Making Sense (and Cents) of Food and Nature:
A media guide to covering agro-ecology and food sovereignty

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"Here are two facts that should not both be true: There is sufficient food produced in the world every year to feed every human being on the planet. Nearly 800 million people literally go hungry every day, with more than a third of the earth's population -- 2 billion men and women -- malnourished one way or another, according to the United Nations Food and Agriculture Organization."

— Michael Dorris, *Rooms in the House of Stone: The "Thistle" Series of Essays*

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One of the least reported features of agro-ecology is that it can be profitable

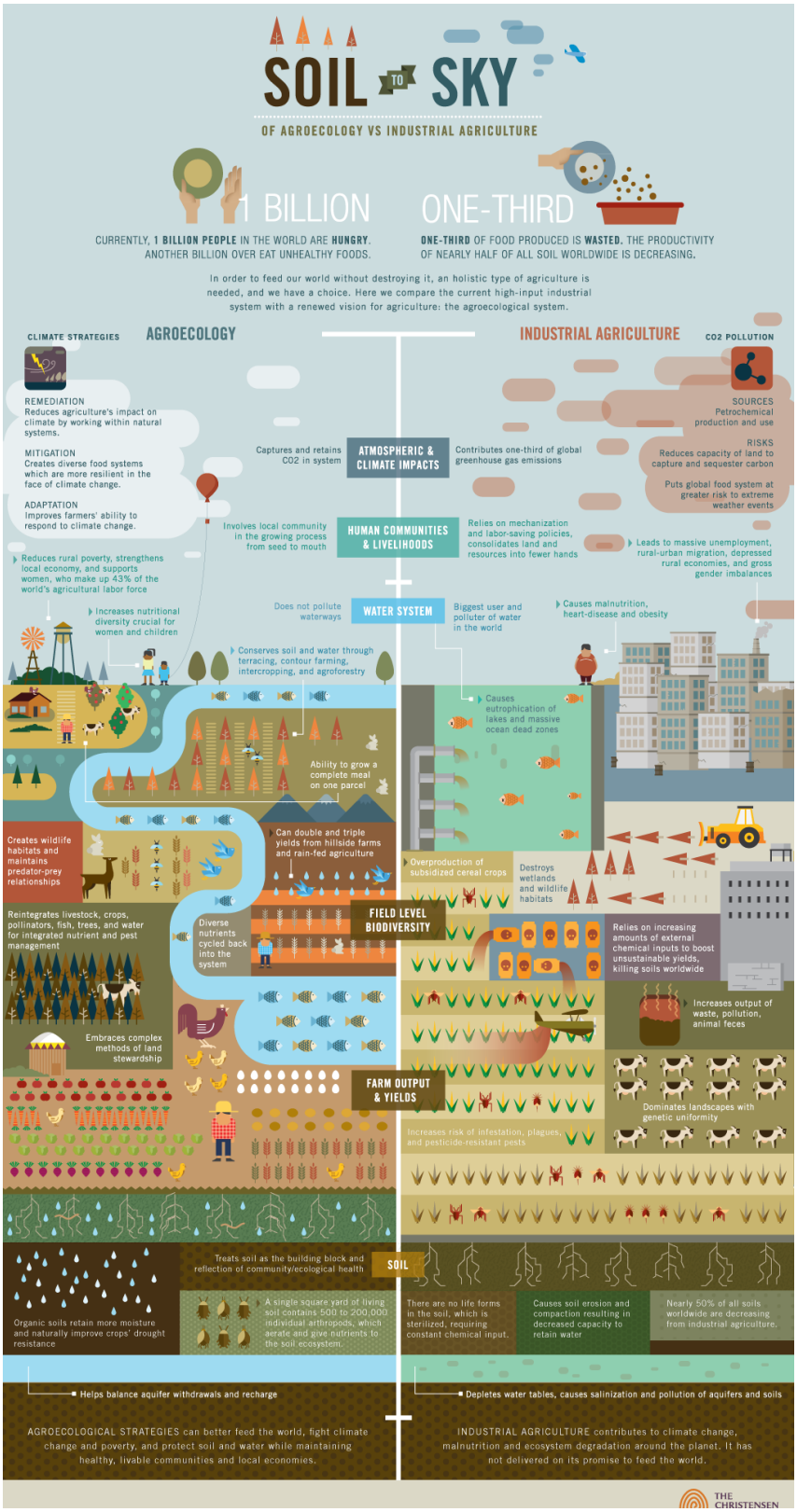
1. FOOD AT A CROSSROADS

The costs of industrial agriculture, factory farming and junk food are becoming increasingly apparent, prompting a search for sustainable alternatives to (the food) business as usual

The world of food is at a crossroads. The UN Food and Agriculture Organization predicts that the world will need to increase food production by 70 percent by 2050 to keep pace with expected population increase and rising living standards in rapidly developing countries. This will be no easy task, as arable land is reduced through land degradation and land productivity is impacted by climate change. Options for increasing food production seem to be already limited, with extensive agriculture blamed for deforestation and intensive farming responsible for chemical contamination of soil, water, air and biological organisms – including people. Meanwhile, the globe is bifurcating into a world of obese haves and malnourished have-nots, with the global middle replacing traditional diets with a menu of processed and nutritionally deplete "food-like substances," to quote food writer Michael Pollan.

Photo:James Fahn

Few seem to be arguing for a continuation of either forest-hungry agricultural expansion or more chemical contamination of farmland, though in practice these approaches are still spreading. In fact, the direction of agricultural science and technology is now under great scrutiny. International scientific assessments have demonstrated the increasing global footprint of agriculture, including its contribution to climate change (IPCC, 2007; Millennium Ecosystem Assessment, 2005), while nongovernmental organizations and scientists have long called for radical changes in this field (Union of Concerned Scientists, 1996; Food Ethic Council, 2004; European Science Social Forum Network, 2005). Perhaps most influentially, the International Assessment of Agricultural Science and Technology for Development in 2008 officially called for a reorientation of agricultural science and technology towards more holistic approaches, after a 4-year process that involved over 400 international experts (IAASTD, 2008). This panel has already been compared to the Intergovernmental Panel on Climate Change, both for the quality of its governance and the importance of its recommendations, which are straightforward:



"Successfully meeting development and sustainability goals and responding to new priorities and changing circumstances would require a fundamental shift in agricultural knowledge, science and technology".

This shift is the crossroads at which we stand. While the IAASTD calls for greater support of agro-ecological approaches, which it considers a great potential for world agriculture, the role of genetic engineering was the chief element of controversy within the panel.

Proponents of genetic engineering argue that genetic modification can help crops to flourish in the degraded ecosystems produced by decades of industrial farming. Proponents of agro-ecology argue for a kind of agriculture rooted in ecological principles, with practices that help restore degraded environments, not by setting them apart from human use, but rather the opposite: by healing the earth through growing food.

Many in both camps would agree that the current model of industrial agriculture is not sustainable. Industrial food production is destabilizing Earth's life-support systems. As Ken Wilson of the Christensen Fund notes: "Every calorie it provides requires so much oil and gas to produce that our agricultural system generates nearly a third of the globe's greenhouse gases. And through massive use of

fertilizer, we have disruptively tripled the nitrates in Earth's natural nitrogen cycle. The productivity of nearly half of all soil worldwide is decreasing. Another 15 percent can no longer be used for farming because its biology has been so depleted."

Definitions

- **Industrial agriculture**

is the context of our world today, a system that has spread across the globe, connecting orangutan habitat in Borneo to a world of consumers through cheap palm oil; and linking habitat loss from coral reefs and estuaries, to forests and grasslands, with the worldwide boom in artery-clogging deep-fried fast food.

Industrial agriculture is based on maximizing large-scale production and productivity of individual commodities and products through mechanization and motorization, the development of agro-chemicals to fertilize crops and control weeds and pests, and the use of high-yield varieties of crops. (For more information, please see the Union of Concerned Scientists.)

- **Factory farming**

is the process of raising livestock in confinement at high stocking density, in what are known as Concentrated Animal Feeding Operations (CAFOs), where a farm operates as a factory. The main products of this industry are meat, milk and eggs for human consumption. However, there have been issues regarding whether factory farming is sustainable and ethical.
Confinement at high stocking density is one part of a systematic effort to produce the highest output at the lowest cost by relying on economies of scale, modern machinery, biotechnology and global trade. Confinement at high stocking density requires antibiotics and pesticides to mitigate the spread of disease exacerbated by these crowded living conditions. In addition, antibiotics are used to stimulate livestock growth by killing intestinal bacteria. These practices have been shown to breed more resistant pests and diseases, creating a vicious cycle that ultimately put humans and our food supply at risk. (See here for some of the statistics and arguments against factory farming, as well as in support of factory farming.)

- **Genetic engineering**

is the deliberate modification of the characteristics of an organism by the manipulation of its genetic material. The main technology upon which this process is based is transgenesis, following the discovery of the recombinant DNA technique in 1973. The best known applications of genetic engineering in agriculture are transgenic herbicide-tolerant crops such as soybean or pest-resistant *Bt* maize in the USA. The fundamental strategy in genetic engineering is to modify the plants to allow them to be productive in adverse conditions caused, for instance, by pests, pathogens, drought, saline environments and unfertile soils; or to design plants for new objectives such as plants with altered nutritional contents.

- **Agro-ecology**

emerged from the convergence of traditional knowledge, ecology and agronomy (see Dalgaardet al., 2003). It is the application of the ecological science to the study, design and management of sustainable agro-ecosystems (see Altieri here and here, 1995). Agro-ecology integrates scientific understanding about how particular places work -- their ecology -- with farmers' knowledge of how to make their local landscapes useful to humans. It focuses on the value of diverse and complex methods of land stewardship and the re-integration of livestock, crops, pollinators, trees, and water in ways that work

resiliently with the landscape.

Agro-ecology is an umbrella concept for different agricultural practices and innovations such as

- biological control of pests rather than chemical control,
- planting different crops rather than a single crop (monoculture)
- agroforestry systems
- habitat management techniques -- for instance, strip management or beetle banks around wheat fields
- natural systems agriculture aiming at perennial food-producing systems
- crop rotations
- soil fertility improvement practices
- mixed crop and livestock management
- and intercropping.

Photo:Willie Shubert

Some applications involve cutting edge technologies while others are old practices, for instance, traditional systems that provide significant insights to agro-ecology. (Explanations and examples of some of these techniques are found below.)

Agro-ecology is not synonymous with “the old ways” or indigenous tradition. It values and is informed by these, but it has benefited from the modern science of ecology. There is great potential for diverse forms of fusion of the ancient and ecology, the scope of which remains unknown but is tantalizing. Its potential to rejuvenate a wounded planet are a hinted at but often misunderstood story in our world today. Careers are being made out of telling these stories. But they need to be mainstreamed in media understanding and reporting.

Critics of chemical-intensive farming argue that it produces high yields initially, but undermines the foundation of future food production in the long term. In contrast, agro-ecology is the application of ecological concepts and principles to the design and management of sustainable food systems. Its proponents argue that practices that build healthy soil, protect biodiversity, conserve natural resources and limit dependence on petroleum-based products like synthetic fertilizers and pesticides are the best bet to cope with the challenges of the future.

- **Food sovereignty**

In the context of international development, food sovereignty is the right of peoples to healthy and culturally appropriate food produced through sustainable methods and their right to define their own food and agriculture systems. In contrast to *food security* policies and programs, *food sovereignty* puts the aspirations, needs and livelihoods of those who produce, distribute and consume food at the heart of food systems and policies rather than the demands of markets and corporations. Proponents of food sovereignty might argue that a food security agenda that simply provides surplus grain to hungry people is just another form of commodity dumping, facilitating corporate penetration of foreign markets, undermining local food production, and possibly leading to irreversible biotech contamination of indigenous crops with patented varieties.

Via Campesina launched the idea of "Food Sovereignty" at the World Food Summit in 1996. This idea has now grown into a global people's movement including social sectors such as the urban poor, environmental and consumer groups, small farmers, women associations, fisher-folks, pastoralists and many others. It is also recognized by several institutions and governments.

THE AGRO-ECOLOGY PERSPECTIVE ON MEDIA:

- **Enough doom and gloom already**. We know there's something wrong with the food. What we don't know: It doesn't have to be that way. People are increasingly aware, though still woefully misinformed, that there is something wrong with how food works in our world. But instead of breeding action and commitment to finding solutions, this awareness risks breeding fatalism and complacency. Exciting advances in agro-ecology worldwide offer hope and avenues for action, but the message is not getting out.
- **Industrial food isn't just bad for your health, it's bad for the environment.** Food writing isn't just about recipes and health trends anymore. The story of our food spans the globe, from wars over oil fields in the Middle East, to the loss of entire ecosystems, to hospital cardiac units. What people don't know about the way modern humanity exploits the natural world, and exploits itself, is literally killing us – and damaging the planet.
- **Waging chemical warfare against nature in order to grow food is not a necessary evil.** Advances in agro-ecology the world over are showing that dependence upon synthetic pesticides and fertilizers is not only destructive to farmers, consumers and ecosystems, it's unnecessary.
- **It's not just about farming; it's about food.** Help connect the dots between the field and the dinner table. Sure, farmers can be hard on the environment, but we're paying them to do it! Everyone, every time we open our mouths to eat, is complicit in this great drama. Remind your audience of the relationship between their daily bread/rice/porridge and rainforest destruction, groundwater depletion and contamination, climate change and cancer; but open their eyes to the world of alternatives, too.

2. LOOK BEHIND THE HYPE

What the public doesn't know
is damaging its health and the planet. Does it have to be that way?

The Hype

Photo:James Fahn

As with many things in the modern world, there is far more to food than meets the eye. The world of food is shrouded in a cloak of myth and misunderstanding. The dramatic (re)discoveries that are emerging every day through the integration of traditional knowledge and the modern science of ecology are often hidden or belittled. The wonders of – or worries about – genetic manipulation capture the headlines.

"Between 1981 and 2008 the archives of The New York Times contain, for instance, 2,696 references to 'genetic engineering' against 3 for 'agroecology', 7 for 'agroforestry' and 0 for 'cultivar mixtures'."

Vanloqueren and Baret;

An all pervading myth in our world is that of scarcity, according to a new breed of writers and researchers. There are too many of us and we can't feed ourselves without the help of modern chemistry and agribusiness. Pesticides and petroleum-based fertilizers are a necessary evil. Even conservationists buy into this myth, arguing for chemical-intensive agriculture as a necessary antidote to slash-and-burn or other extensive land use.

In a nutshell, the story goes like this: chemicals, genetically modified crops and processed food are necessary evils. They're the only way to feed a world of 7 billion people. Besides, it's what the "market" demands. It is true that industrial agriculture produces a great deal of commodity crops: American corn farmers can turn a half a bushel of seed corn into more than 150 bushels per acre, on average. But the fact is that the majority of grain produced from industrial farms does not directly feed people. In "Fair Food," Oran Hesterman breaks down the ultimate output of this bounty. (Keep in mind, only 1 percent of corn, or maize, grown in the United States is "sweet corn" for human consumption. The rest is known as "feed corn" and is not eaten directly by people.) Of the total feed corn harvested in the United States:

- 43 percent was used to feed domestic livestock;
- 15 percent was exported, mainly to feed livestock;
- 30 percent was processed into ethanol;
- the remaining 12 percent was processed into thousands of products, much of which we know as "junk food".

"Make no mistake: we've created a situation where American SUVs are competing with African eaters for grain. We can see who is winning," writes Michael Pollan, probably America's most influential food writer. "It comes down to this: the world's agricultural lands make up a precious and finite resource; we should be using it to grow food for people, not for cars or cattle."

But an alternative story is emerging, and in some pretty high places: In 2010, the UN's Special Rapporteur on the Right to Food released a report concluding that "agro-ecology ... can double food production in entire regions within 10 years while mitigating climate change and alleviating rural poverty."

Jacques Diouf, then director-general of the FAO, declared in 2011 that "the present paradigm of intensive crop production cannot meet the challenges of the new millennium." What the world needs, he wrote, is "a major shift from the homogeneous model of crop production to knowledge-intensive, often location-specific, farming systems."

Critics of the industrial food system argue that its problems are not limited to all the hidden costs passed on to people and the environment in terms of health and resource degradation. The problem is that industrial food is inherently unsustainable, writes Fred Kirschenmann. It cannot continue in existence for much longer. Change is inevitable, either organized systematic change, or system breakdown.

Biodiversity on the farm.
The opposite of monoculture is polyculture: growing more than one crop on a piece of land. As seen in "A Viable Food Future", family farmers in the Indian state of Uttaranchal regularly achieve higher and more dependable production from their land than large farms practicing monoculture in similar environments. The total yield per hectare for farms with diverse cropping systems, in this case four different crops, was about 6 percent higher than for those with only one crop. In addition, smallholders who grow traditional crops that have more value to local consumers have more market options than those who only grow one crop for export. In addition, the monocropping farms had higher production costs because the crops required chemical fertilizer and pesticides. In total, the net income of the farms with diverse cropping systems was 135 percent higher than for the farms with only one crop.

Kirschenmann holds a doctorate in philosophy from the University of Chicago and was an organic farming pioneer, transforming his family farm in North Dakota to certified organic back in 1980. The farm is a natural prairie livestock grazing system that combines a nine-crop rotation of cereal grains, forages, and green manure.

He says that there are four key threats to industrial farming which undermines its capacity to continue in the future; In other words, its sustainability.

1-Energy constraints

The question to challenge policy makers today is this, "What kind of system will we need when crude costs $300 per barrel? Since our current industrial agriculture model is based upon cheap energy, this is his number one concern. Fertilizers, pesticides, equipment manufacturing and operation, all rely upon cheap fossil fuels. When the cost of fossil fuels goes up, farming costs skyrocket. In Iowa, anhydrous ammonia went from $200 per ton to more than $1,000 per ton almost overnight when energy prices

peaked in 2008. Farmers cannot operate profitably under such high input cost conditions, and people living hand-to-mouth can no longer afford to buy food.

2-Water Availability

Photo:James Fahn

We have been drawing down our water supplies at an unsustainable rate. The two main population centers, China and India, are drawing down their water quickly. China, which relies upon irrigation for 80 percent of its grain production draws its aquifers down about ten feet per year and is drawing at depths of 1,000 feet in some places. India depends upon irrigation for 60 percent of its grain production and is drawing down aquifers at twenty feet per year to depths of 2,000 feet some places.

According to Kirschenmann, in the US, where 20 percent of grain production is dependent upon irrigation, the country has depleted the Ogallala aquifer by one-half since 1960. It is being drawn down at a rate 1.3 trillion gallons faster than it can be replaced.

3-Climate Change

The latest thinking is that changes in climate probably won't be gradual, and it will have a potentially severe impact on farmers. Extreme weather events, shifts in weather patterns and pests, make an unpredictable profession all the more difficult. Farms using industrial approaches and dependent on monoculture and degraded soils will be particularly vulnerable.

4-Ecological Degradation

Kirschenmann is especially concerned about the destruction of biodiversity, especially of previously healthy soils. Australian agronomist Christine Jones argues that 50 – 80% of the organic carbon that was once in the topsoil has been lost to the atmosphere over the last 150 years or so, "due to our failure to take care of the earth as a living thing".

The good news is that alternatives are emerging around the world. Farmers in Kenya, for example, have created a "push-pull" system to control parasitic weeds and insects without chemical insecticides. The system "pushes" pests away by planting insect-repellant species among corn crops while "pulling" pests to plots of napier grass, which excretes a sticky gum that attracts and traps insects.The results have been remarkable. "Push-pull" doubled yields of maize and milk and is now used on over 10,000 farms in East Africa.

The global summary of the IAASTD offers agro-ecological examples as an alternative to the chemical warfare of industrial agriculture, including “improved soil and water management to increase water retention and decrease erosion; (...) wider deployment of soil conservation measures; (...) modeling of pest and alien species dynamics to reduce reliance on chemicals to maintain human and ecosystem

health while addressing emerging pest threats posed by climate change. Integrated crop, tree, livestock and fish systems can be intensified and managed as multifunctional agricultural systems with less negative consequences to ecosystems." (Global Summary, Options for Action, p. 27)

In a report for the 2012 Rio+20 summit, world-recognized agro-ecologist and University of California professor Miguel Altieri offers several examples of agro-ecology practices:

- **Crop rotations.** diversity over time, as farmers alternate crops, eg. maize followed by soybeans, followed by alfalfa. Or rice followed by garlic, but with "break crops" of nitrogen-fixing plants to increase soil fertility and "break" populations of pests or diseases.

- **Polycultures**. diversity over space, with mixed plantings instead of monocultures of a single crop. Insects can be confused by a diverse field. On-site fertility can be improved by planting nitrogen-fixing trees amongst high-value fruit trees or vegetable crops.

- **Agroforestry systems**. These are systems that combine trees with annual crops. In some cases, annual crops like maize or short-lived perennials like pineapple are planted between rows of young trees. In other systems, nitrogen-fixing trees provide fertility and partial shade for high-value crops like cacao, coffee or tea. Such systems result in higher yields and more diverse products.

- **Cover crops and mulching**. Exposed soil can be eroded by wind, rain and sun, and/or covered with weeds. Cover crops, like peanuts or other beans, and mulch like leaf litter or straw, can protect the soil and suppress weeds.

Organic food research in China

> "Some years ago, I proposed that China make efforts to develop its organic farming, or eco-farming sector, but was told that people would starve as a result. Agricultural experts have continued to spread that idea, and many academics and officials have accepted it unquestioningly. As a result, ecologists have shied away from eco-farming, while biotech experts continue to rave that genetically modified crops are the only possible solution to China's food security issues."
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> **-Jiang Gaoming** is chief researcher at the Chinese Academy of Sciences' Institute of Botany.

The methods used by the Chinese Academy of Sciences experts included: taking straw normally burnt off by farmers and processing it into fodder for cows, saving 1,500 yuan to 2,000 yuan (US$232 to US$309) per head of cattle; using some of the cow manure to make methane, to be used as an energy source, and the rest as quality organic fertilizer for the fields; and tackling pests with "physical and biological" methods – for example, insect light traps were used all year round, and chickens were kept in the field and fed on the insects. Weeds were gathered up and used as organic fodder for geese, fish and locust farming; and appropriate levels of irrigation used to maintain soil moisture. These methods allowed ecological restoration of unproductive land that had been polluted with fertilizer, pesticide and herbicide and allowed production levels to increase.

- **Crop-livestock mixtures**. The American farmer-philosopher Wendell Berry said that when animals were removed from American farms and placed into feedlots (or "factory farms") that one solution was neatly divided into two problems: not enough fertilizer (manure) for the farms and too much fertilizer (read: pollution) in the feedlots. Managing farm animals along with crops can help build fertility and control pests, and diversify the farms output.

Agribusiness and its allies in the media might portray agro-ecology as elitist or hippie sentimentalism, but nature-informed farming is a viable alternative to mainstream agricultural development. Integrating the science of ecology with traditional agricultural knowledge, agro-ecology or eco-agriculture can:

- Reduce climate change and cool the planet
- Provide enough, good, nutritious food for the world's population (including cities via urban agriculture)
- Restore biodiversity, soil fertility and water resources to degraded farmlands
- Drastically reduce poverty, improve livelihoods and security
- Maintain agrobiodiversity, critical for the resilience of food systems
- Maintain the important cultural and spiritual elements of food and strengthen food sovereignty

Extolling the virtues of agro-ecology is not to minimize the challenges faced with feeding the world,but it is to say that the dominant discourse of scarcity, doom and the genetic engineering as savior doesn't reflect reality. The challenges are real, but so are the alternatives offered by agro-ecology.

The International Assessment of Agricultural Knowledge, Science and Technology for Development (IAASTD), the most comprehensive study ever made of agricultural science and technology, reached a prophetic conclusion in 2008: "Business as usual is no longer an option."

3. SEEING FOOD THROUGH A JOURNALISTIC LENS

Reporting the truth about our food system requires an understanding of ecology and the validity of farming traditions. And it requires good solid journalism.

The BBC's Richard Black in a recent article about a new advance in plant genetics by the International Rice Research Institute (IRRI) provides a too typical example of the mainstream media's coverage of genetic engineering. The article extolled the virtue of a new GM rice plant for India that can increase yields by helping plants to better uptake soil phosphorous, a nutrient usually deficient in Asia's rice bowls. Nowhere in the article did Black quote critics of genetically modified food plants, nor did he mention the debate over earlier introduced GM crops like Bt cotton or Roundup Ready soybeans, nor did he discuss alternative research or methods for improving phosphorous uptake.

Photo:James Fahn

Norman Uphoff, a Cornell University professor and proponent of innovative cropping systems known as the System of Rice Intensification, calls this kind of thinking "genocentric," a phenomenon in which all the diverse factors that determine a good crop are simplified into a sole focus on genetics, with unfortunate consequences.

While welcoming news of the scientific advance coming out of IRRI, Uphoff warned against becoming "enamored or misled" by genocentric thinking. Such thinking "reinforces the idea that 'genes are everything' and all other aspects of crop production are secondary or subsidiary (or just forgotten). Such thinking narrows the scope of our research, and other elements of crop improvement get overlooked or little supported," said Uphoff in an email response to the IRRI study.

"Second, it reinforces in farmers unfortunate kinds of commercial and psychological 'dependence.' Farmers are likely to think that they are helpless unless they have new and better varieties, rather than

learn how to use their own resources to better effect. This kind of 'cognitive immobilization' is very pervasive in India these days and, I think, harmful.

"We need to move beyond genocentric thinking to an agro-ecological frame of mind. We should be working with farmers to help them understand how much they can accomplish by managing plants, soil, water and nutrients in different and better ways, so that we also achieve more of the benefits from soil organisms in association with plants."

Black's article is an example of how basic good journalism can be forgotten when it comes to the heady advances in technology. The idea of wondrous new plants is a lot sexier than good soil management. But that fact doesn't absolve us of our responsibility to dig deeper into the issues of food and farming.

The alternatives we face are often quite stark. By illuminating the differences with concrete examples, we can help our audiences better understand the issues. Consider the example of herbicides, or weed killers.

Herbicides can theoretically have immense practical value in a nature-informed farming, for instance for one-off local applications to establish an agroforest, say, or for attacking an invasive species to allow native plants to become re-established. But then consider the reality of herbicides in industrial food: developed from the technology of chemical warfare; dependent upon control and exploitation of petroleum; and spawning a billion-dollar industry bred by the harmful misunderstanding that it is good practice to use poisonous chemicals as a principal tool in farming.

Free fertilizers from thin air.
Nitrogen is important for plant growth. Fortunately, it is the most abundant element in the air. Unfortunately, plants can't access it by themselves. They need the help of bacteria. Certain plants, mostly members of the bean family, have a special relationship with these bacteria and can fix nitrogen from the atmosphere. These leguminous plants like acacia, peanuts and many others, decompose and make nitrogen available to crops. Synthetic nitrogen from petrochemicals, on the other hand, is a chief source of pollution and contributor to greenhouse gas. Farmers who rotate leguminous plants with their chief crops -- like Thai rice growers who grow a 45-day "break crop" of leguminous sesbania plants between their two annual rice crops -- get free nitrogen while reducing pollution and greenhouse gas emissions. In Kenya farmers who grow Faidherbia albida interspersed amongst their field crops, get nitrogen, more drought-resistant crops and fodder for animals, all in the same bargain.

Now look at it from an agro-ecological standpoint: the harm is one thing. But the main critique is that the practice is akin to burning money. Organic matter is paramount whether you're talking about nutrition, soil fertility, or carbon savings. But industrial farming discourages it. Land is wasted that could grow material for food, animal feed, fuel, mulch and compost, habitat for beneficial insects and animals, and so on. But instead it's kept bare with poisons. Soil is exposed with multiple negative impacts. Or the land is mismanaged with herbicide and rendered good habitat for invasive or noxious plants. Billions of dollars are spent on a wasteful and harmful substance.

What does genetics say about herbicide? Are the R&D and sales going mainly for grass-fighting grain crops or alleleopathic properties (natural chemical properties that discourage competition from other

species)in high nitrogen-fixing soybeans? No, they're going for plants like soy that can survive herbicides and the increasingly lifeless and simplified ecosystems they create. (Read more here about the controversy over Roundup-Ready soybeans)

Tips for Covering Food and Nature

Clearly, if the world is to feed itself sustainably, it needs to be better informed about the possibilities that are available and the lessons learned by practitioners of agro-ecology. Journalists and local media can play a critical role in spreading these lessons, and helping societies find a path toward food sovereignty, but they first need a better grounding and understanding of the various approaches that are being adopted, and the issues surrounding them.

Here are some tips for improving your coverage of agro-ecology and food security issues:

a) **Use Different Angles** – Using a "green" lens is important when it comes to agriculture. But don't just approach these issues from an environmental viewpoint. "Personal journalism" topics such as Food and Dining are more popular than ever these days so adopting this angle for a story can help you to reach larger and more diverse audiences. But there are plenty of other angles you can choose from: Agro-ecology and food sovereignty can be approached as a business or economic story, a scientific story, a health story, a social and cultural story, a security story, and so on. Reporting on these issues from different angles not only broadens your appeal and your audience, but makes the reporting more fun.

b) **Focus on People** – Most of all, look for interesting people who are working on these issues. Stories centered on individuals, rather than issues, are generally more appealing, and focusing on case studies of farmers, agro-ecologists and researchers in the field help audiences to see what is (and isn't) people. And the subjects don't just have to be success stories; efforts that failed can be just as interesting and even more enlightening.

Photo:James Fahn

c) **Avoid (or Explain) Jargon** – As with any complicated or scientific topic, agro-ecology is a topic loaded with jargon – complex words and phrases that experts toss off easily but lay audiences struggle to understand. Indeed, many of these terms are used in this toolkit! These can be a real turn-off, so try to avoid jargon wherever possible, or if you must use them, explain the terms in simple and easy-to-understand language. This glossary of agroecology terms can help.

d) **Translate the Science** – A corollary to the above is to help the audience understand the broader science and technical issues involved. Agro-ecology involves not just cutting edge research which can be quite technical and arcane, but also broad ecological and economic concepts that audiences may not be familiar with. Especially when interviewing scientists, economists and other experts, think of yourself as an interpreter who needs to translate the language of this expertise into common terms that everyone can understand.

e) **Focus on Solutions, Not Just Problems** – This may seem obvious given that agro-ecology and food sovereignty are essentially presented as solutions, but given the media's (and many editors') preference for highlighting problems and crises, journalists may be tempted to focus more on the problems of food scarcity, chemical run-offs, loss of soil quality and agro-biodiversity, and so on. Certainly, these are worthy topics to explore. But too much gloom and doom can generate apathy, fatalism and ultimately a loss of interest by the audience. Including potential solutions – and there are of course others proposed besides agro-ecology – provides a story with more balance.

f) **Explore All Sides** – More broadly, try to report on all sides of the topic, space permitting. This toolkit obviously focuses on one set of solutions, but in order to understand why it may be preferable, you first need to study and report on the current widely used system of industrial agriculture and the tensions it has created, as well as other proposed solutions such as genetic engineering. Interviewing proponents of these approaches, and coming to understand why they support the approaches they do, and what assumptions they are using, will make your reporting on agro-ecology and food sovereignty more nuanced, contextual and credible. Of course, finding the time and space to do all this research and reporting – perhaps by reporting a series of stories -- is a challenge, but it will prove to be a boon both to your understanding and career as a journalist.

g) **Use Pictures and Graphics** –A picture is worth a thousand words, as the saying goes, and the same can be said for graphics and illustrations that show the food challenges we face and how they are being met in real life. Social media is of course another tool that modern reporters have come to rely on to distribute stories more widely, get feedback and indeed find sources and information.

h) **Find News Pegs** –Editors and producers who prioritize topics such as politics and finance may be reluctant to support stories on subjects they consider arcane, such as agro-ecology and food sovereignty. So get creative in finding ways to pitch your stories in the newsroom. Good news pegs can include commemorative days (World Food Day, farmer-related events and even traditional holidays such as harvest festivals), or current events that relate to agricultural and environmental problems – famines, rising food prices, dead zones created by agricultural run-off and so on. If you're having trouble with your line editor, try approaching editors of other sections who run stories on food and dining, or business or any of the other beats mentioned in tip (a) above.

Investigating the conventional wisdom on food

Journalists need to avoid the trap of truisms, or repeating things that people tend to take for granted – thanks to billions of dollars in corporate advertising – but are often not true. Here are some examples:

1. We can't feed the *planet* without industrial agriculture.
2. Promoters of natural or organic food are elitists who will damn billions to starvation.
3. Industrial food has its downsides, but it's more productive.
4. Global hunger could be solved if all countries had enough modern technologies like nitrogen fertilizer, pesticides and 'high-yield' seeds.
5. Organic (or natural) farming is too labor intensive.

Let's examine the last point, and consider that some work is risky and harmful, and some inspires and uplifts. Working a natural agro-ecosystem is different from a job in the industrial food system. A family tending and harvesting its own agroforest in peace and sufficiency is a different kind of "labor" than an immigrant family living and working near an industrial-sized slaughterhouse.

The higher labor demand of agro-ecology compared to current conventional farming can be considered an advantage where few alternative employment opportunities exist, or where concentration of land and industrial farming in rural areas are pushing millions of farmers into overcrowded urban slums, as is happening around the world.

The forest underground. Farmers in Niger have helped hold off desertification through an ingenious yet simple practice of allowing trees to regenerate themselves on their fields. The practice involves selective pruning of shrub shoots to allow them to grow into proper trees. Previously, farmers believed that growing trees amidst productive fields would reduce their yield. As native trees tried to grow up from their roots, they were either plowed under or burned with crop residues.

But through minimal pruning of naturally regenerating shrubs, within a few years new woodlands were growing. Farmers in Niger have regenerated more than 30,000 square kilometers using this technique, which is called Farmer Managed Natural Regeneration. Properly spaced and pruned trees actually increased crop yield, by as much as 200 percent to 300 percent, all while providing an additional source of fodder and firewood. Even within a short period of time, there was enough residue from pruned trees to provide mulching for fields—increasing soil water retention and reducing evaporation.

Focus on problems today

There are many underreported stories of the harm being done by industrial agriculture today, harm that agro-ecology would avoid and could repair.

It is important for journalists to remind readers about certain facts: undernourishment, new chemical compounds in the environment, imbalance in funding between microbiology and sustainable agriculture. And remind them of the opposite messages they're often bombarded with..

One of the lessons of agro-ecology is to look at the world of food in different ways, through different lenses, than has been the norm for the last several decades of industrial food. This is true whether we're looking at soil, ecosystems, or the very question of human hunger. MS Swaminathan, one of the fathers of modern agriculture in India and a committed proponent of agro-ecology, has a message which journalists should heed:

"Hunger in the Asia - Pacific region has three major dimensions – chronic hunger caused by inadequate purchasing power; hidden hunger caused by the deficiency of micronutrients and transient hunger caused by disruption in communication due to drought, floods, cyclones, etc. Therefore any strategy for the elimination of hunger should be based on a clear understanding of the causal factors. What types of hunger exist in the areas where you work and how are they being handled? In particular how is the problem of overcoming hidden hunger being addressed?"

4. FARMING WITH NATURE … DOES IT PAY?

One of the least reported features of agro-ecology is that it can be profitable

Agro-ecology works, and generates profits, too. Too often, touchy-feely stories romanticize natural farming, but reporting that demonstrates the economics of agro-ecology will have more influence. Demonstrate examples that show the multiple benefits – biodiversity conservation, stronger local economies, healthy kids – but hammer away at the economics. If your investigations show it's not working, then tell that story. But don't repeat the old saw about how farming with nature can't feed the world. The industrial food system currently in use doesn't feed the whole world, (see 1 billion undernourished), while agro-ecology could potentially feed the world several times over while restoring health to natural systems.

Photo:James Fahn

One example: the System of Rice Intensification, known as SRI, is an agro-ecological methodology for increasing the productivity of irrigated rice by changing the management of plants, soil, water and nutrients. SRI originated in Madagascar in the 1980s and is based on the cropping principals of using fewer seedlings, younger seedlings, naturally fertilized soils and reducing water usage.

The benefits of SRI have been demonstrated in over 45 countries. They include: 50%-100% or more increased yields, up to a 90% reduction in required seed, and up to 50% water savings. SRI principles and practices have been adapted for rainfed rice as well as for other crops (such as wheat, sugarcane and teff, among others), with yield increases and associated economic benefits.

SRI's motto is "more from less": more food for less fertilizer, water and seed. Its yields don't require genetically modified seeds, or much else produced by agribusiness companies. And that's part of the problem with promoting it, of course. It produces more food and stronger rural livelihoods, but it doesn't produce much profit for multinational businesses.

"Agro-ecosystems of even the poorest societies have the potential through ecological agriculture … to meet or significantly exceed yields produced by conventional methods, reduce the demand for land

conversion for agriculture, restore ecosystem services (particularly water), reduce the use of and need for synthetic fertilizers derived from fossil fuels, and the use of harsh insecticides," reported the IAASTD. (Synthesis Report, p. 64)

(Re)Creating sustainable food systems with agro-ecology

Agro-ecosystems are not limited to rural areas, either. One of the lessons of agro-ecology is the importance of local food. Eating food produced closer to home means more nutritious food, but also food that can create jobs, improve lives and reduce so-called food miles and the carbon intensity of a meal. Urban farming is growing around the world, from Detroit to Bangkok to Rio.

"Women in one of the poorest neighborhoods of (Nova Iguacu) this city 40 km north of Rio de Janeiro no longer have to spend money on vegetables, because they have learned to grow their own, as organic urban gardening takes off in Brazil," reports InterPress Service.

Power of Duck
In Japan and Vietnam, some organic farmers raise ducks, and sometimes fish, in their rice paddies to manage pests and weeds. Raising ducks with rice is not a new system, but the wisdom of this older practice is recognized by agroecologists for its symbiosis (mutually reinforcing relationship) between the ducks and the rice: the ducks eat snails that are a pest of young rice seedlings, and they eat and suppress the weeds that compete with the rice. The ducks' manure helps with soil fertility, and their constant movement and foraging helps reduce weed germination. Of course, the farmers get meat and eggs in the bargain. By-products of the rice crop (rice bran, broken rice) can be fed to the ducks. Farmers who practice this type of crop-livestock integration report higher yields and lower labor costs.

Bringing farms into cities is of no little importance, as urbanization brings more and more people into the cities. In 2000, 81 percent of Brazilians lived in urban areas, and 10 years later the proportion has risen to over 84 percent, according to the country's 2010 census.

In fact, there are thousands of initiatives throughout the world aimed at (re)developing local food economies. Direct marketing systems like community-supported agriculture (CSA) are popping up like mushrooms around the world, directly connecting small farmers with communities. In the United States, tens of thousands of families have joined CSAs, and in some areas of the country there is more demand than there are CSA farms to fill it, reports www.localharvest.org. While there are no official figures on these often very unofficial systems, Local Harvests' database includes more than 4,000 CSAs around the country. In the early 1980s, there were none.

This reconnection of farmers and food consumers is not unique to the developed world. Agro-ecologist Miguel Altieri provides an example from Brazil, where food sovereignty is being furthered by an initiative called RedeEcovida, where family farmers, supportive NGOs and consumers whose objective is to promote agro-ecological alternatives and local markets "tighten the circle between local producers and consumers, ensuring local food security and that the generated wealth remains in the community.

"Ecovida encompasses 180 municipalities and approximately 2,400 families of farmers (around 12,000 persons) organized in 270 groups, associations and cooperatives. They also include 30 NGOs and 10

ecological consumers' cooperatives. All kinds of agriculture products are cultivated and sold by the Ecovida members, including vegetables, cereals, fruits, juice, fruit-jelly, honey, milk, eggs and meat reaching thousands of consumers."

Initiatives are emerging worldwide linking farmers with school, slums, hospitals, government offices and other institutions that can reward farmers that practice agro-ecology and scale up the system so that it can feed an increasing number of people.

Carbon and food

Obviously, how far food needs to travel from farm to consumers – in the US, this is estimated to be 1,500 miles, on average – has a consequence on the Earth's climate. But the potential of agriculture to exacerbate, or reduce, global warming, extends far beyond the question of transportation. In the UK, it is estimated that the food system contributes up to a fifth of the country's greenhouse gas emissions. The food chain running from petrochemical-based fertilizers and pesticides to methane-emitting garbage dumps is a long one.

> "After cars, the food system uses more fossil fuel than any other sector of the economy — 19 percent. And while the experts disagree about the exact amount, the way we feed ourselves contributes more greenhouse gases to the atmosphere than anything else we do — as much as 37 percent, according to one study. Whenever farmers clear land for crops and till the soil, large quantities of carbon are released into the air," writes Michael Pollan in a New York Times op-ed piece.
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> "But the 20th-century industrialization of agriculture has increased the amount of greenhouse gases emitted by the food system by an order of magnitude; chemical fertilizers (made from natural gas), pesticides (made from petroleum), farm machinery, modern food processing and packaging and transportation have together transformed a system that in 1940 produced 2.3 calories of food energy for every calorie of fossil-fuel energy it used into one that now takes 10 calories of fossil-fuel energy to produce a single calorie of modern supermarket food. Put another way, when we eat from the industrial-food system, we are eating oil and spewing greenhouse gases."

This chain of consequences can be significantly shortened with agro-ecology, through organic farming and buying locally. But it is the potential of living soil to both increase yields and income, and to capture carbon from the atmosphere, that has the most exciting possibilities for many.

The promotion by the World Bank and other powerful institutions of what is called "climate-smart agriculture" is regarded by some supporters of agro-ecology, like the Institute for Agriculture and Trade Policy, as either a ruse or a distraction, putting too much emphasis on carbon trading and not enough on sustainable practices. But the emerging story of carbon sequestration in the soil goes way beyond this.

After the oceans, the soil is the earth's largest carbon sink, says agronomist Christine Jones. Through photosynthesis plants convert CO2 to sugars to power growth, releasing oxygen into the atmosphere. The activities of symbiotic bacteria and fungi, associated with roots and fed by the sugars, enable the exuded carbon to be combined with soil minerals and made into stable humus, which locks the carbon away.

"This can't happen where farm chemicals kill the essential soil microbes," says Jones. "When chemical use is added to intensive cultivation, which exposes and oxidizes the humus already in soil, it is easy to see why soil has become a huge net source rather than a net "sink" for atmospheric CO2 under current farming practices."

But recover the soil with agro-ecology and the equation changes. For example, in 2009 the Portuguese government introduced soil carbon offsets scheme based on dryland pasture improvement. The scheme paid an estimated 400 participating farmers to establish biodiverse perennial mixed grass/legume pastures (upwards of 20 species) to improve soil carbon, soil water holding capacity and livestock productivity in an area of approximately 42,000 hectares, according to Jones' organization, Amazing Carbon.

A participating professor, Tiago Domingos, calculated that the area of agricultural land in Portugal amenable to soil carbon offsets could collectively sequester more than the current Portuguese national emissions deficit under the existing Kyoto Protocol arrangements .In addition to the carbon payments they receive, participating Portuguese farmers were reported as "enjoying the environmental spin-offs of greater biodiversity, higher soil fertility, higher water infiltration rates, less erosion, less desertification, fewer fires, less floods, improvement in water quality, less dependence on concentrated feed for their herds in protracted dry periods and better milk and meat quality."

Tim Wiley, a development officer with Western Australia's Department of Agriculture and Food, reports that "if all Western Australia's agricultural soils were sequestering carbon, we would soak up WA's current emissions. This would have the potential to significantly decrease Australia's net emissions and meet our Kyoto obligations." Add in the rest of Australia's agricultural land area – and the world's – and the impact on global CO2 levels is evident.

Serious challenges ahead, but also hope

As the challenges of feeding the world's population become more complex and critical, new thinking and approaches become necessary. Journalists can make an important contribution to debates over food and farming by helping to inform their audiences about not just the challenges, but also about the emergence of agro-ecology and its potential to make a difference. As food writer Michael Pollan writes, eating "is a political act." Food is one area where everyday people can make a difference. The job for journalists is to help people understand the challenges, the alternatives, and ways they themselves can make a difference.

> "The ecological footprint of industrial agriculture is already too large to be ignored, and projected increases in future global environmental changes could make the footprint even larger

… . Natural resources, especially those of soil, water, plant and animal diversity, vegetation cover, renewable energy sources, climate, and ecosystem services are fundamental for the structure and function of agricultural systems and for social and environmental sustainability, in support of life on earth. Historically the path of global agricultural development has been narrowly focused on increased productivity rather than on a more holistic integration of natural resource management with food and nutritional security. A holistic, or systems-oriented approach, is preferable because it can address the difficult issues associated with the complexity of food and other production systems in different ecologies, locations and cultures."

-Summary Report of the International Assessment of Agricultural Science and Technology for Development (IAASTD)