions of low rainfall, and more resistant to insects and fungi without costly chemical inputs. And a rural development agenda geared toward the interests of peasant proprietors would have emphasized, not increasing the yield of seeds in response to expensive irrigation and chemical inputs, but improving the soil. Technical improvement of traditional techniques, and integration

of intermediate technology into small-scale production (for example, wider use of crop rotation and green manuring with leguminous cover crops, and pest control through companion planting) would have drastically increased the per-acre yield of subsistence farms, at little cost. Treated human and animal waste, efficiently used, would have provided several times the amount of nitrogen in chemical fertilizers, at a tiny fraction of the cost. For an example of the spectacular results possible from labor-intensive techniques based on low-cost soil improvement, just consider the work of John Jeavons on intensive raised-bed farming.

The Green Revolution, coming as it did on the heels of land expropriation, channelled innovation in the directions most favoring the land-grabbers. It was a subsidy to the richest growers, artificially increasing their competitiveness against the subsistence sector.

Historically, the Green Revolution represented a choice to breed seed varieties that produce high yields under optimum conditions. It was a choice *not* to start by developing seeds better able to withstand drought or pests. It was a choice *not* to concentrate first on improving traditional methods of increasing yields, such as mixed cropping. It was a choice *not* to develop technology that was productive, labor-intensive, and independent of foreign input supply. It was a choice *not* to concentrate on reinforcing the balanced, traditional diets of grains plus legumes.

It's also significant that whatever increased productivity results from the Green Revolution has, as one of its primary effects, increased rents. The introduction of the Green Revolution into areas controlled by big landlords, with land worked by tenant labor, had an effect that Henry George could easily have predicted.

Third World hunger results, not from a deficiency in generic technique, but in a deficit of control over productive resources and decision-making power over what direction technical innovation is to take.

Elite research institutes will produce new seeds that work... for a privileged class of commercial farmers. Genetic research that involves ordinary farmers themselves will produce seeds that are useful to them. A new seed, then, is like any other technological development; it's contribution to social progress depends entirely on who develops it and who controls it. [p. 134]

The above considerations, I think, entitle us to call bullshit on Coasean arguments that justice in holdings doesn't matter, as long as they wind up in the "most efficient" hands. For one thing, it matters a great deal to the person who was robbed; it matters a great deal whether you're producing enough staple crops on your own land to feed your family, or instead holding a begging bowl in the streets of Calcutta or living in some tin-roofed shantytown on the outskirts of Mexico, while your stolen land is being used to grow export crops for those with the purchasing power to buy them. And as we've seen, there's no such thing as generic "efficiency" in the use of resources. The "most efficient" use of a piece of land depends mightily on who owns it, and what their needs are. An "efficient" technique for the land thief is entirely different from what would have been efficient for the land's rightful owner. Large-scale, capital-intensive, high-input techniques are only more "efficient" given the artificial objectives of those who stole the land.

And capital-intensive techniques that increase output per man-hour, but reduce output per acre, are suited to the interests of American-style agribusiness. They're perfect for large landowners who, as a historical legacy, have preferential access to large tracts of land and can hold significant parts of it out of use, but want to reduce their dependence on hired labor. In areas with underutilized land and unemployed population, on the other hand, it makes a lot more sense to increase output per acre by adding labor inputs. And this is exactly the pattern that prevails in small-scale agriculture. Lappé found, in a survey of studies from around the world, that small farms were universally more productive—far more productive—per acre than large plantations. Depending on the region and the crop, small farms were from one-third to fourteen times more productive. The efficiency of small proprietors working their own land, compared to plantation agribusiness using wage or tenant labor, is analogous to that of the small family plots in the old USSR compared to the state farms. Plantation agriculture is able to outcompete the peasant proprietor only through “preferential access to credit and government-subsidized technology...” [p. 189]

Follow-up:

Since I wrote the original Green Revolution post, I found Dave Pollard's link to this excellent article: “The Seven Deadly Myths of Industrial Agriculture.” My favorites:

Myth One — Industrial Agriculture Will Feed the World World hunger is not created by lack of food but by poverty and landlessness, which deny people access to food. Industrial agriculture actually increases hunger by raising the cost of farming, by forcing tens of millions of farmers off the land, and by growing primarily high-profit export and luxury crops...

...Industrial agriculture proponents spend millions on advertising campaigns each year claiming that people are starving because there is not enough food to feed the current population, much less a continually growing one. “Guess Who's Coming to Dinner? 10 billion by 2030” proclaimed an old headline on Monsanto's Web page. The company warns of the “growing pressures on the Earth's natural resources to feed more people” and claims that low-technology agriculture “will not produce sufficient crop yield increases to feed the world's burgeoning population.” Their answer is pesticide- and technology-intensive agriculture that will produce the maximum output from the land in the shortest amount of time. Global food corporations, they say, will have to serve as “saviors” of the world's hungry...

A deeper look at the root causes of hunger will reveal that any claim that world hunger is caused by a lack of food is simply a self-serving agribusiness myth. In reality, food production has kept pace with population growth. Studies conducted by the U.N. Food and Agriculture Organization (FAO) clearly indicate that it is abundance, not scarcity, that best describes the world's food supply. Every year, enough wheat, rice, and other grains are produced to provide every human with 3,500 daily calories. In fact, enough food is grown worldwide to provide 4.3 pounds of food per person per day, which would include two and a half pounds of grain, beans, and

nuts, a pound of fruits and vegetables, and nearly another pound of meat, milk, and eggs...

If we have plenty of food to feed today's population and to support population growth for the foreseeable future, why do 800 million people still go hungry every day? One basic cause is food dependence. The industrial system has, over centuries and in virtually every area of the globe, "enclosed" farmland, forcing subsistence peasants off the land, so that it can be used for growing high-priced export crops rather than diverse crops for local populations. The result of enclosure was, and continues to be, that untold millions of peasants lose their land, community, traditions, and most directly their ability to grow their own food-their food independence. Removed from their land and means of survival, the new "landless" then flock to the newly industrialized cities where they quickly become a class of urban poor competing for low-paying jobs and doomed to long-term hunger or starvation. The victims of enclosure are becoming ever more numerous. Just 50 years ago, only 18 percent of the population of developing countries resided in cities; by the year 2000 the figure jumped to 40 percent. Unless current policies change, by 2030 it is estimated that 56 percent of the developing world will be urban dwellers. A United Nations report has found that close to 50 percent of this urban population growth is due to migration, much of it forced, from rural to urban communities.

...Increasing agricultural output has little effect on the hungry because it fails to address the key issues of access to land and purchasing power that are at the root of hunger...

Yet another way that industrial agriculture increases hunger is by what it grows. The problem is that corporate-driven agriculture, after it "encloses" land and evicts the farm communities from these lands, does not grow staple foods for the hungry. Global corporations favor luxury high-profit items like flowers, sugarcane, beef, shrimp, cotton, coffee, and soybeans for export to wealthy countries. Local people are often left with nothing.

Myth Four – Industrial Agriculture is Efficient

Small farms produce more agricultural output per unit area than large farms. Moreover, larger, less diverse farms require far more mechanical and chemical inputs. These ever increasing inputs are devastating to the environment and make these farms far less efficient than smaller, more sustainable farms...

According to a 1992 U.S. Agricultural Census report, relatively smaller farm sizes are 2 to 10 times more productive per unit acre than larger ones. The smallest farms surveyed in the study, those of 27 acres or less, are more than ten times as productive (in dollar output per acre) than large farms (6,000 acres or more), and extremely small farms (4 acres or less) can be over a hundred times as productive.

In a last-gasp effort to save their efficiency myth, agribusinesses will claim that at least larger farms are able to make more efficient use of farm labor and modern technology than are smaller farms. Even this claim cannot be maintained. There is virtual consensus that larger farms do not make as good use of even these production factors because of management and labor problems inherent in large operations. Mid-sized

and many smaller farms come far closer to peak efficiency when these factors are calculated...

...It is time to reembrace the virtues of small farming, with its intimate knowledge of how to breed for local soils and climates; its use of generations of knowledge and techniques like intercropping, cover cropping, and seasonal rotations; its saving of seeds to preserve genetic diversity; and its better integration of farms with forest, woody shrubs, and wild plant and animal species. In other words, it's time to get efficient.

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