A Messenger from the South Brings Word to the North: There's a Better Way to Feed the World

A Conversation with Miguel Altieri
By Russell Schoch
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Miguel Altieri
Photo by Robert Holmgren

With starvation threatening one-sixth of the world's population, and the West's technological solutions called into question—the Green Revolution of the 1950s and 1960s failed to solve the problem, and now the Gene Revolution, or agricultural biotechnology, is under increasing attack—many think it's time for another way. Berkeley's Miguel Altieri, an associate professor of insect biology in the College of Natural Resources, has a world-wide reputation for his alternative solution: "agroecology," or sustainable agriculture, which respects the knowledge of indigenous peoples, protects the environment, and promotes social equity.

"I was trained in the West," says Altieri, "but after studying ancient agricultural systems, I realized that Western knowledge is inadequate to deal with the complexities of Third World agriculture." Altieri has an impressively broad range: he works in the fields alongside the world's poor farmers, writes influential books and articles about the principles he champions, and attends conferences around the world, speaking out against biotechnology and in favor of agroecology. His advice has been sought by peasants, a Prince, and the Pope.

Altieri came to Berkeley in 1980 to fill the post left vacant by the death of Robert van den Bosch, a professor of entomology from the 1940s until his death in 1978. Just before he died, van den Bosch wrote The Pesticide Conspiracy, which many have called a worthy successor to Rachel Carson's Silent Spring. His book attacked the marketing and use of pesticides and portrayed

modern agriculture as dominated by politics, not science.

The politics of agricultural science is also a key concern for Altieri. He warns against the increasing division in the Third World between the rich farmers who can afford modern technology, often used for producing export crops, and the poor farmers who lack capital and access to good land but who are often responsible for feeding their populations.

Altieri was born in Santiago, Chile, in 1950, to parents of differing politics and nationalities. His Italian-immigrant father, who was a tailor, had been a supporter of Mussolini; his Chilean mother, a progressive school teacher, was a socialist and a friend of Salvador Allende, who was elected President of Chile in 1970. While in high school, in the mid-1960s, Altieri spent a year in Los Angeles as an exchange student. Back home, he entered the University of Chile as a student of agronomy, a topic that did not capture his full attention until, in 1968, he took a course in ecology. After the Allende government was overthrown in 1973, Altieri went to Colombia, where he earned his master's degree, studying poly-culture (or mixed-crop) farming, at the National University of Colombia. By the time he earned his Ph.D. in entomology at the University of Florida, he had already published 24 articles in his field.

Altieri is a world traveler, spending six months of the year helping small farmers abroad, mostly in Latin America, the other six teaching at Berkeley. This semester alone, he has been to England to speak about sustainable agriculture at a conference organized by Prince Charles; to the Vatican for a meeting on the food needs of the developing world, where he met with the Pope; and back to Italy as a resident scholar at the Bellagio Institute, where he worked on the third edition of his pioneering text, Agroecology: The Science of Sustainable Agriculture—while there, he was invited to a meeting in Belgium on biotechnology and the poor. Last month, he traveled to Vancouver for a conference comparing conventional, organic, and genetically modified food.

Based in Berkeley, he considers himself a messenger from the South. "I work here," he says in his office in Mulford Hall, "but I

support groups there: non-governmental organizations, peasants' organizations, people who are promoting sustainable agriculture." His current message can be summarized in the title of his eighth book, Genetic Engineering in Agriculture: The myths, environmental risks, and alternatives, published last month.

What is the common understanding of the cause of world hunger?
Most people perceive the problem of hunger and malnutrition as a gap between population and food production.

Meaning too many people—six billion on the planet—and not enough food?
Exactly. But that's a Malthusian view of the world, which says that famine is inevitable because the population grows at a faster rate than food can be produced; there's no data that supports that view. In fact, today there's enough food in the world to feed nine billion people. The real problems are poverty and distribution: Three billion people live on $2 a day, and people lack access to land to produce the food they need.

Furthermore, most of the food that is being produced is fed to cattle. In the United States, seven out of ten pounds of grain are fed to animals. In Latin America, Asia, and Africa there are huge amounts of land that are devoted to soybean production for export to Europe to feed cattle—which, by the way, the Europeans are killing because of mad cow and foot-and-mouth diseases.

Seventy percent of grains in this country are fed to cattle?
Yes. And if it was possible to redistribute that food, so that instead of feeding cattle you fed people, you would immediately cease to see hunger.

What about the Green Revolution, the Western technological approach which used high-yielding crop plants, pesticides and fertilizers to increase production. Didn't this feed millions and millions of hungry people?

There’s no denying that the Green Revolution raised the total output of grains. But it was the big and rich farmers of the flatlands—the ones who could afford to pay for fertilizers, pesticides, and technical advice—that benefited from the Green Revolution. It wasn’t the poor farmers.

Some people say that if the Green Revolution didn’t happen, maybe we would have two billion people starving today. There’s no way we can know that. But the reality is that today we have one billion people starving. The levels of rural poverty in the Third World average between 50 and 70 percent; and these people live in marginal environments, on hillsides and in semi-arid areas, which were untouched by the Green Revolution.

In Latin America, 80 percent of the agricultural land is in the hands of 20 percent of the farmers; and this is the best agricultural land. And all those farmers are exporting their crops for feeding cattle in Europe. Twenty percent of the land is in the hands of 80 percent of the farmers, the peasants. But they are the ones who are producing 50 percent of the potatoes, 60 percent of the corn, and 70 percent of the beans. It is the small and poor farmers who are feeding the continent—not the large farmers.

What’s happening today, as globalization takes hold, is that countries are forced to become agro-exporters, to exploit their “comparative advantage.” There’s no reason for Chile to be growing corn when they can grow fruits to sell here in the winter when it’s summer down there. That’s their comparative advantage. But it doesn’t feed their own people.

The fact remains, there are 370 million rural households that are poor and exist in marginal environments. These people have a very important role in food security. And these are the ones I am interested in reaching.

What needs to be done for these small farmers ?

For small farmers in developing countries, it’s not important to increase the productivity of one crop, but rather of the whole system, because they grow many crops, many trees sometimes,

many animals. They're complex farming systems. But Western agronomists have been trained to understand agriculture from a unilateral perspective.

Let me give you an example: When I was studying in Florida, I went to Guatemala, to an international agricultural development project. There was an agronomist, an agricultural economist, and myself, a graduate student. We were interviewing some farmers. The main reason they brought me was because I speak Spanish [laughs].

The scientist saw that these farmers were planting corn every meter, and that it was full of weeds. Not only that, they were growing more than just corn; they were planting five seeds of corn and maybe three seeds of beans, with weeds interspersed among them.

And the American scientist said, "Your productivity is very low." He did some measurements and then drew up how they would grow it in Iowa—every six inches, and very dense. "Do this, and you're going to increase your productivity." All the farmers were watching, as I was translating, and finally one said, "And how do you feed your animals?" "What? They don't have animals [in the Iowa corn fields], they just grow corn." "Well, we do. And the grass in between is to feed the animals."

On top of that, these farmers were on hillsides, and the grass was protecting the soil. They were not interested in per-hectare production; they were interested in optimizing production of grain per plant, because they select the best seeds to keep for the next year. But all these reasons the peasant had for growing corn his way were just dismissed.

Wouldn't pesticides help the peasant farmer?

No. In the first place, he can't afford to use pesticides. Second, it is not desirable from an environmental or public health perspective—many pesticides still used in the South were banned in the North. In the United States alone, the social costs and the health costs of pesticides reach 8 billion dollars a year. These costs include human poisonings, elimination of pollinators and

other beneficial insects, fish and wildlife losses, and so on.

We're losing 33 percent of our crops to pests before harvest, despite the fact that we are putting about 1 billion pounds of pesticides into the U.S. environment every year. That percentage is exactly the same as what was being lost in 1942 [before large-scale use of pesticides]. Exactly the same. Thus, the pesticide technology has failed. And the same actors that brought us the failed chemical-pesticide revolution are now bringing us what is going to be the failed biotechnology revolution.

What is the extent of agricultural biotechnology today?

There are 42 million hectares of transgenic, or genetically modified, crops in the world today—up from four million in 1994. Seventy-two percent of all that is in the United States. Most corn- and soybean-based products consumed by people in this country are GM, but people have no way of distinguishing them because they are not labeled.

The EPA, the FDA, the Department of Agriculture, even the National Academy of Sciences, all have reported that genetically modified foods are basically the same as conventional crops and are safe to eat.

Right. But you wonder when you see things like StarLink, a variety of genetically engineered corn which is approved only for animal consumption, leaking into the human food supply. The corn caused allergic reactions in consumers, and was recalled by the USDA. However, a portion of the corn remains unaccounted for. Despite this, Aventis, the European company that developed StarLink, is asking the EPA to lift the restrictions on StarLink products, arguing that StarLink is safe to consume and that the unaccounted-for products should be allowed to remain on the market.

What are other possible effects of GM crops?

There is a lot of research showing potential environmental impacts. One form of genetically modified corn expresses the toxin found in Bacillus thuringiensis (Bt); this toxin can last up to 230 days in the soil and may kill the beneficial bacteria or invertebrates in the soil that are important in organic processes.

Cornell researchers showed that monarch butterflies that fed on leaves dusted with pollen from this modified corn grew less and had higher mortality than larvae that fed on leaves dusted with normal pollen.

The point is that this is a study that a high school student could have done. But it was not required by the EPA, which conceded to corporate pressures by considering transgenic crops as substantially equivalent to conventionally bred crops. There are a lot of studies that could have and should have been done. But every piece of research that comes out is fought by the corporations with their own science and their own results.

Couldn't your own analysis be seen as politically biased?
Well, it is. This is a political debate. The whole debate on biotechnology today is political, it's not scientific. What happens in these international agricultural meetings is that I come in with my data, and somebody else comes with totally different data, data that shows that modern agricultural technologies are helping the poor.
But then you have independent scientists who have done all this research—

Independent scientists?
Independent in the sense of funding—meaning they aren't funded by major corporations.The point I'm trying to make is that we reach an impasse. You have your data, I have my data. So why don't we recognize that that we're analyzing this from different world views? You have your value system, I have my value system. Your value system says that we need to give peasants fertilizers and pesticides in order to modernize them. Or you see knowledge as a commodity, as a marketable good with cash value, and I see it as a public good.

I see my role differently. I see that what we need to do is to help peasants, to empower them—and then they can make their own decisions about what kind of developmental path they want to take. I don't want to impose anything. I just want to become a facilitator; I want to respect their knowledge. That's the difference.

But a strong selling point for biotechnology is that it will reduce pesticide use.

Studies show that using Bt cotton saves about 450,000 kilos of active ingredient, nationally, and GM corn saves about 320,000 kilos, 9 percent of the average application rate of pesticides. But any integrated pest management program—which uses cultural practices such as crop rotations or cover crops and releases of beneficial insects—saves between 30 and 50 percent of insecticides. So why do we need a technology that only saves 9 percent?

The other point is that biotechnology is going to fail because of resistance. No entomologist—not even one from Monsanto—will question the fact that there's going to be resistance. Corporations are already preparing the second generation of transgenic crops in anticipation of this failure.

We have 560 arthropod species that are resistant because of the continued spraying with pesticides. Can you imagine what will happen to insects that are exposed every day, every hour to the Bt expressed by transgenic cotton and maize planted over about a million hectares? Insects are certainly going to become resistant, are going to be able to overcome this very short-sighted agroeconomic approach. Which means that the biotech approach is condemned to fail.

You see, it's a different conception of science we're talking about. I see science not as unique, true, universal. I see science as the product of a particular society. In the West, it's a way of viewing the world by those who say: We've got to dominate nature.

But I see the 500 ways in which 500 ethnic groups in Latin America view the world. And each one of them is a scientific approach, backed up by thousands of years of practice by farmers and peasants. So that means there are 501 approaches to nature in Latin America.

But the one that dominates is the Western one. It's arrogant because it says its way is the only true way, and it will not recognize the knowledge that poor farmers in the South have.

There are indigenous people that recognize more than 1,000 species of plants, select for seeds that withstand drought or disease, classify soils according to color or taste, and develop systems where crops grow in the midst of frost at 3,800 meters above sea level.

I'm not talking about absolute right and absolute wrong here. There are merely different ways of seeing the world. What we need to establish is a respectful dialogue of wisdoms. And that's what is lacking.

Prince Charles talked with Miguel Altieri (right) at St. James's Palace in London on January 15, following a conference on sustainable agriculture.

How so?

A dialogue of wisdoms means that you have to bring to the table the people you're supposed to be helping. For example, there should be at the University of California—which is a land-grant university with a mission of helping farmers—at least one farmer on the Board of Regents. At least one. Our College of Natural Resources should periodically consult with farmers, ranchers, and environmentalists.

Let's move to alternatives to the West's technological solutions. In California, we certainly hear a lot about organic farming.

There are a lot of studies that show that organic agriculture preserves the environment, builds up the soil, and that its food is more nutritious. In the U.S. there are about 12,000 organic farmers, the fastest growing sector in the agricultural economy.

But the "organic revolution" is in the North, in the United States and Europe. It is subjected to standards, and crops need to be certified as organic, which is an expensive process for Third World farmers. In the South, it's a totally different revolution: the agroecological revolution.

How does it differ?

In order to benefit the poor more directly, technologies must be applicable under the difficult conditions in which smallholders

live. They must be environmentally sustainable and based on the use of local and indigenous resources, and not necessarily subjected to foreign standards. The emphasis must be on improving the productivity of the whole farming systems and not on the yields of specific crops, as emphasized by organic or conventional agriculture. To be of benefit to the rural poor, any agricultural innovation must operate on the basis of a "bottom-up" approach, using and building upon the resources already available: local people, their knowledge, and their natural resources. It must also seriously take into consideration the needs, aspirations, and circumstances of smallholders.

So, we're interested in a grass-roots approach that emerges from the knowledge of the people themselves—the poor people and their indigenous agricultural systems. We want to build on traditional agriculture with modern agroecological knowledge—which is basically modern agricultural science with a lot of influence from ecology and from social sciences like anthropology and sociology. Because we need to understand that agriculture is the product of the coevolution between natural and social systems. This builds upon traditional knowledge; it doesn't suppress it.

It's economically viable because it depends on local resources for managing the systems. It's socially activating because it is participatory—the research comes from the farmers; they have to be part of the research agenda, and they have to speak for the kinds of things that they need. Also, it's ecologically sound because it doesn't alter the system. It doesn't replace what the peasants have, it optimizes it.

The Green Revolution said to the small farmer: Out with your system; here come the monocultural, high-yielding varieties. What I say is: We need to optimize the system you have in place, building on traditional agriculture.

What are the results of agroecology?

The reason I went to England to see Prince Charles earlier this year was to report the results of 208 sustainable agricultural projects and agroecological approaches from Africa, Asia, and

Latin America. The studies showed that nine million farmers, working on more than 29 million hectares, have increased their overall yields from 50 to 100 percent. And these are in marginalized environments—hillsides and semi-desert areas—and they did so at one-tenth the cost of the Green Revolution. Not to mention the empowerment of the people—which can't be measured—and the biodiversity, the regeneration of the land, the conservation of the resources, and such things.

What's the problem with implementing agroecology on a wider scale?
There are several policy barriers, such as pesticide subsidies, and also a lack of political will to champion this more pro-poor approach. But I also think it's because the North wants to call the shots, set the agenda. It is very difficult for scientists from the North who are supposed to be specialists in international agriculture to accept that the South knows better.

They could talk to you.
Sure! Somehow people get the idea that there's this guy in Berkeley [laughs], he's opposing biotechnology, he's speaking up for the world's poor farmers. So in a way I become a little token, and I get invited to these international conferences, usually to present the minority view. Not many other people are doing this at the scientific level because they don't want to speak out.

Why not?
Because there are consequences. If you speak out against biotechnology, you're going to be called prejudiced, political, unscientific. When Robert van den Bosch spoke out against the pesticide industry, he was called a pseudo-scientist. In response to my speaking out, I have been called a third-rate scientist. I say: "It would be better to call me a Third World scientist. I'm proud of being that."