



The Solari Report

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The Solari Food Series

Miguel Altieri
&
Harry Blazer

the **Food Series**



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Harry Blazer: Hello, everyone. I am here with Miguel Altieri. It may be a name you're not all that familiar with, but by the end of this interview, I hope you will have a greater understanding of who this person is and how important he is.

He is someone who I met several decades ago. I finally tracked him down, and we are going to have a conversation. Miguel, thank you very much for joining us.

Miguel Altieri: Oh, you are welcome, Harry.

Blazer: So who are you? Tell me a little bit about yourself.

Altieri: I'm a 67-year-old person who was born in Chile in South America. I came here to the United States about 40 years ago. I studied agronomy in Chile, and then I did some work in Latin America. Then I ended up getting my PhD at the University of Florida on biology and the control of pests. Then I came to Berkeley as a Professor of Agroecology in 1981.

I've been here for 37 years on the faculty teaching agroecology and also working with small farmers in Latin America and many other parts of the world.



Blazer: Are you still at Berkeley? When I called there, they didn't know where you were.

Altieri: I'm an emeritus professor now. That means that I retired, but I'm still active. I still teach a practical class called Urban Agriculture that the students really like. I also teach agroecology. The reason why they asked me to teach is because they don't have anybody else to teach these classes because they are practical classes where students learn how to plant and grow plants and living things. Most of the new professors are into modernizing and computers and genetics, and they don't have a lot of knowledge in how to grow crops in a sustainable manner.

The type of professors that we had in the past knew how to work in the fields and identify insects in the field, and now they all need labs and computers to do that.

Blazer: Miguel, you use this word 'agroecology'. What is your association with agroecology?

Altieri: Well, agroecology is a science. Basically what it does is it's the science of designing sustainable, resilient, socially just, agricultural systems. It is based not only on the contributions of ecology and other modern scientific fields, but it also involves the knowledge of traditional farmers. In Latin America we are lucky because we have farming communities that have been farming for 5,000 years or more, and their systems have stood the test of time. We have a lot to learn from them.

What agroecology does is it tries to create a dialogue of wisdom between the two fields of science – both the western science and the folk science.



From that, we devise principles; they take different technological forms, depending on the biophysical and socioeconomic conditions of each region.

The principles are universal, but they take different technological forms depending on the realities of the rural communities.

Blazer: Are you being a little modest? Didn't you kind of invent the whole agroecological movement – at least the modern version of it?

Altieri: Yes. I wrote my first book on agroecology in 1982. It came out in Spanish, and then it was translated into English in 1987. So really agroecology was born pretty much in Latin America, although here in the United States we have had several people who have made major contributions to agroecology. One of them is Professor Stephen Gliessman from the University of California Santa Cruz, who also wrote a textbook on agroecology, and he is also retired.

It's interesting that he and I came together to California in 1980, and we both retired and we were not replaced by agroecologists. So pretty much the original fields of agroecology – at least in California – are dying, in my opinion. Now agroecology has evolved, and everybody is talking about it, but there is also a co-option of agroecology going on.

Blazer: That is a good lead-in to some questions that I want to ask. What is the relationship of agroecology to 'sustainability' or 'sustainable' agriculture – that word that is thrown around so much?

Altieri: It depends on how you define 'sustainable' and what it is that you want to sustain.



If you go to the website of Monsanto or other corporations that are promoting big agribusiness, what they want to sustain is their systems and their corporate-industrial agriculture. That is what they want to sustain.

They talk about ‘sustainable’ agriculture, but the way that they define it is very different from other people like myself. To me, sustainable agriculture is a goal; it’s not a method of production. It’s a goal of development.

Everybody says, “Sustainable agriculture is agriculture that is environmentally sound, socially just, economically viable, culturally sensitive, etc.”

But when you get into the nitty-gritty of defining what is socially just, that is when the politics come in and the different political perspectives collide. For me, ‘socially just’ means that we need to do land reform to give land to the peasants because they are the ones who are feeding the world. But obviously that definition of ‘socially just’ doesn’t go along with Monsanto’s definition; or doesn’t go along with the definition of the organic farming movement, which in this country has become very, very elitist because only the rich people have access to organic food. To me, we need to democratize the food system so that the right food is realized for everybody, not just the ones who can afford the healthy food.

Blazer: You said that the peasants are them anions supplying food to the world? That can’t be true. I mean, after the Green Revolution and Monsanto and all these other guys, they must be doing it, right?



Altieri: It turns out that it's not my data; it's data from the United Nations Food and Agriculture Organization that has shown, and many other reports show that small farmers, which are about 350 million farmers in the world occupying 20% of the land using 20% of the water, 30% of the fossil fuels, producing no greenhouse gas emissions are the ones that are producing 70% of the food that we eat in the world.

Corporate agriculture, which occupies 80% of the land is only 20% of the farmers using 80% of the water, 70% of the fossil fuels, and producing 35% of the greenhouse gases are only producing 30% of the food that we eat in the world. They are really not interested in producing food; they are interested in producing biomass. They are interested in biofuels, bioplastics, biopharmaceuticals, whatever. Food is something that if it is profitable for them, they will produce it, but that is not their main objective.

So these people using most of the arable land in the world are not producing the food, and they are the ones who are causing climate change.

Blazer: I love you, man! I want to ask a few other questions about how agroecology is associated with this other thing called 'regenerative ag'. What is that all about?

Altieri: There are a lot of new terminologies that are coming out—regenerative agriculture, climate smart agriculture, ecological intensification, and even biodynamic agriculture and organic agriculture and permaculture. There are a lot of terminologies out there.



To me, agroecology is the science that provides the principles on how you design an agriculture that is resilient, sustainable, productive and diversified. If people want to call it regenerative agriculture and they use the principles, that is great. If it's regenerative agriculture based on agroecology principles, then great. But there is a lot of what they call regenerative agriculture that is not based on the principles, so it's not agroecological.

It's the same with organic. In organic agriculture we have 35 million hectares of organic certified agriculture in the world, and about 80% of it doesn't follow agroecological principles; they are monoculture-based with equivalent substitutions. Instead of chemicals, they use organic products, but they are insecticides, etc. to a point where I know farmers in California who use 18 different products in vineyards, and many of those products contradict themselves.

For example, sulfur which kills diseases can also kill beneficial insects that you want to also have in the system. So basically that agriculture doesn't follow the agroecological principles. Then, on the other hand, there are a lot of farmers who follow the ecological principles, and they decide not to call themselves or certify themselves as 'organic'.

So basically what agroecology is is the science that allows you to study all the systems. I can go to a permaculture farm and understand it from an agroecological perspective. I can go to a biodynamic farm and see if they are applying the agroecological principles or not. Many times they are not. Even though they are applying their biodynamic principles, which is fine, from an agroecological perspective, they are still weak.



The other thing that is interesting is that social movements in the world – especially the small farm movements of the world – have taken agroecology as the flag of their food sovereignty strategy, and they have not used other terms. Agroecology is much, much closer to their rationale because it was born in the south.

Permaculture was born in Australia. Biodynamics was born in Germany. Regenerative is kind of a US terminology. It's not really ringing a bell in the south where most of the peasants live. Eighty percent of the small farmers or more live in the south, not in the north. To me, there is no contradiction. I mean, if somebody wants to explain

their system with the principles of Steiner, that is fine, but those systems don't meet the agroecological standards sometimes.

There is no contradiction. You could improve those systems with agroecological principles. In fact, I worked with some farmers here in California who are biodynamic, and they have monocultures, but I helped to diversify them. They don't have to abandon their biodynamic principles; they enrich their systems with agroecology.

Blazer: Let's talk about the philosophical underpinnings and these principles that you've been talking about. Tell us about the principles of agroecology.

Altieri: This is not something that we scientists and researchers have just invented, but this is something that small farmers who have been farming for thousands of years have done. They have observed how nature works, and then they basically mimic that in their systems. So the first thing that they realize is that in nature the systems are diversified; they are not monocultures.



So they started growing their crops in very complex patterns, like the forester systems and the cropping systems whereby diversity plays a major role.

By assembling these different crops – not just because they want to have a rich diet or diversity of crops per se – they start assembling these crops and observing that there were interactions between these crops that were complementing each other. For example, corn and beans were complementing each other nutritionally. The beans feed the corn with nitrogen and phosphorus through mycorrhizal associations; the corn provides pollen for beneficial insects that control the pests on the beans. The meetings through the system of the small farmers of Latin America are full of interactions regarding the product of these interactions that happen with the different components and these plants that are complementing each other.

What agroecology tries to do, then, is use the principles of synergy, recycling and diversity in order to create systems that are able to sponsor their own function. They don't need external inputs once you have the assemblage of crops and animals and trees and soils that are going to be able to set in motion this ecological interaction that promote the processes that are fundamental for agriculture to be interactive.

What do you need for agriculture to be proactive? You need nutrient cycling. Well, for that you need microbes in the soil and organic matter. What else do you need? Well, you need regulation of the weeds and diseases and insects so that they don't take off. For that, you need predators, parasites and antagonists and all of these beneficial organisms that need to be present in the system that are going to be sustained through associations of crops that are going to provide a habitat and the soil conditions for them to thrive, etc.



That is the way that agroecology works. It's kind of ecological engineering.

Also, it is accompanied by a knowledge that is millinery, so we need to learn from the farmers not only how they use the plants, but their knowledge about predicting the climate variability, how to manage the soil, how to keep the biodiversity going, and so on and so on.

Blazer: So it's hardly top-down; it's more bottom-up where you respect these traditional farmers and what they know, and incorporate that and validate it through science.

Altieri: Yes, and actually we don't even validate it because most of the time through years and years of research, all I do is just figure out that the systems are correct, and then facilitate a process of transfer of knowledge between the farmers who know and the farmers who don't know this information. That is how agroecology is being transmitted through what is called the 'campesino campesino'. It's peasant-to-peasant, farmer-to-farmer networks that offer exchange of information. And they have their own way of transmitting.

We don't need the extension system or the research system for these farmers to innovate and to exchange information. Our role is more like facilitating the process.

Then, obviously, I can do research on the systems and find out how it works. Then those mechanisms I can transmit to other farmers, for example here in the United States. What we learn from farmers in the south, we can apply here. There is a very important example of that.



In the south of Brazil, many small farmers created a system of no-till organic agriculture, which in the US is totally dominated by monocultures with the herbicides of Monsanto's RoundUp and all the other herbicides.

They figured out that by growing a cocktail of cover crops, if they smothered them and left them as mulch, then they could plant their crops in the absence of weeds. When that residue starts decomposing, they release these chemical substances called allelochemicals, which accumulate, in the first two centimeters of the soil where 99% of the weed seed bank is. So all of the weeds that will be there will die, and the crop would also die, but the farmers figured out that they needed to plant their crops deeper. So at four centimeters they plant the corn and beans, and then the corn and

beans come up through that toxic layer without being affected with the absence of weeds.

It turns out that that system is now being used in many parts of the US by organic farmers, and they took the knowledge directly from the peasants in Brazil. The only thing is that they never compensated those farmers for the knowledge.

Blazer: How much of how things have gone wrong is because of corporate greed or because of our scientific bias that is based on things that are in your book, like atomism, mechanism, universalism, objectivism, and monism as opposed to holism, contextualism, subjectivism, and pluralism. How much of it is the greed part, and how much of it is the orientation?



Altieri: Well, they are both connected. The science that we practice in conventional agriculture is based on assumptions of people who gave certain perspectives to agricultural science. For example, the first one was Descartes who basically said that you cannot study the whole; you need to understand by dividing into parts. That is how we became specialized in agriculture.

If you want to study agriculture, you have to study insects and soils and pathogens separately in the university. You're going to take classes that are specialized classes. The assumption is that by understanding the part, you would understand the whole. That never happened.

The second one was Darwin. Although perhaps he didn't think about this and his message wasn't this, but the main thing that was taken from Darwin was the law that evolution was driven by competition – by the survival of the fittest – whereas in nature there is much more cooperation than competition.

So we left aside all of the interactions, all of the positive synergies that could happen, and we emphasize competition and try to limit the competition. So we eliminate all of the insects and the weeds and everything from the system because they are competing without understanding that there could be some beneficial interactions.

Obviously Malthus had something to do with that thinking because most of the thinking about hunger in the world is all based on Malthus. “Because we have so many people, we have hunger. What we need to do is increase production with high technology” – when hunger doesn't have anything to do with production; it has to do with poverty and inequities with maldistribution, lack of access to land, and many other issues.



Finally there was a German Justus von Liebig who came out with the principle of the limiting factors, and that there was always going to be a limiting factor out there that is going to be limiting your production – insects, weeds, and all of the competitors which actually open the gates for the big corporations that actually carried from World War II the chemical technology to declare warfare on the competitors. That gave rise to the monoculture agriculture that we have today.

So greed and science have connected because actually much of the science in the university is being funded by big corporations. Berkeley receives \$500 million from BP (British Petroleum) to produce genetically engineered biofuels.

Blazer: I was there, by the way. I sponsored a project that David Pimentel did in part right when BP made that contribution of \$500 million to basically totally undermine what Pimentel and other good guys were doing (e.g. his son and Tad Patzek), to try to show that getting ethanol from corn is a ridiculous proposition, and the only way that it works is because it's subsidized.

BP wanted to shove it right down their throat and sideline these guys. So they gave them \$500 million to do it.

Altieri: Exactly. What happened is nothing came out for the public whereas biological control, which started in California in the late 1800's, actually saved California \$1.9 billion in pesticides just in the research that was done at the public university at that time. When I came in 1995, that group was closed down despite all of the benefits to society. Then they went in for Novartis and other big corporations' monies, which never yielded anything for the public.



Blazer: I just want to go over these five things. We're going to talk about what you've written. There's this primary book, *Agroecology: The Science of Sustainable Agriculture*. It's in its second edition. You've edited it and contributed to it. Just from that, these five things that I've mentioned, these philosophical underpinnings of modern science, are: 1) *Atomism* posits that parts can be understood apart from the systems in which they are embedded and that systems are simply the sum of their parts. 2) *Mechanism* posits that relations between parts of a system do not change, a necessary condition for prediction and control. That is why so much of this work is done in laboratories as opposed to out in the field. 3) *Universalism* posits that the heterogeneous and complex world around us can be explained by the interaction of a relatively small number of universal principles. 4) *Objectivism* posits that our values, ways of knowing, and actions can be kept apart from the systems that we are trying to understand. 5) *Monism* posits that separate disciplinary ways of knowing are merging into a coherent whole.

Basically every one of these, when you take a look at living systems, in particular soil-based living systems, are wrong. So it's holistic, it's systems-oriented, there is context that creates meaning that is totally ignored by these approaches.

You use the term 'subjectivism' in which the most natural systems cannot be understood apart from our activities, our values, and how we have understood, and hence acted upon these systems. Then there is pluralism in which complex systems can only be known through multiple, different patterns of thinking – each of which is necessarily a simplification of reality.



So talk a little bit about the social aspect of agroecology. Almost no other systems really incorporate that as part of their science.

Altieri: Agroecology foresees agricultural systems as the coevolution between nature and social groups. Humans started manipulating nature and selecting crops through the millennia, and there was a co-evolutionary process in which societies that treated nature correctly and developed the agricultural systems that would be based on these agroecological principles survived and the ones that didn't collapsed.

If you read the book of *Collapse* by Jared Diamond, you'll see that many, many of the civilizations that collapsed, like he describes, is because the societies went overboard in terms of exploiting nature beyond its capacity. Nature included many agricultural systems. That is the first thing.

The second thing is that food production has a social role. The main role of food production is to convey food for all people, not just for a few. So there comes the dimension of equity and so on that is important, and that food needs to be produced in land - there is a social function of the land - and that comes to the point that the land has to be in the hands of the ones who produce it - the ones who produce food- which are the peasants and the small farmers. So there comes the political dimension that we need to do land reform. We need to give land back to the people who produce the food and take care of the soil and the genetic resources and the water and so on.

This social dimension of agroecology is not only just a sociological dimension - that we need to understand the co-evolutionary process and that we need to understand the knowledge that the farmers have which has accumulated for centuries -



but also the dimension of the social function of agriculture and of the land.

The main objective is to produce food for all and to realize what is the 'right food'. That's when agroecology collides with the big interests who are not interested in realizing the social function of the land and agriculture.

Blazer: That is the foundation of what we are calling 'foods sovereignty'.

Altieri: Yes. Food sovereignty is very different from food security, and a country can be food secure. For example, Iowa is food secure, but it's not food sovereign because it imports all of the food that it eats with the exception of corn, soybean and pork. The rest all comes from outside. So they have the power to buy it, and that is why they are food secure, but they are not sovereign.

In order for us to realize food sovereignty, we need to realize first of all the right of access to land of the people, and then the access to the modes of production that are going to make them autonomous so that they can produce without depending on Monsanto or other institutions, and then we need to realize the right to food through more solidarias market arrangements (*solidarias* is a Spanish term akin to solidarity). Not the markets that are a bypass.

We talk about how the food system is controlled by about five corporations today. They determine what the farmers are going to produce, how much they are going to produce, and for whom they are going to produce. At the same time, they control what the consumers eat and they control the big supermarkets – how much they are going to pay, the quality of your food, and all of that.



We can create a bypass to that. But in order to create a bypass, we have to have autonomous ecological territories managed by organized peasant organizations supported by people that are providing the knowledge and the techniques of agroecology. Then through very collaborative solidaristic arrangements with consumers, they are able to create these alternative markets that are going to realize “the right to food”.

There are many examples of this bypass that I’m talking about. People say that farmers markets could be part of the bypass. That is correct, but if you go to a farmer’s market here in California – in Berkeley – you’re not going to find any Latinos or African Americans buying there because the food is pretty expensive.

So when I’m talking about a bypass, I’m talking about alternative markets that are not totally ruled by capitalist rules. They exist within the capitalist society, but there are other solidaristic arrangements in which the transactions between farmers and consumers are not totally ruled by capitalist goals.

For example, I know communities in Columbia and Brazil and Nicaragua where the farmers are selling the produce at lower prices than the conventional food to the consumers because these consumers are loyal to them, and they support them. So you create this solidaristic relationship between these people who are basically transacting with money, but on other terms as well. Not just ruled by the market.

Blazer: I want to read something that I wrote for a conference in the UAE (United Arab Emirates). It’s a few paragraphs, and I would like to get your reaction to it:



First, some definitions. We define ‘food’ as primary ingredients or that which is made from primary ingredients using processes that do not alter the fundamental integrity, wholesomeness, or healthfulness of the primary ingredients used. A primary ingredient is water and also a non-synthetic nutrient with a fully-disclosed one-word ingredient statement which is neither genetically modified nor produced using GM (or nano) technologies.

The reason I started with that is because we keep throwing the word ‘food’ around, but we don’t actually have a definition that for me is real food. So that definition that I just gave throws out about 90% of what you can buy in a supermarket, maybe more.

We define ‘food sovereignty’ as self-sufficiency in the production of all nutrients, including water and wholesome healthful and nutritious land-based foods like fruits, vegetables, grains, livestock, and water-based foods like fish, seafood, and distribution of those nutrients to the populations as required in sufficient quantities for the population to thrive.

Of course, you’ve added the whole dimension of who owns the land, which I’m going to go into in a second.

We define sustainability as that which, at worst, is benign, and preferably beneficial to the quality of air, water, and soil. Sustainability can also be viewed through three lenses: Material lens, where the rate of use is less than the rate of replenishment with the goal of emulating as much as possible nature’s closed nutrient loops, where there is no waste since the waste products of one process become the feedstock for another; Energy lens, where all secondary sources of energy – even so-called renewable sources – are derived from our sun,



so the closer we can get to the direct use of sun's energy, the more sustainable we are likely to be;

Economic social lens, where the key to financial sustainability is to create profitable markets for sustainable products and processes that allow communities to thrive.

Now I want to go to this experiment which I did, which you know about because you introduced me to these guys. I went to Mexico, I found somebody – two folks – who were highly educated and were very intimately related with the peasant/campesino culture down there, who were farmers, and who knew how to do stuff in addition to understanding the science. I gave them a fair amount of money, and my condition was that the farmers had to own the land. There had to be no debt.

I gave them a fair amount of money to do an experiment. At the time I was consulting with a very large supermarket chain in Canada – the largest, as a matter of fact. I said, “I’m going to try to show this supermarket chain that we can create incredible product, get rid of all of the middle men so that we can deliver it directly to them, so we’re creating a market for sustainability for these guys, and it’s basically all organic because they’ve never used any other inputs.”

I provided the irrigation, I provided a tractor and seed and so on, and they produced some of the nicest stuff that I’ve ever seen. I couldn’t get these guys in Canada to do anything about it.



So from my perspective, we don't need Bill Gates and his organization going to Africa telling these people how to grow food and putting his GMO solutions and vaccine solutions and everything else on a country from a position of total arrogance and ignorance. We need to create markets for these guys. They need some infrastructure. They need some cooling, they need some trucking and transport. They need some warehousing. Ultimately they need somebody to buy their damn stuff because they have the capability and the know-how to grow some of the best damn stuff that you can find anywhere in the world.

What is your reaction to that?

Altieri: There are dangers of bringing these people in because you're talking about bringing them into the capitalist economy, and the field is not leveled. They could go in the route that you're talking about and have the warehouses and all this stuff, and the people who buy their products, but then they are going to be competing.

Unfortunately the markets are driven not only by supply, but also by demand, and demand changes. People are so manipulated here by the media. Sometimes they might find that at one point you have consumers who are buying from these Mexican

farmers, but then somebody else comes in and says, "Why don't you buy from these African farmers?"

Then you start putting these people competing with each other, and they get into the logic of the market. So although I agree with you that they need infrastructure and they need markets, it has to be part of the bypass; it cannot be within the logic of capitalism. It has to be a different logic and different alternative markets that are not totally ruled by the capitalist mentality. That is the challenge.



Blazer: There were going to be contract for supply, and one of the other basic rules that I had was that food sovereignty had to be in place so that they would never export anything that the community needed first.

Altieri: But what happens, Harry, is that the experience for example with fair trade, for example, which is one of our objectives and one that you are talking about, when it goes into communities it creates a lot of stratification because there are only a few farmers who are going to get into the cooperative, and they are going to be favored by your grant or your donation. The rest of them are not, so there is immediately going to be stratification within the community. This is happening tremendously with fair trade approaches.

They go into communities, they find the coffee that they like, but not everybody can produce that coffee, so basically it creates animosity within communities and division. It brings things that were not present before.

Blazer: That is very significant. My thing was ultimately to include this entire peasant population through all Latin America, but I would like to hear about some of these alternative channels that you are talking about. How do you envision it?

Altieri: There are some that are occurring. There is a major network in southern Brazil called EcoVida. It's basically a group of farmers and consumers together who have come up with their own cooperatives, and they have come up with their own certification schemes that are participatory. They don't need somebody to come and certify them.



They have their own rules of engagement in terms of how much the price of the food is so that both the consumers and the farmers get fair share. That is one aspect.

The other one is through policies. When social movements create enough political demand so that there are politicians who are going to come up with policies that are going to favor agroecology, that is another approach. For example, again in Brazil, and in Nicaragua and other countries there are what we call ‘institutional markets’.

Brazil has a law which is the national law of agroecology. It wasn’t because some politician was illuminated and said, “Let’s have an agroecological law,” but the social movement pushed the politicians to create it. That one law has many aspects, but one of them is that 30% of the production of the small farmers has to go to the institutional market – the social markets like the schools and the hospitals and the elderly people at home and so on.

If you’re a small farmer, the government buys 30% of your food, and that is assured. That takes you out of the logic of competition in the capitalist market. Thirty percent of your income comes from the government, and the government is saving money because they were previously buying from big corporations before, and now they buy from farmers. The food that they serve is much healthier. So in the long term, there are health benefits which lower the health bills for the country, which is enormous, as you know in this country. The health bill is huge, and it’s very much associated with our industrialized agricultural diet.



Blazer: I've tried to figure out away to do something like that here, and basically have a cooperative that is farmer-based with a captured consumer base. Of course, it's being done in small scales with these consumer agricultural cooperatives (CSA) where they have 100 customers and you get a share of whatever is produced by the farmers. But I think that there is a huge opportunity for this because people want to go direct.

Disintermediation is a huge thing. Instead of having Amazon or Walmart be the dis-intermediators, if we could figure out a way to develop those direct relationships with the farmers. Farmers markets do that, but it's exactly what you said. With rare exception, the food is priced out of the range of a lot of people. So the people who need it the most can't get it.

Altieri: Right. The other thing that is very important to mention, Harry, that I've been working on for the last few years is the development of using agroecology to promote urban agriculture. What happens is in the year 2030 seventy-percent of the world population is going to live in cities. The cities of 10 million people are going to triple in size and numbers. One city of 10 million people has to import every day 6,000 tons of food that have to travel 1,000 miles on average. That is totally unsustainable.

For example, when there was the earthquake in Tokyo about two years ago, the food in the supermarkets lasted one day. So can you imagine here in the Bay Area if a big earthquake hit, and all of the big bridges go down? It would be total chaos because there is no access to local food.



If we do urban agriculture like the Cubans do where they have 50,000 hectares of urban agriculture providing about 30% of the food of the major cities and producing about 20 kilos per square meter per year of food, I made the calculations for Oakland – which is a city near here – where there are 1,400 acres of abandoned public land. If we put that land into production, having half of the productivity of the Cubans – 10 kilos per square meter per year – we could produce enough vegetables to feed 400,000 people. But that is not being realized. That area is a food desert, and it's full of food deserts because there is nobody with the will who can put this land into production for resiliency and for food security in the cities.

Blazer: Cuba is a good example of a country because of the blockades and all of these inputs that they were depending on for agriculture were basically cut in half or worse. So they had to develop an entire country based on agroecological principles. They ended up going through a rough time, but then they ended up having basically an entire organically-produced agricultural system that involved huge numbers of people, great cooperation, and healthy foods, too.

Altieri: Unfortunately things have changed a little bit. With tourism now, there are a lot of restaurants and hotels, and all of the Europeans and Americans who are coming are demanding fresh food. So all of this food that was being produced in urban agriculture for the local food security pretty much of it is now going to feed these foreigners who are demanding fresh food.

That's what happens when you start opening up a country like Cuba to the world economy. Their market and the demands from the people who come there start undermining what their achievements were of the revolution.



Blazer: I want to talk about a couple other concepts. One is the concept of yield. We seem to be in a conventional agriculture, and we are so focused on it. By yield, they define it as kind of a unit per area, but there are lots of other ways to define yield. You could say ‘per unit of labor input’ or ‘per unit of cash investment’ but also energy efficient ratios.

From what I understand, traditional farming is much, much more energy efficient than conventional. It’s something like three inputs to one output as opposed to 10 or 15 inputs to one output. Is that correct?

Altieri: Yes. There are a lot of studies that have been done on the systems, and they have found that they have energy efficiencies of ten or fifteen. That means that you put one kilocalorie of input, and you get 20 or 30 back.

In Cuba I know farms that have values of 30 of energy efficiency. So that is a (high- efficiency based) agriculture.

The way that we measure productivity in agroecology is since we are dealing with mixed systems – we don’t deal with monocultures – you can have small farms that can be 20, 30 or 50 times more productive than large farms when you look at total output, not just the output of one crop. For example, you could compare the small farmer who produces corn with a large farmer in Iowa who has 2,000 hectares of corn. That guy probably produces 18 tons per hectare, and the small farmer produces one ton per hectare. Then you conclude that the large farmer is more productive than the small one. But when you start talking about total productivity, it turns out that the large farmer only produces corn, and the small farmer produces corn, beans, eggs, cows, pigs, chickens, etc., and then when you put that total output, you find out that they are much more productive than large farms.



Then, when you look at the ecological footprint of how it is produced in terms of energy and soil loss and water loss and this and that and whatever indicator you want to use, the systems have a much lower ecological footprint, so the benefits for society – the positive externalities to society which are not valued by the neoliberal economic system – are much higher.

So in order to address productivity, we need to look at it from broad lenses, and that is where there is a new hybrid science called ‘ecological economics’. It looks at the real cost of food and the real values of what are the positive and negative externalities of the food production systems.

Blazer: In your book, even though it was from the 1980’s, there is quite a good chapter on the way that they account for what they call ‘natural resource accounting’. By the time you’re done, you find out that the so-called \$80 of profit under conventional financial accounting becomes a \$27 loss under more complete economic accounting.

So when you put in subsidies and externalized impacts like you were talking about with soil and so on, it’s a very uneconomic system that only exists because of these subsidies.

Altieri: Right. Actually, in our studies we have found that you usually need 50% more land with conventional agriculture to produce the same that we get in our agroecological systems.

When you intercrop corn and beans, you are basically overlapping two systems. We calculate what is called the Land Equivalent Ratio.



We usually get values of 1.5 or 1.7. That means that you need 50%. If you get a 1.5 LER, it means that you need 50% more land in monoculture to get the same amount of productivity that you get in one unit of polyculture.

Blazer: Do you think that market forces alone, if they are legal, they are transparent, and they are ethical, can provide the proper type of solution that we need, or do we need policy? Is it important that we have governmental policy so that we have food sustainability and food sovereignty?

Altieri: I don't think it's free market. I don't believe in free market. I think that the market has to be socially intervened. Obviously that is something that people will not accept in this country because that is a kind of socialism, but basically the markets were never invented to account for social equity. So you need to control them and intervene them.

One way to intervene them is the example that I was giving you before. I said, "We're going to buy the food from small farmers. We're going to feed the schools and the hospitals instead of buying it from corporations." That is one way of intervening in the market.

Blazer: If you were in charge of the USDA and you had the power and ability to get done whatever you wanted to, what would you do?

Altieri: First of all, I would bring into the boards and the committees and commissions farmworkers so that there is a partnership between farmers and researchers. The research is determined by the input of the local farmers.



Obviously it has to be site-specific, so you would need to bring farmers into the universities and into the USDA to have a participatory research agendas that is going to respond to the real needs of farmers and consumers, and not to the needs of the big corporations or the ideas of researchers, which many times were all formed in the universities and have been penetrated by capital anyway.

Blazer: So right now science has been corrupted substantially by money.

Altieri: Science is at the service of capitalism; science is not neutral. On campus here I've had many, many discussions because they said that I was pseudo-scientific because I would bring politics into the discussion. I would say, "Well, science is not neutral. It's at the service of whoever holds the power."

If you want to have a science for the people, that takes a very different form from the science that you guys are developing here, which is responding to corporate interests because they are funding the research with millions of dollars.

Blazer: A quote from your book: "The final requirement of an ecological agriculture is an evolved, conscious human being whose attitude towards nature is that of coexistence, not exploitation."

Altieri: That's getting philosophical, but basically I think that ultimately the challenges that we are facing as humanity today with climate change and ecological degradation that we are undergoing, I don't think that science and technology are going to be enough. I think that we need to have some kind of a jump in consciousness.



I think that the change is as much internal as societal. In order for us to be able to change, we're going to have to have an internal conversion where people realize that the way to surviving this planet is going to take a totally different paradigm and a totally different way of relating with nature.

We cannot continue consuming at the rate that we are going. At this point, in order to have the style of living in this country, we need about ten planets. We cannot afford that anymore, and we need to make changes. Those changes have to be accompanied by internal changes of consciousness where we say, "I don't want to have so much. I want to be more rather than have more," and that kind of thing.

Blazer: By the same token, if we did things right, I think that there would be a lot more abundance for more people as opposed to this scarcity model that we are operating under that concentrates wealth among very, very few.

This planet is amazingly abundant. Nature has provided us an incredible path if we are able to understand it instead of trying to out-engineer it.

Altieri: Yes, but nature didn't provide us with cars and cellphones and stuff like that; it provided us with resources that we should use in an intelligent way and to produce things that are really useful.

I think that half of the stuff that we consume is not necessary; we could live without it. When you and I were children, we lived a totally different life than the children today. I see my grandchildren have probably 80% more than I used to have in terms of things, and I remember having a very happy childhood without any of that stuff.



Blazer: Miguel, before we close down here, what are you doing these days? Tell us a little bit about the projects that you are involved in.

Altieri: Harry, I am very much involved with a society called SOCLA which is the Latin American Scientific Society of Agroecology, which is a group of about 800 researchers, students, professors from different universities of Latin America working very, very closely with small farming communities. We are promoting all kinds of teaching, research, educational programs, and we also have some on-the-ground action projects.

For example, right now we are organizing a group of farmers from Haiti and Puerto Rico to visit Cuba so that they can observe some farms that have resisted the passing of hurricanes. There are a lot of farms in Cuba that have been able to show resiliency against hurricanes because of the way that they are designed based on agroecological principles. We think that is very important to make those links for the farmers to learn how to design these farms because more hurricanes are going to come into the Caribbean. Although they don't have anything to do with climate change (with causing it) – their country is a small island in Puerto Rico, and their effect on climate change is nothing as compared to the US – but they are paying the price.

There are many other projects along these lines. We are very much involved in promoting agroecology. We have a program within SOCLA called 'Relagres' which is a network of people working on how to measure resiliency. How do you assess whether your farm is going to resist the hurricane or drought? What do you need to do in order to enhance the resiliency of those farms to climate change?



Then also I do a lot of lecturing and writing. I'm going to Europe and Latin America. I'm going to be in Montana in October - doing talks. I'm spreading the word. I always think that the work that I do is more of a mission than work. So that is what I'm doing.

Blazer: In terms of your publications, just for our listening audience, if they wanted to get a book to learn more about agroecology, its principles, philosophies, and applications, what would you recommend?

Altieri: If they want more details about my work, they can go to www.Agroeco.org. That is my website. It's not always updated, but it's there. Then there are a lot of publications that are going on right now.

I just put out a book with a colleague, Peter Rosset, *Agroecology: Science, and Politics*. It just came out by Fernwood here in the US. You can find it at Amazon. It talks about the science and the practice of agroecology, but also the political dimensions of agroecology and how politics are so important to be able to scale it up to a level that we need.

There is a lot of stuff coming out.

Blazer: I want to close by saying that every time I talk with you – and it's been quite a few years – I am always humbled because you are totally authentic, you have incredible scientific knowledge and theoretical knowledge as well as incredible practical knowledge, you really care about people and the success of the people who are responsible for growing the food and making sure that they get a fair shake, you have great respect for nature, and the appropriate use of nature.



You're an exceptional human being, an exceptional scientist, and are making exceptional contributions to the agricultural wellbeing of the world. So I wanted people to meet you and get familiar with you, and hopefully they will follow up with looking at your website and looking at some of these books that you've suggested.

Altieri: Thank you very much, Harry, for the opportunity.

Blazer: We're going to talk a little bit offline, but thank you again, Miguel.

Altieri: Thank you very much.

MODIFICATION

Transcripts are not always verbatim. Modifications are sometimes made to improve clarity, usefulness and readability, while staying true to the original intent.

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