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Catherine Sneed to Keynote 2001 NOFA Summer Conference

by Steve Lorenz

The organizing committee for next year's NOFA Summer Conference and Celebration of Rural Life is already hard at work. If nothing else, the 27th annual festival can guarantee another outstanding keynote speaker. The committee is proud to announce that Cathrine Sneed, widely respected for her work in environmental and social justice, will kick off the conference with an invigorating speech on the evening of Friday, August 10, 2001 at Hampshire College.

The logo and theme for the conference is in the works and will reflect Sneed's commitment to "growing community," as evidenced by The Garden Project, which she founded in San Francisco in 1982. An idea which sprouted from Sneed's reading of John Steinbeck's "The Grapes of Wrath" during a serious illness, The Garden Project began in 1982 as a horticulture program for prisoners in the San Francisco County Jail. With little money and tools at the outset, the project grew due to the determination of Sneed and the program's participants. Since its inception, The Garden Project has added a post-release program, which offers job training in organic gardening and tree care, counseling, and educational assistance.

Sneed's work teaching thousands of individuals to work the land has yielded great results: fresh food for hundreds of families and seniors, 10,000 street trees planted and maintained, and a remakably low rate of recidivism for Garden Project participants. Less than one-fourth of those involved in the Garden Project return to jail. Most likely, it is this statistic that garners Sneed so much attention. She has been featured in *The New York Times*, *The Economist*, and on A&E's "Uncommon Americans," and has received numerous awards, such as The National Caring Award, and the Hero for the Earth award.

But, as should concern NOFA folks, it's in the way Sneed achieves these numbers that matters. By teaching them to grow food, she nourishes prisoners and the prisoners' need for growth. And next August, she's sure to give the NOFA community some food for thought, too.

Plans for the rest of the conference will take shape in the coming months and are in very able hands. After some minor restructuring, the committee held its first planning meeting on Sunday, October 1. Evaluations were reviewed and discussed, as were ways to alleviate congestion in the dining hall and ensure that all food served there is local and organic whenever possible (i.e., no more bottled Coca-Cola).

The conference committee's next planning meeting is scheduled for Sunday, December 3. If you are interested in joining this lively group, or if you have any ideas for new workshops, please contact conference coordinator Julie Rawson at 978-355-2853 or JACKKITT@aol.com.

Text of Keynote at 2000 NOFA Summer Conference

by Eliot Coleman

I was invited to speak at a conference in California a few year's ago. The audience was pretty surprised to find someone from back east growing fresh crops during what I believe they called "their season." And I said well, look guys, my taxes are subsidizing your irrigation water out here. My taxes are paying for the highways that allow you to ship produce back east. My taxes are paying to keep the Navy in the Gulf to protect the oil supply so you can do that. I mean, come on, how many more advantages can I give you? You're going to have to learn how to compete on your own! That isn't what I came to talk about tonight but it's worth the story. During our talk tomorrow Barbara and and I will discuss how we do manage to compete with California in winter production.

What are my qualifications for being up here? Well I've been doing this for thirty-five years so I guess that means I have at least put in my time. And being an organic farmer thirty-five years ago was a bit different than it is today. When I mentioned "organic" people would sort of look around to see if I'd tracked something in onto the carpet. But because of that and because of those years of experience I have some strong beliefs on what it's all about. I happen to think that we're pretty important. There's a book that just arrived at our house about a month ago written by Thor Hyerdaal of Kon Tiki fame and its about his earliest expedition. At the end of the book he's talking about what he's learned over the years, seeing the world and the environment.

And he says in the book, speaking of human beings:

> "Our progress has become in part, an effort to complicate simplicity. Farmers and fishermen remain the only true nobility of modern society. Working to feed us from the natural world we left behind. Without them, modern society with all its banks and shops and power lines and water pipes would collapse."

Well, as a member of the only true nobility of modern society, I wanted to comment on some of the things I've seen and some of the things I believe in. I happen to honestly believe from what I've seen of people and what I've seen of livestock over the years, and I've raised every type of livestock imaginable, that eating "real food", fresh food, whole food, food from local farms, grown using compost and green manures and crop rotations and minerals, is the answer. And if we do that, everyone can

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Can Local, Organic Farming Feed the World?

photo courtesy Food & Agriculture Organization

Children in Bhutan

The Natural Farmer Needs You!

The Natural Farmer is the newspaper of the Northeast Organic Farming Association (NOFA). All members receive a subscription as part of their dues, and others may subscribe for $10 (in the US or $14 outside the US). It is published four times a year at 411 Sheldon Rd., Barre, MA 01005. The editors are Jack Kittredge and Julie Rawson, (assisted by their kids), but most of the material is either written by members or summarized by us from information people send us.

Upcoming Issue Topics - We plan a year in advance so that folks who want to write on a topic can have a lot of lead time. The next 3 issues will be:

Spring 2001 - Home Gardening
Summer 2001 - The Other Organic Systems: Biodynamics and Permaculture
Autumn 2001 - Organic Landscaping

Moving or missed an issue? The Natural Farmer will not be forwarded by the post office, so you need to make sure your address is up-to-date if you move. You get your subscription to this paper in one of two ways. Direct subscribers who send us $10 are put on our data base here. These folks should send address changes to us. Most of you, however, get this paper as a NOFA member benefit for paying your chapter dues. Each quarter every NOFA chapter sends us address labels for their paid members, which we use to mail out the issue. We don't keep copies of these, and if you moved or didn't get the paper, your beef is with your state chapter, not us. Every issue we print an updated list of "NOFA Contacts" on the last page, for a handy reference to all the chapter names and addresses.

As a membership paper, we count on you for articles, art and graphics, news and interviews, photos on rural or organic themes, ads, letters, etc. Almost everybody has a special talent or knows someone who does. If you can't write, find someone who can to interview you. We'd like to keep the paper lively and interesting to members, and we need your help to do it.

We appreciate a submission in any form, but are less likely to make mistakes with something typed than handwritten. To be a real gem, send it via electronic mail (JACKKITT@AOL.com) or enclose a computer disk (3 1/2 inch size). We use a Macintosh G3 with Microsoft Word but can with only modest difficulty convert IBM disks as well. Also, any graphics, photos, charts, etc. you can enclose will almost certainly make your submission more readable and informative. If you have any ideas or questions, one of us is usually near the phone - (978) 355-2853, fax: (978) 355-4046

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Throughout my adult life I have been told that it is the responsibility of the United States (with perhaps some help from British Commonwealth countries such as Canada and Australia) to feed the world. Apparently the world, which has been feeding itself for an awfully long time, had lost the knack.

In order to meet our obligation, I remember hearing, we found heroic Green Revolution figures such as Iowan Norman Borlaug who worked tirelessly developing "wonder crops" which saved India and Indonesia. Now, we are told, US food aid is an unblemished bipartisan boon to grateful, hungry masses and genetically engineered crops will soon eliminate malnutrition everywhere.

It never occurred to me to ask why Asians, Africans and Latin Americans couldn't develop their own "wonder crops". Not until I went to Cuba in 1996 and saw decentralized ag research institutes, staffed by farmers with barely a high school education, experimenting with native forages, leguminous trees, biological control of pests, herbal remedies, crop rotations and green manures.

But what they were doing in Cuba was try to get away from the "wonder crops" which they had been growing for a generation. Those crops depended on massive petrochemical inputs for fertility, pest control, and traction. With the collapse of the Soviet Union, imported petroleum was suddenly priced out of reach. The wonder crops failed and the island was experiencing hunger. The researchers were rediscovering how to raise food based on local crops, soils, livestock, and climate.

Most of the developing world, unfortunately, is going through a slower, but very similar process. It has largely been converted to food production that does not suit local conditions and instead requires expensive inputs. Only large farms survive, and then only by growing for the lucrative export market. Small-holders disappear, agricultural poverty spreads, people move to the cities seeking work, and hunger spreads.

Many critics have now come to understand this system and challenge the world view which sustains it. In this issue of The Natural Farmer we look at this process of globalizing agriculture and consider an alternative — going back to local production, based on local knowledge and inputs, rather than capital and petrochemicals. We call this "local, organic" production in the sense that local means it will be eaten by people within a few hundred miles of where it is grown, and organic means it is raised without significant amounts of synthetic chemical inputs, often using traditional knowledge and methods.

We hope this supplement stimulates your thinking.

Advertise in The Natural Farmer

Advertisements not only bring in TNF revenue, which means less must come from membership dues, they also make a paper interesting and helpful to those looking for specific goods or services . We carry 2 kinds of ads:

The NOFA Exchange - this is a free bulletin board service for NOFA members and TNF subscribers. Send in up to 100 words (business or personal) and we'll print it free in the next issue. Include a price (if selling) and an address or phone number so readers can contact you directly. If you're not a NOFA member, you can still send in an ad - just send $5 along too! Send NOFA Exchange ads directly to The Natural Farmer, 411 Sheldon Rd., Barre, MA 01005 or (preferably) E-mail to JACKKITT@AOL.COM

Display Ads - this is for those offering products or services on a regular basis! You can get real attention with display ads. Send camera ready copy to Justine Johnson, 145 LaPlante Circle, Easthampton, MA 01027 and enclose a check for the appropriate size. The sizes and rates are:

Full page (15" tall by 10" wide)	$240
Half page (7 1/2" tall by 10" wide)	$125
One-third page (7 1/2" tall by 6 1/2" wide)	$85
One-quarter page (7 1/2" tall by 4 7/8" wide)	$65
One-sixth page (7 1/2" tall by 3 1/8" wide), or (3 3/4" tall by 6 1/2" wide)	$45
Business card size (1 1/2" tall by 3 1/8" wide)	$12

Note: These prices are for camera ready copy. If you want any changes we will be glad to make them - or to type set a display ad for you - for $10 extra. Just send us the text, any graphics, and a sketch of how you want it to look. Include a check for the space charge plus $10.

Frequency discounts: if you buy space in several issues you can qualify for substantial discounts off these rates. Pay for two consecutive issues and get 10% off each, pay for 3 and get 20% off, or pay for 4 and get 25% off. An ad in the NOFA Summer Conference Program Book counts as a TNF ad for purposes of this discount.

Deadlines: We should receive your ad copy one month before the publication date of each issue. The deadlines are:

January 31 for the Spring issue
April 30 for the Summer issue
July 31 for the Fall issue
October 31 for the Winter issue

Contact for Display Ads: Send display ads with payment to our advertising manager, Justine Johnson at 145 LaPlante Circle, Easthampton, MA 01027. If you have questions, or want to reserve space, contact Justine at (413) 527-1920 or JJSL145@aol.com.

Disclaimer: The Natural Farmer cannot investigate the claims of advertisers and we don't vouch for anything advertised here. Readers are expected to exercise due caution when inquiring about any product or service. Different NOFA chapters have different standards for fertilizers, for instance, and a product acceptable in one state may be prohibited in another. Please check with your chapter when in doubt. Remember, however, that advertisers are helping support the paper and, when appropriate, please support them.

NOFA Exchange

Program Manager Wanted! The CSA Learning Center, an educational non-profit based at Angelic Organics, a 74-acre Biodynamic community supported agriculture (CSA) farm serving 850 shareholders annually, seeks a program manager. The program manager coordinates farm and city based workshops for community members, shareholders and farmer interns. Responsibilities include group scheduling, workshop development and facilitation, volunteer orientation, and organic farming and livestock care. Experience working cross culturally and with low income communities preferred. Salary & benefits negotiable. Send resume and cover letter to Tom Spaulding, CSA Learning Center, 1547 Rockton Road, Caledonia, IL 61011. Or contact us at Learn@AngelicOrganics.com or (815) 389-8455.

Apprentices Needed: Small alternative school with four acres of certified organic veggie, herbs, and flower gardens seeks 3 apprentices for the 2001 growing season (May 1 - Sept.) We have a small CSA and farm stand. We also sell to restaurants. We work hard. We are also located in a very beautiful region of the country just below the White Mountains in NH. The area has many places to swim and hike. It is recommended that you come visit. Send a resume and letter of interest to Jeff Barkstrom, The Community School, 1164 Bunker Hill Road, S. Tamworth, NH 03883. Info call Jeff or Monty @ (603)323-7000

Perennial Vegetable Seeds. Catalog offering low-maintenance edible plants. Including perennial grain rye and wheat! This year many unusual, delicious tropicals which can be grown as annuals in the north. Of course we continue to offer the best selection anywhere of hardy leaf and root crops for edible forest gardens, edible landscapes, and establishing managed foraging patches. Check out www.perennialvegetable.com or send $1 for catalog to Perennial Vegetable Seed Company, PO Box 608, Belchertown MA 01007.

Couple eager to learn how to farm is **looking for intern positions** on a diversified vegetable farm for the 2001 season. Call Lew Kramer or Alice Terry at 631-262-0055, email: sethyin@gis.net.

Internship available for Spring 2001 at George Hall (Ogre) Farm 180 Old Farms Rd. Simsbury, CT 06070 (860) 658-9297 georgehallogre@aol.com. For over 30 years George Hall has been farming organically. Come learn greenhouse work, CSA, farmers' market, retail deliveries, farmstand, beekeeping, and organic farming methods. We provide rustic housing, stipend and veggies from the farm. Five interns are wanted for year 2001, April-October (flexible). (Don't be alarmed by OGRE-like voice on the telephone.

Whole Village (www.wholevillage.org) is an initiative led by a group of families and individuals who intend to build a conservation community (ecovillage) in the Town of Caledon, northwest of Toronto, Ontario, Canada. We are **seeking a farmer or farm family** to take on the responsibility for planning and managing the agricultural aspects of the Whole Village. Those interested must be willing to live in the community and participate fully in all aspects of the undertaking. Financial investment in the project would be appreciated but is not essential for the successful candidate(s). For more information contact Jeff Gold at jgold@netrover.com or by telephone at 519-941-1099.

Farmer Wanted: Experienced in commercial, organic vegetable production. Position and compensation dependent on experience. Year round, long term possibilities. 40 acres certified vegetables and berries, apples. Farmstand. Contact John or Gordon at Hutchins Farm, 754 Monument St., Concord, MA 01742. 978-369-5041, hutchfarm@earthlink.net

Job opportunities at Holcomb Farm CSA, West Granby CT. Our 16 acre CSA serves households and social service organizations in the greater Hartford area. We also provide an on farm education and work experience for at-risk youth 1) Asst. Farm Manager will coordinate produce harvest, distribution, and record keeping, and will assist with all activities required for crop production. 2) 2-4 month Internships and full season Apprenticeships. Participate in all aspects of organic vegetable production on a mechanized farm and help coordinate youth and member activities. For more information contact Paul Bucciaglia, The Hartford Food System, 509 Wethersfield Avenue, Hartford, CT 06114 ph (860)296-9325, email csamanager@hartfordfood.org

Farm Position Available: Field Mgr. and Field Worker for upcoming 2001 season. Salary based on expierence, Send letter of interest or resume to Butter Brook Farm 982 Main Street, Acton, Ma 01720. Attention Guy McKay.

House on Organic Farm for Sale in Vermont. Self-sufficient, sunny home for sale in northeast Vermont. Second house on 180 acre, certified organic, working vegetable, grain and herb farm. Rich river bottom soil. Attached greenhouse, passive solar. Wood heat, cook stove in kitchen. Composting toilet. Gravity-feed water. Three bedrooms, one with loft. Established perennial gardens, generous vegetable garden space. House only, $75,000. Potential for other agricultural enterprises and/or investment as a separate deal with the farmers. Land protected by Vermont Land Trust. Restrictions apply. Annie McCleary, 117 Riverside Farm Lane, East Hardwick, Vermont, 05836. (802)-472-8020. Email: purpconeflower@cs.com

Internship Position: Wild Roots Farm - 110 acre diversified farmstead and 7 acres organic vegetables grown for 100 member CSA. Homesite with young orchard, swimming pond, chickens, Icelandic sheep, Highland cow and lush forest. Interns will have the opportunity to learn CSA marketing, organic vegetable production, off the grid living, blueberry gorging, and natural history. We are 10 minutes from the Catskill Forest Preserve, and 1/2 hour from the Delaware River. We are looking for 2 interns with a passion for learning experientially. Intern cabin, stipend and veggies provided. Amy and Wes Gillingham, 669 Cattail Road, Livingston Manor, NY 12758. 845-439-4799

Farm Manager needed by spring at Holly Hill Farm in Cohasset, MA. This is a full-time, year around position at a small, certified organic privately owned farm starting its third year. Housing available. Individual or couple welcome to apply with second job being open a possibility. Must be experienced organic grower with ability to interact with the public and strong commitment to the "community farm" concept. Call Frank or Jean White at 781-383-6965 to receive detailed job description and information about the farm and/or send letter and resume to Holly Hill Farm, 226 Jerusalem Road, Cohasset, MA 02025 by January 15, 2001.

Internships available at Road's End Farm. Small-scale diversified organic fruit and vegetable operation. Beautiful Finger Lakes rural area. Farmers' market, growers' cooperative, on-farm sales. Opportunity to learn wide variety of skills. Experience not required, enthusiasm and willingness to work are. Room, board, in some cases stipend available. No television; lots of books and wild conversations. Season is early May to early November; shorter and longer terms considered. Rivka Davis, Road's End Farm, 362 Smith Road, Dundee, NY 14837; 607-243-5234

Blow Your Own Horn!

CSA Seeks Farmer - Four-year old, forty-share CSA seeks experienced, organic farmer. Land in southeastern Mass. owned by Dominican Sisters is secure for long-term commitment. Goal is expansion of CSA and development of other operations to make enterprise sustainable. 1 1/2 acres in cultivation on 40 acres, mostly in woodland. CSA is well-established with strong community support. Good infrastructure in place. Simple living accommodations available. For more information contact Crystal Spring Earth Center, 76 Everett Skinner Rd., Plainville, MA 02762, (508) 699-7167; cryspr@naisp.net

Angelic Organics **seeks an assistant field manager** starting this fall or in March of 2001. Assisting the current field manager in the first year and co-managing fields in subsequent years. We are an 800 member Biodynamic CSA vegetable and herb farm located in north-central Illinois. We are entering our 12th year growing organically and our 9th year as a CSA. We manage 80 acres, 25 of which grow vegetables and herbs that feed over 1000 families in the Chicago area. Candidate must have at least 2 years growing experience. Beginning salary - $1,000-$1,200/mo + room & board. Review the web at http://www.AngelicOrganics.com for more information.

Available — 17 34" x 76.5" **solar panels**. Originally used as part of air (vs. water) solar heating system. Planned to use to construct greenhouse. No hardware included. Call Mike (in Connecticut) to inspect at 203-487-3055.

Spring Hill Farm, located in Hopewell, NJ is **seeking two apprentices** for the 2001 growing season. We are a diversified vegetable, herb and flower farm growing for busy farmer's markets and a restaurant. A stipend and off-farm housing will be provided. SHF is part of a regional apprentice education program, which offers farm visits to participating farms. Please send resumé to 135 Princeton Ave., Hopewell, NJ 08525 or call Pam Flory at (609) 466-4747.

We are a non-profit residential treatment center for emotionally troubled youth looking to expand our 3.5 acre therapeutic market garden. We **are hoping to receive tax-deductible equipment donations** but could, with a limited budget, purchase discounted equipment. We are especially in need of a small cultivating tractor, seeders, wheel hoes, rototillers, and produce coolers, but also need fabric row covers, wheel hoes, poly, and hoops. Please contact Jason Townsend at Green Chimneys' Childrens' Services: (845) 279-2995 x228

Positions for 2001 Season: **Asst. Farm Manager** - share responsibility for management of 18 acre farm and CSA. Field planning, seed selection, greenhouse and planting schedules. Field work and tractor experience necessary. Need good communication skills, work as team member. Living space, farm vegetables, workman's comp and salary. **Apprentice** - Will be involved in all aspects of the farm operation. Private room, farm vegetables and stipend. Work week is 5 1/2 days April to November. Contact Eileen, Ol' Turtle Farm, 385 East St., Easthampton, MA 01027, 413-527-9122 olturtle@javanet.com

Farming Opportunities: Seeking both assistant farm manager and interns for 2001. For the right person position could evolve into year round management position or partnership arrangement in the future. Formerly I ran Old Depot Gardens, now expanding onto new 50 acre farm in Granby, MA. Organic vegetables, fruits, flowers and greenhouse crops with an emphasis on retail and CSA marketing. Call Ryan at (413) 367-2395 for more information.

Indian Runner Ducks, 6 female, 1 male, good layers of fertile eggs. Hatched 4/26/98. Can no longer take care of them because of health problems (ours, not the ducks.) No charge, or course. We are located near Winsted, CT. (860) 693-4175 Ed Wagner, Gisela Whittemore

Seeking Grower's Assistant - help with field prep, seeding, cultivating, harvesting, organizing summer staff, implementing day to day work. $375 per week, starts April 1 through mid-November (possibility of year-round employment)**, Forest and Field Manager** - Clear trails, mow large meadows, maintain orchard, tree felling, brush clearning, help out at farm. All work is outdoors and includes long, strenuous hours. Full-time position, pay reflects previous experience. Drivers license required. For either job, send resume and cover letter to: Land's Sake, Inc., PO Box 306, Weston, MA 02493

Many Hands Organic Farm has plenty of NOFA/Mass certified **organic pork and chicken** in our freezer. Chickens (6 lbs.) are $3.00/lb., pork ranges from $4.00 to $4.50/lb. Call at 978-355-2853 or Email at jackkitt @ aol.com.

Two **items about genetically engineered (GE) foods**. 1) A spiral-bound book Contains photocopies of memoranda from FDA's own scientists with warnings about GE food safety. At least 11 of 17 members of FDA's scientific panel declared that GE foods pose unique food safety concerns, and are not "substantially equivalent" to foods produced by conventional plant breeding. A great resource for activists; loan to your doctors, health providers, legislators, etc. 100 pgs. $15 covers my cost, incl. shipping. No copyright; you're free to copy.
2) The censored FOX-TV video about recombinant (GE) Bovine Growth Hormone (rBGH) in the Florida milk supply. 25-minutes, by reporters Acre and Wilson. Never broadcast, due to pressure from Monsanto Co. Acre recently won a $425,000 jury verdict against Fox. This video, a lawsuit-exhibit, is now "public domain." Purchase at cost for $15 (incl. shipping) or pay my shipping cost to you, copy, and then send it back. This is a real 'eye-opener' about the non-organic milk supply and a great way to get your "non-organic" friends and family involved.
Send check/M.O. to: Jason Boehk, 204 Prospect Street, North Adams, MA 01247, or call (413) 664-6645.

Positions Available: Grower's Assistants. Will work on 21 acre farm in Lincoln, Massachusetts as an integral part of growing, marketing, and distributing produce to shelters, soup kitchens, CSA and a Farmers' Market. Full time position from April-November 2001. Workers comp, $375 per week. Send resume and cover letter to The Food Project, PO Box 705, Lincoln, MA 01773. For info call (781) 259-8621 or visit www.thefoodproject.org

News Notes

UN says World Can Feed Itself without GE Foods

According to the Food and Agriculture Organization of the United Nations, the world can produce enough food to meet global demand in 2030 without relying of genetically engineered crops. The population at that point is expected to be 8 billion. The report notes that genetically engineered crops "frequently perform worse for farmers than conventional crops." More information is available at www.fao.org/es/ESD/at2015/toc-e.htm. *source: Alternative Agriculture News, September, 2000*

UK Studies Show Organic Methods Benefit Biodiversity

A report by Britain's Soil Association reviewed numerous studies of the effects of organic and conventional lowland farming on groups of wildlife. Among the findings, organic methods compared to conventional result in: five times the biomass of wild plants in fields, 25% more birds at field edge, 44% more birds in fields during fall and winter, 2.2 times as many breeding skylarks, 1.6 times as many arthropods, 3 times as many non-pest butterflies, 1 to 5 times as many spiders, 57% more wild plant species, and 2 times as many rare plant species. *source: "Organic Farming", summer, 2000*

Females with Male Parts?

As many as two percent of female Norwegian Arctic polar bears are growing male genitals, report scientists at the Norwegian Polar Institute. They suspect the cause is high levels of polychlorinated biphenyls (PCBs*). source: Our Toxic Times, October, 2000*

Another Natural Insecticide?

Wild tobacco plants protect themselves against insect pests by exuding a sugar ester on their leaf hairs that dissolves the waxy coating which protects an insect from desiccation. Commercial products that use this principle are now in development and should be available soon. *source: "Organic Farming", autumn, 2000*

Feds to Limit State Food Labeling

A bipartisan bill pushed by the Grocery Manufacturers Association would prohibit any state or political subdivision from imposing any notification requirement on food respecting that food's safety unless the wording is identical to Federal Drug and Cosmetic Act provisions. The National Uniformity for Food Act of 1999 (HR2129 and S1155) has unanimously passed the Senate Agriculture Committee and awaits full Senate action. *source: In Good Tilth, September, 2000*

Organic Produce Higher in Minerals

A study commissioned by the Organic Retailers and Growers Association of Australia found that organic fruits and vegetables have up to 10 times more mineral content than conventionally grown produce. Tomatoes, beans, capsicums and silver beets grown on an organic farm were analyzed and compared to equivalent conventional produce bought at a supermarket. Calcium levels were up to 8 times higher, potassium 10 times higher, magnesium 7 times higher, and zinc 5 times higher. The tests were done at an Australian government analytical lab. *source: "Organic Farming", autumn, 2000*

Purslane Effective as Living Mulch

Purslane makes a less expensive mulch for spring broccoli than black plastic, and is competitive with chemical weed controls, report researchers at the University of Connecticut. Broccoli yields were not reduced by using the herb in lieu of traditional weed control strategies. *source: "Organic Farming", autumn, 2000*

US to Infect Narcotics with Genetically Engineered Fungus

In what sounds like a bad movie, US scientists working on a joint project for the Department of Agriculture and the Department of Defense have been charged with engineering a fungi, Fusarium oxysporum, to destroy millions of hectares of opium poppy plants, coca plants and cannabis plants around the globe. The effort, "Operation End Smoke", was exposed by the environmental group "The Sunshine" in Nairobi. US Secretary of State Madeleine Albright called for the United Nations Drug Control Program to support the program with funds from other nations to demonstrate international support and avoid an anti-US backlash. *source: In Good Tilth, September, 2000*

Santa Monica Grade School Opens Fresh Salad/Fruit Bar

In an innovative and popular program to increase students' intake of fresh fruits and vegetables, the Santa Monica, California school district is offering elementary school students a salad bar with fresh vegetables and fruits from a local farmers market as an alternative to the traditional hot lunch. Nutritionally, the salad bar exceeds the USDA requirements, especially as it is fortified with something like yogurt or bread. The cost per serving of the salad bar is less than the hot lunch. *source: Growing for Market, October, 2000*

Starbucks to Expand Support for Organic Coffee

The upscale coffee retailer Starbucks will spend $600,000 over the next 3 years helping farmers grow shade grown and organic coffees in Africa and Asia. The Conservation International project technical assistance program was successful in Mexico last year and they believe will help grow coffee without destroying tropical forests. Shade grown coffee is the fastest growing segment of the $5.4 billion coffee industry. *source: Alternative Agriculture News, October, 2000*

Brazil to Refine a Biodiesel Fuel

Brazil is working on refining a diesel fuel from soy oil and sugar cane that may be able to cut air pollution from farm machinery by 90 percent. The fuel is compatible with conventional diesel engines and has been approved for compliance with clean air regulations in several US states. Brazil is a top world producer of soy and sugar cane. . *source: Alternative Agriculture News, September, 2000*

US Investigates "Reuse" of Radioactive Soil for Backyards and Playgrounds

The US Nuclear Regulatory Commission has begun a literature search to discover "realistic reuse scenarios" for many tons of contaminated soil currently piled at the nation's nuclear power plants. One possible scenario is the "suburban scenario" where the "exposure pathway" might include gardening and inadvertent ingestion of soil. One consultant, asked to alert the NDC to other relevant information, suggested Russian documents on the Chernobyl accident and Japanese documents on Hiroshima and Nagasaki. The NRC concluded those cases were not relevant. *source: Environmental News Service, October 19, 2000*

GM Tree Fruit Threatens Organic Orchard

Researchers at the Pacific Agri-Food Research Centre in British Columbia are genetically engineering tree fruit that will not brown when bruised. Over 900 acres of nearby certified organic orchards, open-pollinated by bees, are in danger of losing their certification because of genetic contamination. *source: "Organic Farming", summer, 2000*

Recall of "StarLink" GE Corn Shakes BioTech Industry

StarLink is the name for a protein, also known as Cry9C, which is normally produced by the bacillus thuringiensis soil organism. The protein is deadly to corn borers and has been genetically engineered into corn by the French/German conglomerate Aventis. Although some Bt corn has been approved for human consumption by the Environmental Protection Administration (EPA), this variety had not been approved because it showed properties that might cause allergic reactions in humans. It had been approved, however, for use in animal feed. As everyone knows, somehow StarLink corn got into the human food supply despite the EPA disapproval. On September 18 an anti-GE coalition including the environmental group Friends of the Earth revealed that tests showed StarLink corn in a major food product, Kraft taco shells.

At first Kraft tried to deny the validity of the tests, but when independent testing confirmed the charge, they issued a recall of 2.5 million boxes of tacos. Shortly after that, Aventis halted sales of the seeds, and the USDA issued a formal recall for all 350,000 acres of StarLink corn. The coalition then disclosed that further tests had detected StarLink in other corn products and some of the largest US food and feed processors — Kellogg, ConAgra, Archer Daniels Midland and Tyson — announced closure of grain mills and mandatory further testing. The White House sent teams to Japan and Europe to reassure US trading partners that the flap was under control. As one Iowa grain elevator operator told the Washington Post: "I think we're just hitting the tip of the iceberg here. We just don't know what's in those elevators, and when we start letting this stuff go and it's tested, it's going to get worse!"

Several hundred million dollars have already been lost, and consumers are just starting the class-action lawsuits. The EPA is caught between the food industry, pressing to declare StarLink safe so the problem will go away, and consumers pressing to declare all the nation's Bt corn, potatoes, soy and other crops hazardous. The US decision October 27 to let exporters ship StarLink corn to foreign markets exacerbated the problem, telling the world that Americans are too good to eat what we freely ship elsewhere. The international fallout has begun, with Japan rejecting an entire 55,000-ton shipment of US corn and Argentine farmers reconsidering their acceptance of herbicide-tolerant GE soy.

The real question raised by this fiasco has yet to be answered. If the US regulatory agencies can't keep a forbidden GE food product out of the food stream, how can we trust them when it comes to GE plants containing vaccines or pharmaceuticals? As the British pro-biotech magazine New Scientist noted on October 7: "We can't ignore the taco fiasco…Why was it left to Friends of the Earth to commission the tests that found StarLink in taco shells? The food industry needs to get its act together before the new generation of modified plants arrives. Next time, the consequences could be serious." *source: BioDemocracy News #30*

Bread & Circus & Fresh Fields Offer NOFA Another 5% Day!

Whole Foods Markets, which owns Bread and Circus and Fresh Fields stores in the northeast, has offered once again to sponsor a 5% Day to benefit NOFA. Whole Foods has a history of supporting local non-profit groups through fundraisers like this and we are excited that the Northeast Region of Whole Foods has chosen NOFA as one of only 2 groups benefitting from a region-wide 5% Day this year. This is an opportunity to not just raise money to help fund projects in each state, but also (and perhaps more importantly) to reach out and educate hundreds of consumers. We can let them know how much is already being done locally by NOFAs in each state and how much more we plan to do.

Whole Foods will advertise this day ahead of time in their stores' pamphlets, and will put up a banner over each store on the day itself to help draw people into the store. In return for this support, they ask that we have a strong presence in each store for that day. We'll have display materials and brochures to hand out, and are asking for volunteers from each state to help man the stores. It's great to have farmers and growers there, but the most important quality of any volunteer is… enthusiasm. We also need volunteers to help with organizing and pre event publicity. Anyone who feels strongly that NOFA is doing important work and has a few hours to spare to help should contact their state chapter, with 2 exceptions. Members in Connecticut should contact Johan van Achterberg at 359 Silver Hill Rd., Easton CT 06612-1134; (203) 261-2156, e-mail vanachj@concentric.net. Members in Massachusetts should contact Karen Franczyk at (978) 297-3644, e-mail franczyk@ma.ultranet.com.

Display materials for the stores are being put together this winter, and anyone who has pictures of farms, farmers, animals or NOFA projects they'd like to contribute are welcome to send them to Karen Franczyk at 683 River St., Winchendon, MA 01475. Please only send pictures you don't need back!

There are currently 17 stores in the region, with an 18th opening sometime in February, in Manhattan. (For a complete list of stores you can go to the Whole Foods web site, www.wholefoodsmarket.com.) This is a GREAT opportunity to connect with like-minded people who may choose to join NOFA or support our work in some way in the future. We are also asking members who shop these stores regularly to save up larger purchases for this day to further help us out, and please let your friends and relatives know as well. The date will be either March 27th, March 28th, April 3rd, or April 4th. We will give out the definite date when we get it, through state newsletters, the website, and the next TNF. Thanks in advance for all your enthusiastic help and support!

Special Supplement: Can Local, Organic Farming Feed the World?

Food Security in the Developing World: A Challenge for Agroecological Approaches to Farming?

Prepared by Lynn R. Brown
Lynn Brown is a policy analyst at the World Bank. Here she presents the globalist position on world hunger at its most progressive.

Around 800 million go to bed hungry every night, one third of all preschool children are clinically malnourished, and 2 billion people are deficient in one or more micro-nutrients such as iron, zinc, iodine and vitamin A. The bottom line of these abject statistics is that more than 6 million children a year die of causes related to malnutrition. For those that survive they face high rates of sickness, and achieve less in school resulting in poorer job opportunities, lower wages and likely poverty in adulthood.

These statistics are testimony to the lack of food security in today's world; food security is achieved when everyone has sufficient food to sustain a healthy and active life. At the national level this is the result of sufficient domestic production and/or food imports, at the household level sufficient domestic production and/or income for food purchases, and at the individual level the outcome of intra-household food distribution. Except in time of war or politically imposed famine food insecurity today is a poverty problem. There is more than enough food globally but developing countries and their citizens cannot afford to buy it, despite historically low prices.

Tomorrow, however, food insecurity could also be a food shortage problem. Rising incomes, increasing the demand for livestock products, and an increasing world population means that global food consumption will likely double in the next 40 years. Around 95% of the population increase will be in the developing world, and the majority of those in areas located between the Tropics of Cancer and Capricorn. These areas, the sub-humid and semi-arid tropical regions, have highly complex farming systems about which we are far less knowledgeable. Most farmers are poor with small landholdings, subject to water scarcity, soil degradation, and climate change related temperature stresses. Unsurprisingly agricultural productivity is low, which keeps farmers poor, and leads to further natural resource degradation given the lack of resources to invest in sustainable land management practices.

Today the world faces a double challenge; firstly to ensure access for all people to enough food to sustain a healthy and active life, and secondly to ensure that increases in food production keep pace with, or exceed, population increases. Given that most of the population will be added to the developing world, the bulk of the increased crop production should also occur in these countries. At best we probably have about 10 percent more land available to expand production to meet these increasing needs. Therefore, the majority of the increases must come from increasing crop yields.

The driver of improvements in cereal yields in the past has been technology, and notably the Green Revolution. Today, however, the indications are that cereal yields are stabilizing or even declining. From 1967-82, the main period of the Green Revolution, cereal yields in developing countries rose on average at almost 3 percent per year. Between 1982 and 1994 that average annual increase fell to under 2 percent and International Food Policy Research Institute (IFPRI) forecasts it to fall below 1.5% between 1995 and 2020 (See table 1).

Some criticized the Green Revolution arguing that it disproportionately benefited the rich in the early years, relying as it did on complementary increased useage of fertilizer, pesticides, and irrigation. The higher input farming also led to criticisms on an environmental front, which in some instances were valid. But at the end of the day the Green Revolution enabled us to grow more food on less land. In India, wheat production on existing acreage tripled. Globally, the Green Revolution doubled the yields of staple grains such as rice and wheat. If there had been no new technologies post 1961 it would have been necessary to increase agricultural land by at least 80% to feed the 80% higher population in 1993. That would have meant converting an extra 970 million hectares to cropland, and a total of 3,550 million hectares to agricultural use, with consequences for environmental degradation and loss of biodiversity. As it was, cropland and total agricultural area expansion was just 8 percent (Ghoklany 1998).

Despite the overall success of the Green Revolution we can learn lessons from it as we move forward to face the challenge of producing enough food to feed the world in the future. Gordon Conway, the President of the Rockefeller Foundation, has pointed out that the next technological revolution in agriculture must be doubly green – it must increase food production at a faster rate than in recent years and do it in a sustainable manner without significantly damaging the environment. It should also increase the potential for improving rural incomes, creating employment opportunities, and increasing accessibility to food by the poor.

The Green Revolution was spearheaded by the Consultative Group for Agricultural Research (CGIAR), one of the most significant public research groups for the developing world. The additional wheat production due to growth of CGIAR varieties in developing countries is estimated at US$1.8 billion annually. Maize production has increased threefold in West and Central Africa between 1981 and 1996, sufficient to feed 40 million people each year, with an overall value of US$1.2 billion.

The benefits from this public sector research, however, have accrued far beyond the developing world. The United States Agency for International Development contributed some US$71 million to the International Maize and Wheat Improvement Center, (CIYMMT – Spanish acronym) a CGIAR center, between 1960 and 1993. Between 1970 and 1993, the US economy gained at least US$3.4 billion, and up to US$13.7 billion, from use of improved wheat varieties based on lines developed by CIYMMT (Pardey et al. 1996). This is based on an assessment of the yield gains realized using improved varieties with CIYMMT ancestry, the adoption rate on US farms, and the value of the additional production, net of the corresponding costs. This is a sizeable return on what was a humanitarian investment. Public sector investments in agricultural research for the developing world feed back into improvements in developed country agricultural commodities, which benefit not only developed country farmers but also consumers in terms of lower food prices

The best of all news though is that developing country consumers, particularly the poor who spend the bulk of their incomes on food, are the biggest beneficiaries from this CGIAR research. A recent report indicates that without the agricultural productivity improvements from CGIAR research wheat prices would be 34% higher, maize 29%, rice 41%, other grains 29%, and root crops 27% (Evenson 2000).

Today the CGIAR recognizes the need for its research to both increase agricultural productivity and to sustain, and even rehabilitate, the environment where possible. Many technological advances are win-win propositions. Scientists at the West African Rice Development Association, (WARDA) a CGIAR center, have just "bred" NERICA rice, "New Rice for Africa". In the past it has never been possible to cross the traditional lower yielding, but highly stress tolerant, high tillering African rice with the agronomically superior high yielding Asian rice to produce a high yielding rice variety for cultivation in African rice systems. The profuse droopy lower leaves characteristic of African rice are important as they inhibit weed growth. This is very important in West African rice farming systems

where women are responsible for weeding the paddies, in addition to other agricultural activities, post harvest processing, marketing, child rearing, fuelwood collection, water collection, cooking, and many others - generally with very few labor saving devices. Using the latest scientific techniques WARDA has now successfully achieved this cross, producing a rice which has a shorter maturation period, a higher yield, a higher protein content (important for food insecure areas) and a plant architecture which inhibits weed growth. A winning rice for all stakeholders.

Agricultural science has much to offer in terms of breeding crops which are tolerant to adverse conditions such as nitrogen deficiency, drought, and salinity, or which are resistant to pests and disease. In some cases there are extra bonuses in this approach. Often, not only is a higher yield possible but the crop may be nutritionally enhanced with higher levels of minerals or protein, such as the NERICA rice. However, some answers provided by agricultural science are controversial given their attainment through genetic engineering. While some argue against the genetic enhancement of crops it is interesting to note that nature and conventional plant breeding have been transferring genes between related cultivars since the beginning of time. In conventional breeding where a cross is made to achieve a particular trait, such as a dwarf variety, up to 25,000 unknown genes may be transferred, in addition to the desired genes, to produce an offspring manifesting the desired trait. In modern genetic engineering the desired trait is achieved by the transfer of the specific required genes, generally just one or two. Yet, this modern genetic engineering, which is more precise than conventional approaches, generates considerable debate in Europe and increasingly so in the United States of America, particularly among organic farmers.

Alongside these new scientific developments is an emphasis on more integrated land management practices. There is often serious debate among professionals as to which is the most appropriate practice with regard to land management. This debate ranges from sole emphasis on organic farming methods to emphasis on almost exclusively non-organic practices favoring chemical fertilizers, pesticides and herbicides. Somewhere within that spectrum lies an agroecological approach which emphasizes reducing the level of external inputs in favor or more organic matter and labor inputs (Pinstrup-Andersen et al. 1999). Ultimately I would argue that none of these approaches offers a single viable solution for the developing world's farmers. In fact, best practice for developing country farmers lies in combining the most recent advances in molecular biology, and its biotechnological applications, with the advances in our knowledge of ecosystems management for sustainable natural resources management, to develop appropriate solutions for their own farming systems.

The more organic approaches offer advantages in terms of emphasis on sustainable natural resource management. These approaches rely heavily on labor inputs and management skills. The farming systems of the world's poorest farmers tend to concentrate on low value staple food grain production. For these farmers the returns to labor are extremely low. Increasing labor input to low value staple production is not viable from an economic perspective given the absence of a price premium in the local market for organic produce, as in the American market for example. In many countries agricultural extension service provision is minimal and thus farmers lack the necessary management skills to maximize sustainable agricultural production absent use of any inorganic materials.

Additionally, the extent of soil nutrient depletion in many parts of the developing world puts it beyond redemption by sole use of organic inputs. In the more densely populated semiarid, arid, and Sudano-Sahelian areas of Africa, soils lose 60-100 kilograms of nitrogen, phosphorous and potassium (NPK) per hectare per year. Rates of NPK loss are also high, above 60 kilograms per hectare per year, in the East African highlands and moderate, between 30 and 60 kilograms per hectare per year, in the humid forests and wetlands in southern central Africa. In the period 1993-1995 the difference between nutrient losses and nutrient inputs ranged from 14 kilograms of NPK per hectare per year in South Africa to 136 kilograms per hectare per year in Rwanda. About 86% of African countries show annual NPK losses in excess of 30 kilograms per hectare per year. If this nutrient loss was translated into chemical fertilizer equivalent it equals about US$ 1.5 billion per year. This is in addition to the foregone agricultural production – crop yields were virtually unchanged in the aggregate in Africa between 1981 and 1995 (Henao and Baanante 1999).

These very high losses of nutrients suggest a policy of fertilizer promotion for sub Saharan Africa. It is certainly true that chemical fertilizer use is extremely low in the region – in most countries less than 10 kilograms per hectare per year, and then largely used on a small number of export crops. Burkina Faso, for example, would have to increase its NPK consumption more than 11 fold to maintain current crop production levels without depleting nutrients. Advocating exclusive use of inorganic fertilizers is also an impossible economic proposition for developing country, small-holder, poor farmers. The price of fertilizer at the farmgate in sub Saharan Africa is about four times that in Europe. That said, an over-emphasis on chemical fertilizer use, exceeding basic requirements would lead, potentially, to more harm than good – in the worst case lower yields, higher nutrient losses and groundwater contamination.

In reality a holistic and integrated approach should be used for sustainable agricultural development. Farmers should use both integrated nutrient and pest management approaches.

Integrated nutrient management seeks to increase agricultural production and safeguard the environment using both organic and inorganic plant nutrients. It relies on nutrient application and conservation, new technologies to increase nutrient availability to plants, and the dissemination of knowledge between farmers and researchers (Gruhn, Goletti and Yudelman 2000). Application of appropriate fertilizers, some of which will be inorganic, will be critical given the nutrient imbalances detailed above. However, fertilizer use can be moderated by using terracing, alley cropping, minimum to zero tillage methods, cover crops, crop rotations and tree fallows. Rotation of cereals and leguminous plants has been shown to reduce chemical fertilizer use by 30%, as cereals absorb the nitrates released from the decaying roots and nodules of leguminous plants. The Sesbania tree is used in fallow with maize in Kenya. The trees are planted alongside maize, such that the maize grows to harvest while the trees are still young and small. After the maize is harvested, the trees grow further during the fallow fixing nitrogen in the soil and providing a rich source of fuelwood, another critical commodity in many developing country poor villages. Use of the Sesbania tree fallow approach also reduces the incidence of Stryga infestation. This suggest also that pests and disease can and should be addressed through an integrated approach rather then exclusive use of pesticides and herbicides.

IPM is a knowledge-intensive and farmer-based approach that encourages natural control of pest populations by anticipating pest problems and preventing pests from reaching damaging levels. Appropriate techniques are used, such as enhancing natural enemies, planting pest-resistant crops, adapting cultural control methods, and, as a last resort, using pesticides judiciously.

A key element in ensuring use of integrated nutrient and pest management is ensuring the correct policy environment prevails. This is one which does not lead to an overuse of inorganic fertilizers and pesticides through explicit price subsidies, or through implicit subsidies as with an overvalued exchange rate. A key role of the World Bank is to engage in this policy dialogue with developing country governments. However dialogue in this area is always more difficult when developed country governments heavily subsidize their own agricultural sectors leading to the loss of agricultural markets for the developing world, in which they should have comparative advantage. OECD countries spend US$300 billion a year on agricultural subsidies to protect their agricultural markets, almost equivalent to $316 billion gross domestic product of all of Sub Saharan Africa in 1998. Such an un-level playing field in the agricultural marketplace makes it difficult to encourage sustainable agricultural development practices in the developing world.

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Can Local, Organic Farming Feed the World?

by Jack Kittredge (based on writings from Peter Rosset, Miguel Altieri, Frances Moore Lappé, Mae-Wan Ho, and Joseph Collins)

Introduction

Globalists have argued for over a generation that without active intervention from the "haves" the world's "have-nots" will no longer be able to feed themselves. In service to this belief, the developed world has sponsored a Green Revolution of new, high-yielding crops, has created a network of relief and aid programs to supply cheap food to the masses in developing nations, has facilitated world trade in agricultural products to exploit local advantages for maximum production, and now has endorsed genetic modification (GM) of plants and animals to lower costs per food unit produced.

After a half-century of such policies, however, many critics now suggest that this approach has been self-defeating. They argue that Green Revolution crops require expensive inputs, that they benefit only a small class of very large farmers who grow for export markets, that the availability of imported cheap food undermines the rural economy, and that it has led to hundreds of millions of impoverished families leaving the countryside to seek non-existent work in Third World cities. They believe that GM crops will only aggravate this process. Instead, they propose, let agriculture in developing nations build on traditional crop varieties which are adapted to local conditions, let it employ some of the unemployed masses crowding urban areas, let it use low-cost, locally available inputs, and let it first feed its own people, only secondarily looking to export markets.

Can such a localized, natural or "organic" approach really succeed in feeding a growing world?

Population

World population has certainly been growing rapidly and now stands at over 6 billion. Projections for the future, however, have sometimes been alarmist and have had to be revised downwards several times in the late 1990s. By mid-1998, the UN's estimate was that world population will peak at 7.7 billion in 2040, then go into long term decline to 3.6 billion by 2150, less than two-third of today's number.

An overwhelming 97.5 percent of the increase in population is expected to occur in the developing world, whose share of global population would increase from 79 percent in 1995 to 84 per-cent in 2020. Whereas the absolute population increase will be largest in Asia, 1.1 billion, the relative increase will be greatest in Africa, where the population is expected to increase by 70 percent. This rate of increase, however, is less than had been projected in the past, partly because of HIV/AIDS, which is ravaging the African population. One-third of the total population increase is anticipated to occur in just two countries—China and India. However, India's population is growing much faster and is poised to overtake that of China by 2035.

Hunger

The relationship between population growth and hunger has been hotly debated since Thomas Malthus published his ''Essay on the Principle of Population'' in 1798. In that book he argued that while population grows exponentially, food production grows only arithmetically, inevitably moving us toward scarcity and famine.

But history has not supported Malthus' theory: Over the past 35 years, global per capita food production has outstripped population growth by 16 percent. We now have more food per person available on this planet than ever before in human history.

So why, if this is the case, do we have hungry people at all? The answer lies in how our global food system is controlled and who has access to the abundance it produces. The level of hunger in a country is not just directly linked to the ability of that country to produce food. For every densely populated and hungry country, like Bangladesh, there are sparsely populated countries like Brazil and Bolivia where hunger persists alongside abundant food producing resources.

Hunger is related to the capacity of a society to both produce food and to distribute it to those who need it. Cropping patterns, scale of operation, makeup of the work force, family income levels, ownership of the crop, potential markets, and many more considerations are involved.

Traditional vs. Green Revolution Agriculture

In the 1960s, the Green Revolution was introduced to the developing world by the World Bank and the Rockefeller Foundation, and caused drastic loss of traditional varieties through emphasis on high yield with high input. Farmers were told by "experts," such as Nobel Peace Prize winner Norman Borlaug, to exchange their traditional varieties for the new ones — which turned out to be both very expensive and very susceptible to disease.

One of the primary ways the Green Revolution worked was by establishing "research institutions" such as the International Rice Research Institute (IRRI). IRRI was founded in the Philippines in 1959 under an agreement forged by the Rockefeller and Ford Foundations with the Philippine government, and its lease for operation expires in 2003. At its recent 40th anniversary celebration, hundreds of Filipino rice farmers protested against IRRI for introducing GM crops. They blame IRRI, among other things, for promoting the Green Revolution and causing massive loss of biological diversity in rice paddies throughout Asia.

For instance, in the forests of Thailand the Karen people used to plant 100 varieties of rice. Now only 5 are left. Under "expert" instruction they planted rice in the same place for 4 years, which led to the loss of both the rice crops and the forest. The Karen blame academics and the authorities for not understanding swidden (shifting) agriculture which works on a four year cycle.

Every country in the world still has the resources, if properly mobilized, to feed its own population. Ecologists are increasingly finding that the more biodiverse the ecosystem the greater the carrying capacity, and hence the more people and wild-life it can support. Biodiverse systems are also more stable and resilient. These principles have guided traditional indigenous farming systems and are now being re-applied on 12.5 million hectares around the world in holistic approaches such as organic, biodynamic, or permaculture that integrate indigenous and western scientific knowledge. The yields produced by these approaches have doubled and tripled and are still increasing, at the same time as reversing some of the worst environmental, social and health impacts of the green revolution.

Women as Farmers

Agricultural productivity increases dramatically when women have access to the same amount of inputs as men. In Sub-Saharan Africa when women obtain the same levels of education, experience, and farm inputs that currently benefit the average male farmer, they increase their yields for maize, beans, and cowpeas by 22 percent. In Kenya, where the amount of education women receive is extremely low, a year of primary education provided to all women farmers would boost maize yields by 24 percent.

In much of the world a person's gender affects his or her property rights — the rights to use and manage land resources. Property rights greatly influence land care. Farmers with long-term access to land have a greater incentive to sustain that land and develop ways of preserving and regenerating it. The ability of women to own or cultivate land over the long term will affect the management of natural resources.

Small Farms

Evidence from hundreds of grassroots development projects show that increasing smallholder agricultural productivity with agroecological techniques not only increases food supplies, but also increases smallholder incomes, reducing poverty, increasing food access, reducing malnutrition and improving

the livelihoods of the poor. Data from thousands of successful experiences of sustainable agriculture implemented at the local level show that over time agroecological systems exhibit more stable levels of total production per unit area than high-input systems. They produce economically favorable rates of return; provide a return to labor and other inputs sufficient for a livelihood acceptable to small farmers and their families; and ensure soil protection, conservation, and enhance agrobiodiversity.

Small farmers in the United States are aware of the same phenomenon. Organic farmer Dave Hambleton has kept detailed records of production of first-quality produce in beds on his one acre farm. Utilizing double-cropping and other yield-enhancing but labor intensive practices, he reports harvesting over 19,700 pounds of produce from his operation. That is 9.85 tons per acre or close to one half pound of food per square foot. These figures are comparable to those I recorded in Cuba for various crops, and estimates of yields achieved in the US under agroecological systems.

Cuban & US Production
(tons per acre)

	Cuban (Gilberto Leon Coop)	US agroecological (Karl Schwenke[1])	(John Jeavons)
beets	16.9	10	6.4
cabbage	24.4	15.2	9.6
carrots	16.6	15.2	12.8
lettuce	10	7.6	10.4
potatoes	13	9	11.2
sweet potatoes	9.5	9	5.2
tomatoes	6.8	10	6.8

[1] "Successful Small Scale Farming"

Urbanization

Much of the population growth projected in developing countries is expected to take place in the cities. Urban expansion and issues of food supply and distribution to and in the cities have major consequences. Agriculturally productive lands within and around cities are likely to be lost in competition with demands for land for housing, industry, and infrastructure, so increasing quantities of food must be brought into cities and distributed within the expanding urban areas. Urban preferences for convenience and processed meals raise issues of food quality and type, while the presence of many low-income urban households stresses public health and social order.

photo courtesy Food & Agriculture Organization

Bosnian widow gardens on town land

Expected Level Of Food Consumption in Selected Cities, 2000 and 2010

City	2000	2010
Yaoundé	3,030	5,752
Nairobi	4,805	7,984
Isfahan	13,000	20,500
Karachi	41,800	63,900
Lima	19,276	24,567
Port-au-Prince	2,934	4,450
Managua	2,782	4,075

(Figures in 1,000 metric tons)

Some of the problems with feeding urban populations are significant. With food coming into the city from distant rural areas, food losses from processing and distribution delays can be as high as 35 percent for perishable food products. Processing waste disposal can become a problem if generated far from areas of food production. Transportation costs can reach as high as 90 percent of the overall food marketing margin.

Urban and near-urban agriculture, however, can be an important source of food, especially when the national rural food production, marketing, and transportation systems are not well developed. In Chinese cities, 95% of vegetables are produced locally. Singapore produces all its meat and a quarter of its vegetables. Calcutta ponds provide 20% of the city's fresh fish. Shanghai is almost self-sufficient in fresh vegetables. Urban food production can also reduce fuel needed for food transport, generate income for unemployed city-dwellers, and recycle valuable nutrients back into the food system.

Incomes

In many developing nations a significant mismatch exists and is growing between local food supply and demand. As production becomes larger scale, more capital intensive and oriented to export markets, less employment opportunities exist in agriculture for local labor. Rural income falls and there is less money available to generate demand for traditional foods, so even more farms become export oriented. Eventually rural families move to the city in search of work.

This cycle is swelling capital cities throughout Africa, Asia and Latin America with the landless poor while the farms which used to support them are producing coffee, chocolate, and dozens of other high-value crops for American, European, Japanese and other markets.

Intensive urban agriculture can be part of the solution, particularly where misguided food "aid" does not drive prices to a level that undermines local production. But so far most developing countries have not been able to create an urban middle class with incomes sufficient to nurture a growing market for local foods.

Foreign Aid

Most U.S. aid works directly against the hungry. Where governments answer only to elites, foreign aid not only fails to reach hungry people, it shores up the very forces working against them. Our aid is used to impose free trade and free market policies, to promote exports at the expense of food production, and to provide the armaments that repressive governments use to stay in power. Even emergency, or humanitarian aid, which makes up only five percent of the total, often ends up enriching American grain companies while failing to reach the hungry and dangerously undercutting local food production in the recipient country.

Distribution

The global marketplace moves food around the globe not in response to human need, but rather in response to money. Food flows northward from poor and hungry nations to wealthy and well-fed consumers in northern countries. The poor in those countries are left out.

To maintain internal order within developing countries, many governments have subsidized a few staples, buying the commodities in international markets but reselling at prices below the cost of local production. Financing these subsidies with scarce reserves or debt, authorities face increasing difficulties maintaining such policies as urban poverty increases.

Agricultural Biotechnology

For several years now Green Revolution proponents have been boosting the cause of genetic engineering (GE). They have promoted herbicide-tolerant and pesticide-producing crop varieties as technological wonders which will increase production at no risk to the environment or human health. They have even portrayed the engineering of Vitamin A producing rice as an act of benevolent science. The reality, however, is a little more chilling.

Productivity Issues

Transgenic crops do not significantly increase crop yields. A study at the University of Nebraska shows that GE Roundup Ready soya yielded 6-11% less than non-GE soya, confirming an earlier Univ. of Wisconsin study which also found that the GE soya required 2 to 5 times more herbicides.

A U.S. Department of Agriculture (USDA) Economic Research Service (ERS) report (1999) analyzed data collected in 1997 and 1998 for 12 and 18 region/crop combinations, respectively. The crops surveyed were Bacillus thuringiensis (Bt) corn and cotton, and herbicide tolerant corn, cotton, and soybean, and their nonengineered counterparts. In both years, a majority of the crop/region conbinations showed no significant yield increase in engineered vs. non-engineered crops, and at least one case saw a decrease. In a few cases the Bt

photo courtesy Food & Agriculture Organization

Feria Libre urban market in San José, Costa Rica

engineered crops showed an increase, especially under high European corn borer pressure, but this is sporadic.

Additionally, in commercial plantings of Bt corn it is mandatory for farmers to leave 20 percent of their land as refuges. (It is expected that patchworks of transgenic and non-transgenic crops can delay the evolution of resistance by providing susceptible insects for mating with resistant insects.) The crops in the refuge are likely to sustain heavy damage and, thus, farmers will incur yield losses. A refuge kept completely free of pesticides must be 20-30 percent the size of the engineered plot, but the refuge should be about 40 percent the size of the biotechnology plot if pesticides are to be used, since insecticide spraying can increase the odds of Bt resistance developing.

If, instead, 30 percent of arable land was devoted to growing soybeans in a strip cropping design (as many alternative farmers do in the Midwest), yield advantages up to 10 percent over comparable monocultures of corn and soybean would be achieved, as well as introducing potentials for internal rotation in the field and contour arrangements of strips to minimize erosion on hillsides. Moreover, European Corn Borer would be minimized as pest populations tend to be lower in mixed and rotational cropping systems.

Environmental Issues

GE crops are also turning out to be unsafe for non-target creatures. The bacterial Bt-toxins engineered into many crops are poisonous for beneficial and endangered species such as lacewings, the Monarch butterfly and the black swallowtail. Bt crops also encourage new resistant pests to evolve. Stink bugs in North Carolina and Georgia are eating up the Bt-cotton crops and have to sprayed with pesticides.

Human Health Issues

According to a recent report from Germany, GE genes in pollen have transferred to the bacteria and yeasts in the gut of baby bees. This kind of horizontal gene transfer involves the direct uptake of foreign genetic material. It has been found to happen also in the field. After GE sugar beet was harvested, the GE genetic material persisted in the soil for at least two years and was taken up by soil bacteria.

Not only microorganisms, but animal cells, including human cells can readily take up the GE constructs and the foreign genes often end up in the cell's own genetic material, its genome. Not so long ago, the pro-biotech scientists were insisting horizontal gene transfer couldn't happen. Now, they are saying it happens all the time, so no need to worry.

The crucial question is whether GE genetic material is like ordinary genetic material. The answer is no. There is a world of difference between GE genetic material and natural genetic material. Natural genetic material in non-GE food is broken down to provide energy and building-blocks for growth and repair. In the rare event that the foreign genetic material gets into a cell's genome, other mechanisms can still put the foreign genes out of action or eliminate it. These are all part of the biological barrier that keeps species distinct and has been so for billions of years of evolution.

GE-constructs are designed to invade genomes and to overcome natural species barriers. Because of their highly mixed origins, GE constructs tend to be unstable as well as invasive, and may therefore be more likely to spread by horizontal gene transfer. GE constructs consist of genetic material of dangerous bacteria, viruses and other genetic parasites from widely different origins. They are combined in new ways that have never existed, and put into genomes that they have never been part of. They include antibiotic resistance genes that make bacterial infections very difficult to treat. And, you never just put a gene in by itself. It needs a gene switch or a promoter to work. Typically an aggressive promoter from a virus is used to make the gene over-express continuously – something which never happens in healthy organisms.

One viral promoter in practically all GE crops is from the cauliflower mosaic virus, CaMV for short. This CaMV promoter has a recombination hotspot – a site where it is prone to break and join up with other genetic material. It is promiscuous in function and has been shown to work extremely well in frog eggs and extracts of human cells . It is already known to be able to substitute for promoters of other viruses to give infectious viruses.

What will happen when these dangerous GE constructs spread? There's the obvious potential that they may recombine with viruses and bacteria to create new strains that cause diseases. The antibiotic resistance genes may also spread to bacteria associated with serious diseases such as meningitis and tuberculosis. GE constructs that invade genomes may recombine with, and wake up dormant viruses that have now been found in all genomes.

The Egregious Example of Golden Rice

Perhaps the most recently trumpeted argument for genetic engineering is that a new rice variant, 'Golden Rice', produces Vitamin A and is the proper way to address the condition of two million children around the world at risk of Vitamin A deficiency-induced blindness.

Golden rice was engineered to produce pro-vitamin A or beta-carotene (the substance that makes carrots orange) in the *endosperm*, i.e., the part of the rice grain that remains after it has been polished.

The reason given for creating this strain of rice, however, is that the aleurone layer (in unpolished rice) is usually removed by milling as it turns rancid in storage — especially in tropical areas — and the remaining endosperm lacks pro-vitamin A. The researchers thus admit that at least some varieties of unpolished rice have pro-vitamin A.

The reason rice is milled is to prolong storage for export, and to suit the tastes of the developed world. So why not give the poor access to unpolished rice? A proportion of every rice harvest could be kept unpolished and either given freely to the poor, or sold at the cheapest prices. But the scientists have not considered that possibility.

Unpolished rice was in fact part of the traditional Asian diet until the Green Revolution, when aggressive marketing of white polished rice created a stigma surrounding unpolished rice. Most rural communities, however, still consume unpolished rice and now that consumers have become aware of its nutritional value, unpolished rice is becoming sought after.

It amounts to this: rice is polished, which removes pro-vitamin A, therefore a hundred million dollars (much of it tax-payers' money) is needed to put pro-vitamin A into polished rice. Neither the scientists nor the funders have looked further beyond the technology to people's needs and aspirations, or to what the real solutions are.

This example reveals a tremendous naiveté about the reality and causes of vitamin and micro-nutrient malnutrition. If one reflects upon patterns of development and nutrition one must quickly realize that Vitamin A deficiency is not best characterized as a problem, but rather as a symptom, a warning sign if you will. It warns us of broader dietary inadequacies associated with both poverty, and with agricultural change from diverse cropping systems toward rice monoculture. People do not present Vitamin A deficiency because rice contains too little Vitamin A, or beta-carotene, but rather because their diet has been reduced to rice and almost nothing else, and they suffer many other dietary illnesses such as deficiencies in iron, iodine and a host of other micronutrients that cannot be addressed by beta-carotene, but which could be addressed, together with Vitamin A deficiency, by a more varied diet. A magic-bullet solution which places beta-carotene into rice—with potential health and ecological hazards—while leaving poverty, poor diets and extensive monoculture intact, is unlikely to make any durable contribution to well-being.

The real cure is to re-introduce agricultural biodiversity in the many forms of sustainable agriculture already being practiced successfully by tens of millions of farmers all over the world.

The Myth of Scarcity

by Frances Moore Lappé, Joseph Collins & Peter Rosset

MYTH:

With food-producing resources in so much of the world stretched to the limit, there's simply not enough food to go around. Unfortunately, some people will just have to go hungry. We must put all our efforts into boosting agricultural production in order to minimize hunger.

OUR RESPONSE:

The world today produces enough grain alone to provide every human being on the planet with 3,500 calories a day. That's enough to make most people fat! And this estimate does not even count many other commonly eaten foods—vegetables, beans, nuts, root crops, fruits, grass-fed meats, and fish. In fact, if all foods are considered together, enough is available to provide at least 4.3 pounds of food per person a day. That includes two and half pounds of grain, beans and nuts, about a pound of fruits and vegetables, and nearly another pound of meat, milk and eggs.

Abundance, not scarcity, best describes the supply of food in the world today. Increases in food production during the past 35 years have outstripped the world's unprecedented population growth by about 16 percent. Indeed, mountains of unsold grain on world markets have pushed prices strongly downward over the past three and a half decades. Grain prices rose briefly during the early 1990s, as bad weather coincided with policies geared toward reducing overproduction, but still remained well below the highs observed in the early sixties and mid-seventies. All well and good for the global picture, you might be thinking, but doesn't such a broad stroke tell us little? Aren't most of the world's hungry living in countries with food shortages—countries in Latin America, in Asia, and especially in Africa?

Hunger in the face of ample food is all the more shocking in the Third World. According to the Food and Agriculture Organization (FAO) of the United Nations, gains in food production since 1950 have kept ahead of population growth in every region except Africa. The American Association for the Advancement of Science (AAAS) found in a 1997 study that 78% of all malnourished children under five in the developing world live in countries with food surpluses.

Thus, even most "hungry countries" have enough food for all their people right now. This finding turns out to be true using official statistics even though experts warn us that newly modernizing societies invariably underestimate farm production—just as a century ago at least a third of the U.S. wheat crop went uncounted. Moreover, many nations can't realize their full food production potential because of the gross inefficiencies caused by inequitable ownership of resources.

Finally, many of the countries in which hunger is rampant export much more in agricultural goods than they import. Northern countries are the main food importers, their purchases representing 71.2 percent of the total value of food items imported in the world in 1992. Imports by the 30 lowest-income countries, on the other hand, accounted for only 5.2 percent of all international commerce in food and farm commodities. Looking more closely at some of the world's hunger-ravaged countries and regions confirms that scarcity is clearly not the cause of hunger.

photo courtesy Food & Agriculture Organization

Granary in Uganda

India

India ranks near the top among Third World agricultural exporters. While at least 200 million Indians go hungry, in 1995 India exported $625 million worth of wheat and flour, and $1.3 billion worth of rice (5 million metric tons), the two staples of the Indian diet.

Bangladesh

Beginning with its famine of the early 1970s, Bangladesh came to symbolize the frightening consequences of people overrunning food resources. Yet Bangladesh's official yearly rice output alone — which some experts say is seriously under-reported— could provide each person with about a pound of grain per day, or 2,000 calories. Adding to that small amounts of vegetables, fruits, and legumes could prevent hunger for everyone. Yet the poorest third of the people in Bangladesh eat at most only 1,500 calories a day, dangerously below what is needed for a healthy life.

With more than 120 million people living in an area the size of Wisconsin, Bangladesh may be judged overcrowded by any number of standards, but its population density is not a viable excuse for its widespread hunger. Bangladesh is blessed with exceptional agricultural endowments, yet its 1995 rice yields fell significantly below the all-Asia average. The extraordinary potential of Bangladesh's rich alluvial soils and plentiful water has hardly been unleashed. If the country's irrigation potential were realized, experts predict its rice yields could double or even triple. Since the total calorie supply in Bangladesh falls only 6% short of needs, nutritional adequacy seems an achievable goal.

Brazil

While Brazil exported more than $13 billion worth of food in 1994 (second among developing countries), 70 million Brazilians cannot afford enough to eat.

Africa

It comes as a surprise for many of us to learn that the countries of Sub-Saharan Africa, home to some 213 million chronically malnourished people (about 25 percent of the total in developing countries), continue to export food. Throughout the 1980s exports from sub-Saharan Africa grew more rapidly than imports, and in 1994, 11 countries of the region remained net exporters of food.

The Sahelian countries of West Africa, known for recurrent famines, have been net exporters of food even during the most severe droughts. During one of the worst droughts on record, in the late 1960s and early 1970s, the value of the region's agricultural exports—$1.25 billion—remained three times greater than the value of grain imported, and such figures did not even take into account significant unreported exports. Once again, during the 1982-85 drought food was exported from these countries.

Nevertheless, by 1990, food production per person had apparently been declining for almost two decades, despite the productive capacity suggested by Africa's agricultural exports, and in 1995 over one third of the continent's grain consumption depended on imports. We use the word "apparently" because official statistics notoriously underreport, or ignore all together, food grown for home consumption, especially by poor women, as well as food informally exchanged within family and friendship networks, making a truly accurate assessment impossible. In fact, the author of the AAAS report referred to earlier argues that despite inaccurate statistics and misleading media imagery, hunger is actually less severe in Sub-Saharan Africa than in South Asia. Repeated reports about Africa's failing agriculture and growing dependence on imports have led many to assume that too many people are vying for limited resources. Africa's food crisis is real, as evidenced by moderately high rates of childhood malnutrition—but how accurate is this assumed cause of the crisis?

Africa has enormous still unexploited potential to grow food, with theoretical grain yields 25 to 35% higher than maximum potential yields in Europe or North America. Beyond yield potential, ample arable land awaits future use. In Chad, for example, only 10% of the farmland rated as having no serious production constraints is actually farmed. In countries notorious for famines like Ethiopia, Sudan, Somalia and Mali, the area of unused good quality farm land is many times greater than the area actually farmed, casting doubt on the notion that there are simply too many people for scarce resources.

Many long-time observers of Africa's agricultural development tell us that the real reasons for Africa's food problems are no mystery. Africa's food potential has been distorted and thwarted.

- The colonial land grab that continued into the modern era displaced peoples and the production of foodstuffs from good lands toward marginal ones, giving rise to a pattern where good land is mostly dedicated to the production of cash crops for export or is even unused by its owners. Furthermore, colonizers and, subsequently, national and interna-

tional agencies, have discredited peasant producers' often sophisticated knowledge of ecologically appropriate farming systems. Promoting "modern," often imported, and ecologically destructive technologies, they have cut Africa's food producers out of economic decisions most affecting their very survival.

- Public resources, including research and agricultural credit, have been channeled to export crops to the virtual exclusion of peasant-produced food crops such as millet, sorghum, and root crops. In the 1980s increased pressure to export to pay interest on foreign debt further reinforced this imbalance.
- Women are principal food producers in many parts of Africa, yet both colonial policy and, all too often, ill-conceived foreign aid and investment projects have placed decisions over land use and credit in the domain of men. In many cases that has meant preferential treatment for cash crops over food crops, skewing land use and investment patterns toward cash crops.
- Aid policies unaccountable to African peasant producers and pastoralists have generally bypassed their needs in favor of expensive, large-scale projects. Africa has historically received less aid for agriculture than any other continent, and only a fraction of it has reached rain-fed agriculture, on which the bulk of grain production depends. Most of the aid has backed irrigated, export-oriented, elite-controlled production.
- Because of external as well as domestic factors African governments have often maintained cheap food policies whereby peasants are paid so poorly for their crops that they have little incentive to produce, especially for official market channels. The factors responsible for these policies have included developed country dumping of food surpluses in African markets at artificially low prices, developed country interest in cheap wages to guarantee profitable export production, middle class African consumer demand for affordable meat and dairy products produced with cheap grain, and government concerns about urban political support and potential unrest. The net effect has been both to depress local food production and divert it toward informal, and therefore unrecorded, markets.
- Until recently many African governments also overvalued their currencies, making imported food artificially cheap and undercutting local producers of millet, sorghum, and cassava. Although recent policy changes have devalued currencies, which might make locally produced food more attractive, accompanying free trade policies have brought increased imports of cheap food from developed countries, largely canceling any positive effect.
- Urban tastes have increasingly shifted to imported grain, particularly wheat, which few countries in Africa can grow economically. Thirty years ago, only a small minority of urban dwellers in Sub-Saharan Africa ate wheat. Today bread is a staple for many urbanites, and bread and other wheat products account for about a third of all the region's grain imports. U.S. food aid and advertising by multinational corporations ("He'll be smart. He'll go far. He'll eat bread.") have played their part in molding African tastes to what the developed countries have to sell.

Thus beneath the "scarcity diagnosis" of Africa's food situation lie many human-made (often Western influenced) and therefore reversible causes. Even Africa's high birth rates are not independent variables, but are determined by social realities that shape people's reproductive choices.

A Future of Scarcity?

A centuries-old debate has recently heated up: just how close are we to the earth's limits?

Major studies have arrived at widely varying conclusions as to the earth's potential to support future populations. In a 1995 book Professor Joel Cohen of Rockefeller University surveyed estimates put forth over four centuries. Always a slippery concept, estimates of the Earth's "carrying capacity," or the number of people who could be supported, have varied from a low of one billion in a 1970 study to a high of 1,022 billion put forth in 1967. Among studies published between 1990 and 1994 the range was from "much less than our current population of 5.5 billion" according to Paul Ehrlich and others, to a high of 44 billion estimated by a Dutch research team, with most estimates falling into the 10 to 14 billion range. By contrast the 1996 United Nations forecast, generally considered to be the best future population projection, predicts that the world population will peak at 9.36 billion in the year 2050, and stabilize thereafter (projections of the maximum future population have been coming down over the past few years). This is well within what most experts view as the capacity of the Earth.

In view of today's abundant food supplies as well as the potential suggested here and elaborated in World Hunger: Twelve Myths, we question the more pessimistic predictions of demographic catastrophe. Only 50 years ago, China pundits predicted that famine-ridden nation could never feed its population. Today more than twice as many people eat—and fairly adequately—on only one-fourth the cropland per person used in the United States.

Not that anyone should take the more pessimistic predictions lightly; they underscore the reality of the inevitably finite resource base entrusted to us. They should therefore reinforce our sense of urgency to address the root causes of resource misuse, resource degradation, and rapid population growth.

Lessons from Home

Finally, in probing the connection between hunger and scarcity we should never overlook the lessons here at home. In the 1990s over 30 million Americans can not afford a healthy diet, and 8.5% of U.S. children are hungry and 20.1% more are at risk of hunger. But who would argue that not enough food is produced? Surely not U.S. farmers; overproduction is their most persistent headache. Nor the U.S. government, which maintains huge storehouses of cheese, milk and butter. In 1995, U.S. aid shipments abroad of surplus food included more than 3 million metric tons of cereals and cereal products, about two thirds consisting of wheat and flour. That's enough flour to bake about 600 loaves of bread per year for every hungry child in the U.S.

Here at home, just as in the Third World, hunger is an outrage precisely because it is profoundly needless. Behind the headlines, the television images, and superficial clichés, we can learn to see that hunger is real; scarcity is not.

Only when we free ourselves from the myth of scarcity can we begin to look for hunger's real causes.

A copy of this report can be obtained from:
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The Case of Indonesia's "Food Shortage":Does Food Aid Help?

by Anuradha Mittal

News of food shortages and hunger in Indonesia, reported to be caused by drought, alarmed the world in 1998 and 1999. According to the Minister of Food Affairs and Horticulture, Indonesia was the world's biggest recipient of food aid in 1998. But in recent months news has filtered out that many agricultural communities are prospering in the midst of the crisis.

In view of these conflicting reports, I led one of four teams of a fact-finding missions to Indonesia, on behalf of the South East Asia Food Security and Fair Trade Council. We found that Indonesia is not suffering a critical food shortage in the traditional sense. We did find a surreal juxtaposition of bounty and misery, caused by the well-publicized economic collapse of the world's fourth most populous nation.

Over 100 million Indonesians-half the country's population-are now living below the poverty line, up from thirty million in 1997. The value of the rupiah has plunged, after falling thirty percent in just one week. In 1998 average Indonesians saw ten years of family savings wiped out by six months of currency devaluations. By July the value of the rupiah had fallen fifty percent against the U.S. dollar, pushing up prices and squeezing earnings, hitting those who could least afford it the hardest. This crisis was caused by massive outflows of speculative capital, brought on by more than a decade of pressure from the U.S., World Bank, and International Monetary Fund to open Indonesia's financial markets to foreign investors.

Today many Indonesian banks and companies are on the brink of bankruptcy, with more than a third of the key electronics, machinery, chemical, and metal-based industries forced to close. Every day in Jakarta an estimated 15,000 workers lose their jobs. People have begun migrating from cities back to the countryside. A bleak report from the International Labor Organization states, "Without any improvements in household income, further price increases in 1999 will push some 140 million people, or 66 percent of the population, below the poverty line." But is there a food shortage?

Abundant food is available for those who can afford it, but few can due to the economic collapse. Yet the image of a food shortage that can only be remedied with food aid continues to dominate. Western donors have been rushing in wheat products, undercutting rice-based food self-sufficiency and creating a long term market for U.S. exports.

The Indonesian government has used this aid to pacify the new urban poor and consolidate support for the June 1999 elections. This has been done with the total approval of foreign governments and multilateral organizations. As a World Food Program official put it, "Hungry people are angry people." Singapore has donated rice specifically earmarked for the military. In 1984 Indonesia was awarded the FAO medal in food self sufficiency, while today the food aid pouring in threatens to turn it into a permanent international beggar by bankrupting local agriculture.

Economic conditions in Indonesia do not call for food aid. What is needed are economic policies to provide jobs and income so people can have an adequate diet, and buy goods and services to meet other needs. Agriculture is in trouble in Indonesia, but it is a crisis that is strictly man-made. A huge dependence on fertilizers and other chemical inputs characteristic of Green Revolution technology resulted in a fragile rural economy that can easily be unraveled by policy decisions - for example, the recent ending of the fertilizer subsidy.

Indonesia is not experiencing a classic drought-driven famine. It is experiencing economic collapse. As Mr. Eddy Hidayat, Executive Director of a Jakarta-based group, AULIA, said, "Food aid is not helping us. Instead give us education, health care, jobs, and economic revival."

Manufacturing a Food Crisis in Indonesia
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Can Organic Farming "Feed the World"?

by Christos Vasilikiotis

The Legacy of Industrial Agriculture

With the world population passing the 6 billion mark last October, the debate over our ability to sustain a fast growing population is heating up. Biotechnology advocates in particular are becoming very vocal in their claim that there is no alternative to using genetically modified crops in agriculture if "we want to feed the world." Actually, that quote might be true. It depends what they mean by "we." It's true if the "we can feed the world" refers to the agribusiness industry, which has brought the world to the brink of food disaster and is looking for a way out. Biotech just may be their desperation move. "We'll starve without biotech," is the title of an opinion piece by Martina McGloughlin, Director of the Biotechnology program at the University of California, Davis. Could be. Modern industrial agricultural – which forms the foundation for biotech – ranks as such a dismal failure that even Monsanto holds them up as the evil alternative.

"The commercial industrial technologies that are used in agriculture today to feed the world... are not inherently sustainable," Monsanto CEO Robert Shapiro told the Greenpeace Business Conference recently. "They have not worked well to promote either self-sufficiency or food security in developing countries." Feeding the world sustainably "is out of the question with current agricultural practice," Shapiro told the Society of Environmental Journalists in 1995. "Loss of topsoil, of salinity of soil as a result of irrigation, and ultimate reliance on petrochemicals ... are, obviously, not renewable. That clearly isn't sustainable."

Shapiro is referring to the 30-year-old "Green Revolution" which has featured an industrial farming system that biotech would build on: the breeding of new crop varieties that could effectively use massive inputs of chemical fertilizers, and the use of toxic pesticides. As Shapiro has hinted, it has led to some severe environmental consequences, including loss of topsoil, decrease in soil fertility, surface and ground water contamination, and loss of genetic diversity.

Do we really need to embark upon another risky technological fix to solve the mistakes of a previous one? Instead, we should be looking for solutions that are based on ecological and biological principles and have significantly fewer environmental costs. There is such an alternative that has been pioneered by organic farmers. In contrast to the industrial/monoculture approach advocated by the biotech industry, organic agriculture is described by the United Nations Food & Agriculture Organization (FAO) as "a holistic production management system which promotes and enhances agro-ecosystem health, including biodiversity, biological cycles, and soil biological activity."

Despite the lack of support from government and university extension services in the US, consumer demand for organic products is driving the organic movement ahead at a 20% annual rate of market growth, primarily with the help of an increasing consumer demand for organic products. The amount of certified organic agricultural land increased from 914,800 acres in 1995 to 1.5 million in 1997, a jump of more than 60% in just two years.

Not surprisingly, agribusiness conglomerates and their supporters dismiss organic farming, claiming it produces yields too low to feed a growing world population. Dennis Avery, an economist at the Hudson Institute – funded by Monsanto, Du Pont, Dow, and Novartis among others – had this to say in a recent ABC News' 20/20 broadcast: "If overnight all our food supply were suddenly organic, to feed today's population we'd have plowed down half of the world's land area not under ice to get organic food ... because organic farmers waste so much land. They have to because they lose so much of their crop to weeds and insects." In fact, as a number of studies attest, organic farming methods can produce higher yields than conventional methods. Moreover, a worldwide conversion to organic has the potential to increase food production levels — not to mention reversing the degradation of agricultural soils and increase soil fertility and health.

Comparisons of organic and conventional chemical farming systems

A survey of recent studies comparing the productivity of organic practices to conventional agriculture provides an excellent example of the wide range of benefits we can expect from a conversion to sustainable agricultural methods. The results clearly show that organic farming accomplishes many of the FAO's sustainability aims, as well as showing promise in increasing food production ability.

• Sustainable Agriculture Farming Systems project (SFAS) at UC, Davis.

An ongoing long-term comparison study, SFAS is an interdisciplinary project that compares conventional farming systems with alternative production systems that promote sustainable agriculture.

The study examines four farming systems that differ in crop rotation design and material input use: a 2-year and a 4-year rotation conventional system, an organic and a low-input system.

Results from the first 8 years of the project show that the organic and low-input systems had yields comparable to the conventional systems in all crops which were tested - tomato, safflower, corn and bean, and in some instances yielding higher than conventional systems (Clark, 1999a). Tomato yields in the organic system were lower in the first three years, but reached the levels of the conventional tomatoes in the subsequent years and had a higher yield during the last year of the experiment (80 t/ha in the organic compared to 68 t/ha in the conventional in 1996). Corn production in the organic system had a higher variability than conventional systems, with lower yields in some years and higher in others.

Both organic and low-input systems resulted in increases in the organic carbon content of the soil and larger pools of stored nutrients, each of which are critical for long-term fertility maintenance (Clark, 1998). The most important limiting factor in the organic system appeared to be nitrogen availability (Clark 1999b). The organic system relied mainly on cover crops and composted poultry manure for fertilization. One possible explanation for a lower availability in the organic system, is that high carbon inputs associated with nitrogen to build soil organic matter, thus reducing nitrogen availability for the organic crops. During the latter 2 years of the experiment, soil organic matter levels appeared to be stabilized resulting in more nitrogen availability. This was in agreement with the higher yields of organic crops that were observed during those last two years. The organic systems were found to be more profitable in both corn and tomato among the 4-year rotations mainly due to the higher price premiums (Clark, 1999b).

• Farming Systems Trial at the Rodale Institute – Soybean study.

Initiated in 1981, the Farming Systems Trial compares intensive soybean and maize production under a conventional and two organic management farming systems. The first organic cropping system simulates a traditional integrated farming system. Leguminous cover crops are fed to cattle and the resulting manure is applied to the fields as the main source of nitrogen. In the second organic system, the leguminous cover crops were incorporated in to the soil as the source for nitrogen before corn or soybean planting.

Corn yields were comparable in all three cropping systems (less than 1% difference) (Drinkwater, 1998). However, a comparison of soil characteristics during a 15-year period found that soil fertility was enhanced in the organic systems, while it decreased considerably in the conventional system. Nitrogen content and organic matter levels in the soil increased markedly in the manure–fertilized organic system and declined in the conventional system. Moreover, the conventional system had the highest environmental impact, where 60% more nitrate was

photo courtesy Food & Agriculture Organization

Vietnamese woman sells products made from piglets raised on her homestead.

Production per unit of land is always greatest at the diversified homestead level.

leached into the groundwater over a 5 year period than in the organic systems (Drinkwater, 1998).

Soybean production systems were also highly productive, achieving 40 bushels/acre. In 1999 however, during one of the worst droughts on record, yields of organic soybeans were 30 bushels / acre, compared to only 16 bushels/acre from conventionally- grown soybeans (Rodale Institute, 1999). “Our trials show that improving the quality of the soil through organic practices can mean the difference between a harvest or hardship in times of drought” writes Jeff Moyer, farm manager at The Rodale Institute in Kutztown, Pennsylvania (Rodale Institute, 1999). He continues, “over time, organic practices encourage the soil to hold on to moisture more efficiently than conventionally managed soil.” The higher content of organic matter also makes organic soil less compact so that root systems can penetrate more deeply to find moisture. These results highlight the importance of organic farming methods and their potential to avert future crop failures both in the US and in the rest of the world.

• Broadbalk experiment at the Rothamsted Experimental Station, UK

One of the longest running agricultural trials on record (more than 150 years) is the Broadbalk experiment at the Rothamsted Experimental Station in the United Kingdom. The trials compare a manure based fertilizer farming system (but not certified organic) to a synthetic chemical fertilizer farming system. Wheat yields are shown to be on average slightly higher in the organically fertilized plots (3.45 tones/hectare) than the plots receiving chemical fertilizers (3.40 tones/hectare). More importantly though, soil fertility, measured as soil organic matter and nitrogen levels, increased by 120% over 150 years in the organic plots, compared with only 20% increase in chemically fertilized plots (Jenkinson, 1994).

• Organic grain and soybean production in the Midwestern United States

A comprehensive review of a large number of comparison studies of grain and soybean production conduct by six Midwestern universities since 1978 found that in all of these studies organic production was equivalent to, and in many cases better than, conventional (Welsh, 1999). Organic systems had higher yields than conventional systems which featured continuous crop production (no rotations) and equal or lower yields in conventional systems that included crop rotations. In the drier climates such as the Great Plains, organic systems had higher yields, as they tend to be better during droughts than conventional systems. In one such study in South Dakota for the period 1986-1992, the average yields of soybeans were 29.6 bushels/acre and 28.6 bushels/acre in the organic and conventional systems respectively. In the same study, average spring wheat yields were 41.5 bushels/acre and 39.5 bushels/acre in the organic and conventional systems respectively.

When comparing the profitability of farming systems, the study found that organic cropping systems were always more profitable than the most common conventional cropping systems if the higher premiums that organic crops enjoy were factored in. When the higher premiums were not factored in, the organic systems were still more productive and profitable in three of the six studies. This was attributed to lower production costs and the ability of organic systems to outperform conventional in drier areas, or during drier periods.

The author of the report remarked: “What is most surprising is how well the organic systems performed despite the minimal amount of research that traditional agricultural research institutions have devoted to them” (Welsh, 1999).

• Comparison of conventional and organic farms in California.

Lastly, a study which compared ecological characteristics and productivity of 20 commercial farms in the Central Valley of California gives us a better understanding of how a conversion to organic would fare in a commercial farm setting. The farms compared had a fresh market tomato production. Tomato yields were shown to be quite similar in organic and conventional farms (Drinkwater, 1995). Insect pest damage was also comparable in both cases of organic and conventional farms. However, significant differences were found in soil health indicators such as nitrogen mineralization potential and microbial abundance and diversity which were higher in the organic farms. Nitrogen mineralization potential was three times greater in organic compared to conventional fields. The organic fields also had 28% more organic carbon. The increased soil health in the organic farms resulted in considerably lower disease incidence. Severity of the most prevalent disease in the study, tomato corky root disease, was found to be significantly lower in the organic farms (Drinkwater, 1995).

Can we afford *not* to go Organic?

From the studies mentioned above and from an increasing body of case studies, it is becoming evident that organic farming results in neither catastrophic crop losses due to pests nor in dramatically reduced yields, as many critics from agribusiness and in academia would have us believe. A report from UC Davis predicted a 36% reduction in tomato yields in California if conventional insecticides and fungicides were eliminated (Agricultural Issues Center 1988). On the contrary, organic farming systems have proven that they can prevent crop loss to pests without any synthetic pesticides. They are able to maintain high yields, comparable to conventional agriculture without any of the associated external costs to society. Furthermore, organic and agroecological farming methods continually increase soil fertility and prevent loss of topsoil to erosion, while conventional methods have the opposite effect. In the end, only a conversion to organic farming will allow us to maintain and even increase current crop yields.

The ability of organic agriculture to produce comparable yields is particularly significant, considering that limited research has been conducted in land-grant universities to optimize cultural practices or select for suitable crop genetic traits in organic farming systems. It is becoming imperative that we move away from organic versus conventional systems comparisons, to research into ways of improving organic farming methods.

One of the criticisms of organic agriculture has been that there is not enough nitrogen available naturally, therefore only chemical fertilizers can provide adequate supplies to sustain current yields. This is clearly not the case as shown by both the Rothamsted and Rodale experiments, where manure-based systems can provide enough nitrogen not only to sustain high crop yields but also to build up the nitrogen storage in the soil. Animal manure is not in short supply by any means. EPA estimates indicate that US livestock operations generate one billion tons of manure per year. Most of this is not utilized in agriculture; instead, it leaches nitrogen and phosphorus into our waterways, thus threatening wetlands and river systems and in many cases drinking water supplies. Organic agriculture, and especially small diversified farms, could allow us to once again couple livestock production to crop production, thus cycling this valuable byproduct back into the soil and eliminating costly environmental degradation.

Another argument that critics are making is that organic food is more expensive, therefore, low-income families and people in the third world would not be able to afford it. While it is true that organic food has a price premium, this price difference is the result of higher demand for organic products, and does not necessarily reflect a higher cost of production. According to the Wallace Institute report mentioned earlier, organic production of grains and soybeans in the mid-west was more profitable than

conventional in at least half the cases studied, even without factoring the higher prices that organic soybeans bring in the market (sometimes more than twice as much as conventional soybeans). There are still situations though in which organic systems appear to depend on price premiums to remain profitable, such as the case of high-value tomato crops in California. The higher cost of production that was found in the SFAS project is attributed mainly to the increased labor requirements for weed control in organic systems.

Even these studies overestimate the relative costs of organic production. Federal commodity programs and subsidies are geared towards large-scale chemically intensive agriculture and artificially inflate figures for industrial agriculture. Furthermore, this type of economic comparison ignores external costs that conventional agriculture creates. The World Resources Institute, an environmental policy think tank, reports that when measured with traditional cost analysis methods the average farm shows an $80/acre profit. After accounting for all the external costs of soil loss, water contamination and environmental degradation caused by farming practices, however, the average farm shows a $29/acre loss instead!

A number of European nations have started to factor these expenses into their agricultural support programs. In several European countries, such as Denmark and Sweden, farmers get government support during their conversion to organic and continue to receive support for environmental services that they provide to their communities, such as wildlife corridors and the elimination of toxic runoffs which contaminate underground water sources. These programs helped foster an almost 100-fold increase in organically farmed land in Europe, from 29,000 acres in 1986 to 2.4 million acres in 1996. Similar programs in the U.S. could help the conversion of more farms to organic methods. These price supports do not have to be subsidies, but rather a compensation to organic farmers for each of the ecological and social services that they provide.

Despite claims from the biotech industry and academic researches, there is no indication that biotechnology will solve the shortcomings of industrial agriculture. Compared to the novel and untested crop systems that biotech corporations are pushing as the only solution to food security problems, organic farming has many advantages. The majority of genetically engineered crops currently in cultivation do not appear to show higher yields. For example, contrary to claims by Monsanto, a recent study by Dr. Charles Bendrook, the former director of the Board on Agriculture at the National Academy of Sciences, indicates that genetically engineered Roundup Ready soybeans do not increase yields (Bendrook, 1999). The report reviewed over 8,200 university trials in 1998 and found that Roundup Ready soybeans yielded 7-10% less than similar natural varieties. In addition, the same study found that farmers used 5-10 times more herbicide (Roundup) on Roundup Ready soybeans than on conventional ones. The only reason farmers seem to prefer Roundup Ready soybeans is because they simplify management of large chemically-intensive farms, by allowing them, for example, to spray larger doses of herbicides from planes on crops, engineered to be resistant to the particular herbicide. Applications of biotechnology continue the legacy of industrial agricultural with monocultures and high energy and chemical inputs.

Our current world food production is more than sufficient to provide an adequate diet to all humans, yet more than 840 million people are suffering from hunger. Hunger is a problem of poverty, distribution, and access to food. The question then, is not "how to feed the world," but rather, how can we develop sustainable farming methods that have the potential to help the world feed and sustain itself. Organic management practices promote soil health, water conservation and can reverse environmental degradation. The emphasis on small-scale family farms has the potential to revitalize rural areas and their economies. Counter to the widely held belief that industrial agriculture is more efficient and productive, small farms produce far more per acre than large farms. Industrial agriculture relies heavily on monocultures, the planting of a single crop throughout the farm, because they simplify management and allow the use of heavy machinery. Larger farms in the third world also tend to grow export luxury crops instead of providing staple foods to their growing population. Small farmers, especially in the Third World, have integrated farming systems where they plant a variety of crops maximizing the use of their land. They are also more likely to have livestock on their farm, which provides a variety of animal products to the local economy and manure for improving soil fertility. In such farms, though the yield per acre of a single crop might be lower than a large farm, total production per acre of all the crops and various animal products is much higher than large conventional farms (Rosset, 1999).

Figure 1 shows the relationship between total production per unit area to farm size in 15 countries. In all cases, the smaller farms are much more productive per unit area– 200 to 1000 percent higher – than larger ones (Rosset, 1999).

Even in the United States, the smallest farms, those 27 acres or less, have more than ten times greater dollar output per acre than larger farms (US Agricultural Census, 1992). Conversion to small organic farms therefore, would lead to sizeable increases of food production worldwide. Only organic methods can help small family farms survive, increase farm productivity, repair decades of environmental damage and knit communities into smaller, more sustainable distribution networks – all leading to improved food security around the world.

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Lessons from the Green Revolution

Do We Need New Technology to End Hunger?

by Peter Rosset, Joseph Collins,
and Frances Moore Lappé

Faced with an estimated 786 million hungry people in the world, cheerleaders for our social order have an easy solution: we will grow more food through the magic of chemicals and genetic engineering. For those who remember the original "Green Revolution" promise to end hunger through miracle seeds, this call for "Green Revolution II" should ring hollow. Yet Monsanto, Novartis, AgrEvo, DuPont, and other chemical companies who are reinventing themselves as biotechnology companies, together with the World Bank and other international agencies, would have the world's anti-hunger energies aimed down the path of more agrochemicals and genetically modified crops. This second Green Revolution, they tell us, will save the world from hunger and starvation if we just allow these various companies, spurred by the free market, to do their magic.

The Green Revolution myth goes like this: the miracle seeds of the Green Revolution increase grain yields and therefore are a key to ending world hunger. Higher yields mean more income for poor farmers, helping them to climb out of poverty, and more food means less hunger. Dealing with the root causes of poverty that contribute to hunger takes a very long time and people are starving now. So we must do what we can - increase production. The Green Revolution buys the time Third World countries desperately need to deal with the underlying social causes of poverty and to cut birth rates. In any case, outsiders - like the scientists and policy advisers behind the Green Revolution - can't tell a poor country to reform its economic and political system, but they can contribute invaluable expertise in food production. While the first Green Revolution may have missed poorer areas with more marginal lands, we can learn valuable lessons from that experience to help launch a second Green Revolution to defeat hunger once and for all.

Improving seeds through experimentation is what people have been up to since the beginning of agriculture, but the term "Green Revolution" was coined in the 1960s to highlight a particularly striking breakthrough. In test plots in northwest Mexico, improved varieties of wheat dramatically increased yields. Much of the reason why these "modern varieties" produced more than traditional varieties was that they were more responsive to controlled irrigation and to petrochemical fertilizers, allowing for much more efficient conversion of industrial inputs into food. With a big boost from the International Agricultural Research Centers created by the Rockefeller and Ford Foundations, the "miracle" seeds quickly spread to Asia, and soon new strains of rice and corn were developed as well.

By the 1970s, the term "revolution" was well deserved, for the new seeds - accompanied by chemical fertilizers, pesticides, and, for the most part, irrigation - had replaced the traditional farming practices of millions of Third World farmers. By the 1990s, almost 75 percent of Asian rice areas were sown with these new varieties. The same was true for almost half of the wheat planted in Africa and more than half of that in Latin America and Asia, and about 70 percent of the world's corn as well. Overall, it was estimated that 40 percent of all farmers in the Third World were using Green Revolution seeds, with the greatest use found in Asia, followed by Latin America.

Clearly, the production advances of the Green Revolution are no myth. Thanks to the new seeds, tens of millions of extra tons of grain a year are being harvested. But has the Green Revolution actually proven itself a successful strategy for ending hunger? Not really.

photo courtesy Food & Agriculture Organization

Green Revolution father Norman Borlaug

Narrowly focusing on increasing production - as the Green Revolution does - cannot alleviate hunger because it fails to alter the tightly concentrated distribution of economic power, especially access to land and purchasing power. Even the World Bank concluded in a major 1986 study of world hunger that a rapid increase in food production does not necessarily result in food security - that is, less hunger. Current hunger can only be alleviated by "redistributing purchasing power and resources toward those who are undernourished," the study said. In a nutshell, if the poor don't have the money to buy food, increased production is not going to help them.

Introducing any new agricultural technology into a social system stacked in favor of the rich and against the poor - without addressing the social questions of access to the technology's benefits - will over time lead to an even greater concentration of the rewards from agriculture, as is happening in the United States.

Because the Green Revolution approach does nothing to address the insecurity that lies at the root of high birth rates - and can even heighten that insecurity - it cannot buy time until population growth slows. Finally, a narrow focus on production ultimately defeats itself as it destroys the very resource base on which agriculture depends. We've come to see that without a strategy for change that addresses the powerlessness of the poor, the tragic result will be more food and yet more hunger.

More Food and Yet More Hunger?

Despite three decades of rapidly expanding global food supplies, there are still an estimated 786 million hungry people in the world in the 1990s. Where are these 786 million hungry people? Since the early 1980s, media representations of famines in Africa have awakened Westerners to hunger there, but Africa represents less than one-quarter of the hunger in the world today. We are made blind to the day-in-day-out hunger suffered by hundreds of millions more. For example, by the mid-1980s, newspaper headlines were applauding the Asian success stories - India and Indonesia, we were told, had become "self-sufficient in food" or even "food exporters." But it is in Asia, precisely where Green Revolution seeds have contributed to the greatest production success, that roughly two-thirds of the undernourished in the entire world live.

According to Business Week magazine, "even though Indian granaries are overflowing now," thanks to the success of the Green Revolution in raising wheat and rice yields, "5,000 children die each day of malnutrition. One-third of India's 900 million people are poverty-stricken." Since the poor can't afford to buy what is produced, "the government is left trying to store millions of tons of foods. Some is rotting, and there is concern that rotten grain will find its way to public markets." The article concludes that the Green Revolution may have reduced India's grain imports substantially, but did not have a similar impact on hunger.

Such analysis raises serious questions about the number of hungry people in the world in 1970 versus 1990, spanning the two decades of major Green Revolution advances. At first glance, it looks as though great progress was made, with food production up and hunger down. The total food available per person in the world rose by 11 percent over those two decades, while the estimated number of hungry people fell from 942 million to 786 million, a 16 percent drop. This was apparent progress, for which those behind the Green Revolution were understandably happy to take the credit.

But these figures merit a closer look. If you eliminate China from the analysis, the number of hungry people in the rest of the world actually increased by more than 11 percent, from 536 to 597 million. In South America, for example, while per capita food supplies rose almost 8 percent, the number of hungry people also went up, by 19 percent. In south Asia, there was 9 percent more food per person by 1990, but there were also 9 percent more hungry people. Nor was it increased population that made for more hungry people. The total food available per person actually increased. What made possible

photo courtesy Food & Agriculture Organization

Access to water in the developing world can be a major agricultural problem. Larger farms can afford deep wells, while smaller farms cannot. Here women in Mali draw water by hand.

greater hunger was the failure to address unequal access to food and food-producing resources.

The remarkable difference in China, where the number of hungry dropped from 406 million to 189 million, almost begs the question: which has been more effective at reducing hunger - the Green Revolution or the Chinese Revolution, where broad-based changes in access to land paved the way for rising living standards?

Whether the Green Revolution or any other strategy to boost food production will alleviate hunger depends on the economic, political, and cultural rules that people make. These rules determine who benefits as a supplier of the increased production - whose land and crops prosper and for whose profit - and who benefits as a consumer of the increased production - who gets the food and at what price.

The poor pay more and get less. Poor farmers can't afford to buy fertilizer and other inputs in volume; big growers can get discounts for large purchases. Poor farmers can't hold out for the best price for their crops, as can larger farmers whose circumstances are far less desperate. In much of the world, water is the limiting factor in farming success, and irrigation is often out of the reach of the poor. Canal irrigation favors those near the top of the flow. Tubewells, often promoted by development agencies, favor the bigger operators, who can better afford the initial investment and have lower costs per unit. Credit is also critical. It is common for small farmers to depend on local moneylenders and pay interest rates several times as high as wealthier farmers. Government-subsidized credit overwhelmingly benefits the big farmers. Most of all, the poor lack clout. They can't command the subsidies and other government favors accruing to the rich.

With the Green Revolution, farming becomes petro-dependent. Some of the more recently developed seeds may produce higher yields even without manufactured inputs, but the best results require the right amounts of chemical fertilizer, pesticides, and water. So as the new seeds spread, petrochemicals become part of farming. In India, adoption of the new seeds has been accompanied by a sixfold rise in fertilizer use per acre. Yet the quantity of agricultural production per ton of fertilizer used in India dropped by two-thirds during the Green Revolution years. In fact, over the past thirty years the annual growth of fertilizer use on Asian rice has been from three to forty times faster than the growth of rice yields.

Because farming methods that depend heavily on chemical fertilizers do not maintain the soil's natural fertility and because pesticides generate resistant pests, farmers need ever more fertilizers and pesticides just to achieve the same results. At the same time, those who profit from the increased use of fertilizers and pesticides fear labor organizing and use their new wealth to buy tractors and other machines, even though they are not required by the new seeds. This incremental shift leads to the industrialization of farming.

Once on the path of industrial agriculture, farming costs more. It can be more profitable, of course, but only if the prices farmers get for their crops stay ahead of the costs of petrochemicals and machinery. Green Revolution proponents claim increases in net incomes from farms of all sizes once farmers adopt the more responsive seeds. But recent studies also show another trend: outlays for fertilizers and pesticides may be going up faster than yields, suggesting that Green Revolution farmers are now facing what U.S. farmers have experienced for decades-a cost-price squeeze.

In Central Luzon, Philippines, rice yield increased 13 percent during the 1980s, but came at the cost of a 21 percent increase in fertilizer use. In the Central Plains, yields went up only 6.5 percent, while fertilizer use rose 24 percent and pesticides jumped by 53 percent. In West Java, a 23 percent yield increase was virtually canceled by 65 and 69 percent increases in fertilizers and pesticides respectively.

To anyone following farm news here at home, these reports have a painfully familiar ring - and why wouldn't they? After all, the United States - not Mexico - is the true birthplace of the Green Revolution. Improved seeds combined with chemical fertilizers and pesticides have pushed corn yields up nearly three-fold since 1950, with smaller but still significant gains for wheat, rice, and soybeans. Since World War II, as larger harvests have pushed down the prices farmers get for their crops while the costs of farming have shot up, farmers' profit margins have been drastically narrowed. By the early 1990s, production costs had risen from about half to over 80 percent of gross farm income. So who survives today? Two very different groups: those few farmers who chose not to buy into industrialized agriculture and those able to keep expanding their acreage to make up for their lower per acre profit. Among this second select group are the top 1.2 percent of farms by income, those with $500,000 or more in yearly sales, dubbed "superfarms" by the U.S. Department of Agriculture. In 1969, the superfarms earned 16 percent of net farm income; by the late 1980s, they garnered nearly 40 percent.

Superfarms triumph not because they are more efficient food producers or because the Green Revolution technology itself favored them, but because of advantages that accrue to wealth and size. They have the capital to invest and the volume necessary to stay afloat even if profits per unit shrink. They have the political clout to shape tax policies in their favor. Over time, why should we expect the result of the cost-price squeeze to be any different in the Third World? In the United States, we've seen the number of farms drop by two-thirds and average farm size more than double since World War II. The gutting of rural communities, the creation of inner-city slums, and the exacerbation of unemployment all followed in the wake of this vast migration from the land. Think what the equivalent rural exodus means in the Third World, where the number of jobless people is already double or triple our own.

Not Ecologically Sustainable

There is also growing evidence that Green Revolution-style farming is not ecologically sustainable, even for large farmers. In the 1990s, Green Revolution researchers themselves sounded the alarm about a disturbing trend that had only just come to light. After achieving dramatic increases in the early stages of the technological transformation, yields began falling in a number of Green Revolution areas. In Central Luzon, Philippines, rice yields grew steadily during the 1970s, peaked in the early 1980s, and have been dropping gradually ever since. Long-term experiments conducted by the International Rice Research Institute (IRRI) in both Central Luzon and Laguna Province confirm these results. Similar patterns have now been observed for rice-wheat systems in India and Nepal. The causes of this phenomenon have to do with forms of long-term soil degradation that are still poorly understood by scientists. An Indian farmer told Business Week his story:

Dyal Singh knows that the soil on his 3.3-hectare [8 acre] farm in Punjab is becoming less fertile. So far, it hasn't hurt his harvest of wheat and corn. "There will be a great problem after 5 or 10 years," says the 63-year-old Sikh farmer. Years of using high-yield seeds that require heavy irrigation and chemical fertilizers have taken their toll on much of India's farmland.… So far, 6 percent of agricultural land has been rendered useless.

Where yields are not actually declining, the rate of growth is slowing rapidly or leveling off, as has now been documented in China, North Korea, Indonesia, Myanmar, the Philippines, Thailand, Pakistan, and Sri Lanka.

The Green Revolution: Some Lessons

Having seen food production advance while hunger widens, we are now prepared to ask: under what conditions are greater harvests doomed to failure in eliminating hunger?

First, where farmland is bought and sold like any other commodity and society allows the unlimited accumulation of farmland by a few, superfarms replace family farms and all of society suffers.

Second, where the main producers of food - small farmers and farm workers - lack bargaining power relative to suppliers of farm inputs and food marketers, producers get a shrinking share of the rewards from farming.

Third, where dominant technology destroys the very basis for future production, by degrading the soil and generating pest and weed problems, it becomes increasingly difficult and costly to sustain yields.

Under these three conditions, mountains of additional food could not eliminate hunger, as hunger in America should never let us forget. The alternative is to create a viable and productive small farm agriculture using the principles of agroecology. That is the only model with the potential to end rural poverty, feed everyone, and protect the environment and the productivity of the land for future generations.

Successful Examples

That sounds good, but has it ever worked? From the United States to India, alternative agriculture is proving itself viable. In the United States, a landmark study by the prestigious National Research Council found that "alternative farmers often produce high per acre yields with significant reductions in costs per unit of crop harvested," despite the fact that "many federal policies discourage adoption of alternative practices." The Council

concluded that “Federal commodity programs must be restructured to help farmers realize the full benefits of the productivity gains possible through alternative practices.”

In South India, a 1993 study was carried out to compare “ecological farms” with matched “conventional” or chemical-intensive farms. The study’s author found that the ecological farms were just as productive and profitable as the chemical ones. He concluded that if extrapolated nationally, ecological farming would have “no negative impact on food security,” and would reduce soil erosion and the depletion of soil fertility while greatly lessening dependence on external inputs.

But Cuba is where alternative agriculture has been put to its greatest test. Changes underway in that island nation since the collapse of trade with the former socialist bloc provide evidence that the alternative approach can work on a large scale. Before 1989, Cuba was a model Green Revolution-style farm economy, based on enormous production units, using vast quantities of imported chemicals and machinery to produce export crops, while over half of the island’s food was imported. Although the government’s commitment to equity, as well as favorable terms of trade offered by Eastern Europe, meant that Cubans were not undernourished, the underlying vulnerability of this style of farming was exposed when the collapse of the socialist bloc joined the already existing and soon to be tightened U.S. trade embargo.

Cuba was plunged into the worst food crisis in its history, with consumption of calories and protein dropping by perhaps as much as 30 percent. Nevertheless, by 1997, Cubans were eating almost as well as they did before 1989, yet comparatively little food and agrochemicals were being imported. What happened?

Faced with the impossibility of importing either food or agrochemical inputs, Cuba turned inward to create a more self-reliant agriculture based on higher crop prices to farmers, agroecological technology, smaller production units, and urban agriculture. The combination of a trade embargo, food shortages, and the opening of farmers’ markets meant that farmers began to receive much better prices for their products. Given this incentive to produce, they did so, even in the absence of Green Revolution-style inputs. They were given a huge boost by the reorientation of government education, research, and extension toward alternative methods, as well as the rediscovery of traditional farming techniques.

As small farmers and cooperatives responded by increasing production while large-scale state farms stagnated and faced plunging yields, the government initiated the newest phase of revolutionary land reform, parceling out the state farms to their former employees as smaller-scale production units. Finally, the government mobilized support for a growing urban agriculture movement - small-scale organic farming on vacant lots - which, together with the other changes, transformed Cuban cities and urban diets in just a few years.

The Cuban experience tells us that we can feed a nation’s people with a small-farm model based on agroecological technology, and in so doing we can become more self-reliant in food production. A key lesson is that when farmers receive fairer prices, they produce, with or without Green Revolution seed and chemical inputs. If these expensive and noxious inputs are unnecessary, then we can dispense with them.

The Bottom Line

In the final analysis, if the history of the Green Revolution has taught us one thing, it is that increased food production can - and often does - go hand in hand with greater hunger. If the very basis of staying competitive in farming is buying expensive inputs, then wealthier farmers will inexorably win out over the poor, who are unlikely to find adequate employment to compensate for the loss of farming livelihoods. Hunger is not caused by a shortage of food, and cannot be eliminated by producing more.

This is why we must be skeptical when Monsanto, DuPont, Novartis, and other chemical-cum-biotechnology companies tell us that genetic engineering will boost crop yields and feed the hungry. The technologies they push have dubious benefits and well-documented risks, and the second Green Revolution they promise is no more likely to end hunger than the first.

Far too many people do not have access to the food that is already available because of deep and growing inequality. If agriculture can play any role in alleviating hunger, it will only be to the extent that the bias toward wealthier and larger farmers is reversed through pro-poor alternatives like land reform and sustainable agriculture, which reduce inequality and make small farmers the center of an economically vibrant rural economy

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The Multiple Functions and Benefits of Small Farm Agriculture in the Context of Global Trade Negotiations

by Peter M. Rosset, Ph.D.

Introduction

For more than a century mainstream economists in both capitalist and socialist countries have confidently and enthusiastically predicted the demise of the small, family farm. Small farms have time and again been labeled as backward, unproductive and inefficient—an obstacle to be overcome in the process of economic development. The American model of large scale, mechanized, corporate agriculture is held out as the best, if not the only way to efficiently feed the world's population. Small farmers—or "peasants"—have been expected to go the way of the dinosaurs, and rightly so, according to conventional wisdom.

In this article I challenge the conventional wisdom about small farms and assert that they are "multifunctional"—more productive, more efficient, and contribute more to economic development than large farms. I argue that small farmers make better stewards of natural resources, conserving biodiversity and better safe-guarding the sustainability of production. The evidence I present comes from both the Third World and from industrialized countries like the United States.

Today's on-going process of liberalization in international agricultural trade is widely recognized to have dramatically negative effects on small farmers in both Northern and Southern countries. This puts the small farm issue—called The Agrarian Question by renowned social scientist Karl Kautsky at the beginning of this century—squarely on the agenda for debate at the end of the millennium.

If small farms are worth preserving—if indeed a small farm model of rural development makes more sense than does the large-scale, mechanized, chemical intensive, corporate dominated and socially excluding model toward which business-as-usual is carrying us— then now is the time to act.

The first point worth noting is that while small farmers have been driven out of rural America by the millions, and we have seen a similar, though lesser, rural-urban migration in the Third World, the fact is that family farmers do still persist in the U.S. and continue to be numerically dominant. In the Third World they are central to the production of staple foods. The prediction of their demise continues to be premature, though their numbers have dropped substantially and they face new threats to their livelihoods on an unprecedented scale.

The second point is that small farms are far from being as unproductive or inefficient as so many would have us believe. Peasants have stubbornly clung to the land despite more than a century of harsh policies which have undercut their economic viability. The third point is that small farms have multiple functions which benefit both society and the biosphere, and which contribute far more than just a particular commodity—though there is ample evidence that a small farm model for agricultural development could produce far more food than a large farm pattern ever could. These multiple and beneficial functions should be seriously valued and considered before we blithely accept yet another round of anti-small farm policy measures—this time at the level of the global economy. It is toward the second and third points—the benefits of small farms, that I direct the bulk of this paper.

In the conclusion to this article I outline the grave threat to small farms presented by the WTO negotiations for an Agreement on Agriculture (AoA). Several countries, led by the United States, seek to push further free trade in agricultural products. I show how this could lead to the destruction of small farms and severely damage rural environments worldwide.

I close by issuing a call to rally around the concept of the multiple functionality of small farms, for both human societies and for the biosphere. By recognizing the important role played by small farms we have an opportunity to stop and even reverse trade policies which erode the viability of small farms.

Small Farm Virtues in the U.S.

I am not alone in speaking to the value of small farms and calling for policy change to take advantage of their potential dynamism. The United States Department of Agriculture's (USDA) National Commission on Small Farms released a landmark report in 1998 titled A Time to Act. What the USDA calls the public value of small farms includes:

a. **Diversity**: Small farms embody a diversity of ownership, of cropping systems, of landscapes, of biological organization, culture and traditions. A varied farm structure contributes to biodiversity, a diverse and esthetically pleasing rural landscape, and open space.

b. **Environmental benefits**: Responsible management of the natural resources of soil, water, and wildlife on the 60 percent of all U.S. farms less than 180 acres in size, produces significant environmental benefits for society. Investment in the viability of these operations will yield dividends in the stewardship of the nation's natural resources.

c. **Empowerment and community responsibility**: Decentralized land ownership produces more equitable economic opportunity for people in rural areas, as well as greater social capital. This can provide a greater sense of personal responsibility and feeling of control over one's life, characteristics that are not as readily available to factory line workers. Land owners who rely on local businesses and services for their needs are more likely to have a stake in the well-being of the community and the well-being of its citizens. In turn, local land owners are more likely to be held accountable for any negative actions that harm the community.

d. **Places for families**: Family farms can be nurturing places for children to grow up and acquire values. The skills of farming are passed from one generation to another under family ownership structures. When farm children do not continue to farm, farming knowledge, skills and experience are lost.

e. **Personal connection to food**: Most consumers have little connection to agriculture and food production. As a consequence, they have little connection with nature, and lack an appreciation for farming as cultivation of the earth for the production

of food that sustains us. Through farmers' markets, community supported agriculture, and the direct marketing strategies of small farmers, consumers are beginning to connect with the people growing their food, and with food itself as a product of a farmer's cooperation with nature.

f. **Economic foundations**: In various states and regions of the U.S., small farms are vital to the economy.

The USDA Commission on Small Farms concludes with a powerful call to change the policies that have favored large, corporate-style farms for so very long, with hideous costs to rural communities and the environment.

Small Farm Virtues in the Third World

A similar pattern holds in the Third World, where policies promoting large farm, export agriculture have increasingly eroded the viability of small farms, despite the many benefits small scale production of food offers.

In traditional farming communities the family farm is central to maintaining community and to the sustainability of agricultural production. On the small farm, productive activities, labor mobilization, consumption patterns, ecological knowledge and common interests in long-term maintenance of the farm as a resource, contribute to a stable and lasting economic and family-based enterprise. Work quality, management, knowledge and relationships are intertwined and mutually reinforcing. Short-term gain at the risk of degrading essential resources not only invites community sanction, but also places the family and the farm at risk of collapse. Family farmers regularly achieve higher and more dependable production from their land than do larger farms operating in similar environments. Labor intensive practices such as manuring, limited tillage, ridging, terracing, composting organic matter, and recycling plant products into the productive process, enhance soil conservation and fertility.

The durability of small farm production is clear in its historical and spatial ubiquity: small farms exist in all environments, in all political and economic contexts, in all historical periods over the last 5,000 years, and in every known cultural area where crops can be grown. Small farmers have developed and use a variety of technologies, crops, and farming systems. Perhaps most important in an era of diminishing non-renewable resources, small farmers frequently produce with minimal recourse to expensive external inputs.

We must value the multiple functions of farms in the Third World if we are to achieve a sustainable agriculture, according to the Food and Agriculture Organization (FAO) of the United Nations (1999):

> To face the current challenges of agriculture, we need to address agriculture and land in a broader context by integrating multiple roles (economic, food production, nature and land management, employment etc.). Sustainable agriculture and land use is not just a means to obtain more food and income, in socially acceptable ways which do not degrade the environment. Rather, it has an all-encompassing impact on communities, environments, and consumers. We must reach a consensus and common understanding of sustainable land use as an opportunity to improve the quality of the environment, including its physical (increased soil fertility, better quality air and water), biological (healthier and more diverse animal, plant, and human populations), and social, economic and institutional (greater social equity, cohesion, peace/stability, well-being) components…. Land is not just a resource to be exploited, but a crucial vehicle for the achievement of improved socio-economic, biological and physical environments. Concretely, by paying attention to the multiple functions of agriculture and land use, all economic, social and environmental functions of agriculture, at multiple levels, are recognized and included in decision making in order to promote synergies between these functions and to reconcile different stakeholder objectives.

Small farms play multiple key functions in rural economies, cultures and ecosystems worldwide. In the following sections I summarize some of the evidence for these claims.

Small Farm Productivity

How many times have we heard that large farms are more *productive* than small farms? Or that they are more *efficient*? And that we need to consolidate land holdings to take advantage of that greater productivity and efficiency? The actual data shows exactly the reverse for productivity: that smaller farms produce far more per unit area than larger farms. Part of the problem lies in the confusing language used to compare the performance of different farm sizes. As long as we use crop *yield* as *the* measure of productivity, we will be giving an unfair advantage to larger farms.

Total Output versus Yield

If we are to fairly evaluate the relative productivity of small and large farms, we must discard "yield" as our measurement tool. Yield means the production per unit area of a single crop, like "metric tons of corn per hectare." One can often obtain the highest yield of a single crop by planting it alone on a field — in a monoculture. But while a monoculture may allow for a high yield of one crop, it produces nothing else of use to the farmer. The bare ground between the crop rows — empty "niche space" in ecological terms — invites weed infestation. The presence of weeds makes the farmer invest labor in weeding or capital in herbicide.

Large farmers tend to plant monocultures because they are the simplest to manage with heavy machinery. Small farmers on the other hand, especially in the Third World, are much more likely to plant crop mixtures — intercropping — where the empty niche space that would otherwise produce weeds instead is occupied by other crops. They also tend to combine or rotate crops and livestock, with manure serving to replenish soil fertility.

Such integrated farming systems produce far more per unit area than do monocultures. Though the yield per unit area of one crop—corn, for example—may be lower on a small farm than on a large monoculture, the total output per unit area, often composed of more than a dozen crops and various animal products, can be far, far higher. Therefore, if we are to compare small and large farms we should use *total output*, rather than yield. Total output is the sum of everything a small farmer produces: various grains, fruits, vegetables, fodder, animal products, etc. While yield almost always biases the results toward larger farms, total output allows us to see the true productivity advantage of small farms.

Surveying the data we indeed find that small farms almost always produce far more agricultural output per unit area than larger farms. This holds true whether we are talking about an industrial country like the United States, or any country in the Third World. This is now widely recognized by agricultural economists across the political spectrum, as the "inverse relationship between farm size and output". Even leading development economists at the World Bank have come around to this view, to the point that they now accept that re-distribution of land to small farmers would lead to greater overall productivity , a view long since arrived at by others.

Table 1 shows the relationship between farm size and ouput per acre in the United States. The smallest farms, those of 27 acres or less, have more than ten times greater dollar output per acre than larger farms. While this is in large part due to the fact that smaller farms tend to specialize in high value crops like vegetables and flowers, it also reflects relatively more labor and inputs applied per unit area, and the use of more diverse farming systems.

I have looked at the relationship between farm size and total output for fifteen countries in the Third World. In all cases relatively smaller farm sizes are much more productive per unit area—2 to 10 time more productive—than are larger ones. We observe two general forms of the relationship, as shown in Figure 2. Curve I is found in countries where the smallest reported farm size category is the most productive per unit area. Curve II is found where the most productive size category, while not the smallest, is still relatively small. All countries for which data is available fit one of these two types. The data from the U.S. clearly matches type I.

There are a variety of explanations for the greater productivity of small farms in the Third World. Some of these are:

a. <u>multiple cropping</u>: as explained above, while large farmers almost always use monocultures, and one or at the most two cropping cycles per year, small farmers are more likely to intercrop various crops on the same field, plant multiple times during the year, and integrate crops, livestock and even aquaculture, making much more intensive use of space and time.

b. <u>land use intensity</u>: larger farmers and land owners tend to leave much of their land idle, while small farmers tend to use their entire parcel. (In the U.S. the relationship is reversed. Small farms tend to have a lower intensity of land use, leaving greater proportions of their land in woodland, cover crops, etc.

(continued on next page)

c. output composition: large farms are oriented toward land extensive enter-prises, like cattle grazing or extensive grain monocultures, while small farmers emphasize labor and resource intensive use of land. As in the U.S. case, large farms may produce crops with lower value than do smaller farms.

d. irrigation: small farmers may make more efficient use of irrigation.

e. labor quality: while small farms generally use family labor — which is personally committed to the success of the farm — large farms use relatively alienated hired labor.

f. labor intensity: small farms apply far more labor per unit area than do larger farms.

g. input use: small farms often use far more inputs per unit area than larger farms, though the mix on small farms favors non-purchased inputs like manure and compost while large farms tend to use relatively more purchased inputs like agrochemicals.

h. resource use: large farms are generally less committed to management of other resources — such as forests and aquatic resources — which combine with the land to produce a greater quantity and better quality of production.

It is the commitment that family members have to their farm, and the complexity and integrated nature of small farms, that guarantee their advantage in terms of output. Pretty (1997) has documented the productivity of such systems in a wide variety of environments.

Figure 1. Typical forms of the relationship between farm size and total output. In Type I the smallest farm sizes produce the most total output per unit area. In Type II the most productive size class is not the smallest, but is still relatively small. These idealized types have been abstracted from the data on Third World countries.

Small Farm Efficiency

While small farms are clearly more productive than large farms in terms of output per unit area, claims are often made that large farms are still *more efficient*. To start with, this depends on the definition of efficiency that one chooses. Small farms make more efficient use of land. Large farms generally have higher labor productivity due to mechanization, so they might be considered to be more efficient in labor usage. The definition of efficiency most widely accepted by economists is that of "total factor productivity," a sort of averaging of the efficiency of use of all the different factors that go into production, including land, labor, inputs, capital, etc. Data from the 1960s, 70s and early 80s show small farms have greater total factor productivity than large farms in Sub-Saharan Africa, Asia, Mexico and Columbia. The curves follow the same patterns, Types I or II, shown in Figure 2 for farm size vs. output. More recently, the same pattern has been found in Honduras.

In industrial countries like the U.S. the pattern is less clear. The consensus position is probably that very small farms are inefficient because they can't make full use of expensive equipment, while very large farms are also inefficient because of management and labor problems inherent in large operations. Thus peak efficiency is likely achieved on mid-sized farms that have one or two hired laborers, giving the U.S. an efficiency curve like the Type II productivity curve, but with the peak more toward mid-size than small. In a recent, detailed analysis of true total factor productivity, corrected for a number of biases in the data, the author concludes that advantages to larger farm sizes found by some analysts "disappear, while there is evidence of diseconomies as farm size increases". In other words, even in the United States, there is no reason to believe that large farms are more efficient, and very large farms may in fact be quite inefficient. But there is far more to the economic importance of small farms once we move outside the farm gate and ask questions about economic development.

photo courtesy Food & Agriculture Organization

Land reform - the distribution of land to landless and land-poor rural families - can be an effective way to improve rural welfare, increase production and reduce hunger. Here a Chinese family bundles rice transplants.

Small Farms in Economic Development

Surely more bushels of grain is not the only goal of farm production; farm resources must also generate wealth for the overall improvement of rural life—including better housing, education, health services, transportation, local business diversification, and more recreational and cultural opportunities.

Here in the United States, the question was asked more than a half-century ago: what does the growth of large-scale, industrial agriculture mean for rural towns and communities? Walter Goldschmidt's classic 1940's study of California's San Joaquin Valley compared areas dominated by large corporate farms with those still characterized by smaller, family farms.

In farming communities dominated by large corporate farms, nearby towns died off. Mechanization meant that fewer local people were employed, and absentee ownership meant that farm families themselves were no longer to be found. In these corporate-farm towns, the income earned in agriculture was drained off into larger cities to support distant enterprises, while in towns surrounded by family farms, the income circulated among local business establishments, generating jobs and community prosperity. Where family farms predominated, there were more local businesses, paved streets and sidewalks, schools, parks, churches, clubs, and newspapers, better services, higher employment, and more civic participation. Studies conducted since Goldschmidt's original work confirm that his findings remain true today.

The Amish and Mennonite farm communities found in the eastern United States provide a strong contrast to the virtual devastation described by Goldschmidt in corporate farm communities. Lancaster County in Pennsylvania, which is dominated by these small farmers who eschew much modern technology and often even bank credit, is the most productive farm county east of the Mississippi River. It has annual gross sales of agricultural products of $700 million, and receives an additional $250 million from tourists who appreciate the beauty of traditional small farm landscapes. Ludwig and Anderson (1992) argue that Amish farm communities provide a North American model for what they call "indigenous development," essentially an emphasis on building a strong local economy as the basis for participating in the larger world:

> The vision of indigenous development is one of global inter-dependence through the intra-dependence of semiautonomous regions. Instead of placing emphasis on the highest or global level of competitive interaction, it starts at the bottom and places emphasis on the development of strong, independent, semiautonomous regions with unique identities… Many of the Amish communities, separated by self-defined boundaries, are… self-reliant. These [are] interesting examples because their economies are market oriented and highly successful; they do substantial trade with the outside; they are great husbands of the natural environment; and their members find a great deal of meaning and centeredness in their work. While their economies are market based, they are highly diverse and integrated rather than fragmented, cooperative rather than competitive, based on value added rather than on commodity products, and dedicated to reciprocity more than dominance (p.35).

If we turn toward the Third World we find similar local benefits to be derived from a small farm economy. The Landless Workers Movement (MST) is a grassroots organization in Brazil that helps landless laborers to organize occupations of idle land belonging to wealthy landlords. When the movement began in the mid-1980s, the mostly conservative mayors of rural towns were violently opposed to MST land occupations in surrounding areas. In recent times, however, their attitude has changed. Most of their towns are very depressed economically, and occupations can give local economies a much needed boost. Typical occupations consist of 1,000 to 3,000 families, who turn idle land into productive farms. They sell their produce in the marketplaces of the local towns and buy their supplies from local merchants. Not surprisingly those towns with nearby MST settlements are now better off economically than other similar towns, and many mayors now actually petition the MST to carry out occupations near their towns.

It is clear that local and regional economic development benefits from a small farm economy, as do the life and prosperity of rural towns. Can we re-create a small farm economy in places where it has been lost, to improve the wellbeing of the poor?

Improving Social Welfare Through Land Reform

Recent history shows that the re-distribution of land to landless and land-poor rural families can be a very effective way to improve rural welfare. Sobhan (1993) examined the outcome of virtually every land reform program carried out in the Third World since World War II. He is careful to distinguish between what he calls 'radical' re-distribution (called 'genuine land reform' by Lappé et al., 1998), and 'non-egalitarian' reforms (or 'fake land reform' in the Lappé et al.'s terminology). When quality land was really distributed to the poor, and the power of the rural oligarchy to distort and 'capture' policies broken, real, measurable poverty reduction and improvement in human welfare has invariably been the result. Japan, South Korean, Taiwan and China are all good examples. In contrast, countries with reforms that gave only poor quality land to beneficiaries, and/or failed to alter the rural power structures that work against the poor, have failed to make a major dent in rural poverty. Mexico and the Philippines are typical cases of the latter.

While Sobhan looked at national-level statistics to derive his conclusions, Besley and Burgess (1998) recently looked at the history of land reform in 16 individual Indian states from 1958 to 1992. While these were by and large not radical reforms in Sobhan's sense, many did abolish tenancy and reduce the importance of intermediaries. The authors found a strong relationship between land reform and the reduction of poverty. Similarly in Brazil, land reform beneficiaries and members of MST-settlements have a higher standard of living than those families who remain landless. In fact land reform holds promise as a means to stem the rural-urban migration that is causing Third World cities to grow beyond the capacity of urban economies to provide enough jobs.

In Brazil IBASE, a social and economic research center, studied the impact on government coffers of legalizing MST-style land occupations-*cum*-settlements versus the services used by equal numbers of people migrating to urban areas. When the landless poor occupy land and force the government to legalize their holdings, it implies costs: compensation of the former landowner, legal expenses, credit for the new farmers, etc. Nevertheless the total cost to the state to maintain the same number of people in an urban shanty town — including the services and infrastructure they use — exceeds in just one month, the yearly cost of legalizing land occupations.

Another way of looking at it is in terms of the cost of creating a new job. Estimates of the cost of creating a job in the commercial sector of Brazil range from 2 to 20 times more than the cost of establishing an unemployed head of household on farm land, through agrarian reform. Land reform beneficiaries in Brazil have an annual income equivalent to 3.7 minimum wages, while still landless laborers average only 0.7 of the minimum. Infant mortality among families of beneficiaries has dropped to only half of the national average.

This provides a powerful argument that land reform to create a small farm economy is not only good for local economic development, but is also more effective social policy than allowing business-as-usual to keep driving the poor out of rural areas and into burgeoning cities.

Sobhan (1993) argues that *only* land reform holds the potential to address chronic underemployment in most Third World countries. Because small farms use more labor — and often less capital — to farm a given unit of area, a small farm model can absorb far more people into gainful activity and reverse the stream of out-migration from rural areas. What of national economic development? How do countries characterized by small farms fare compared to those dominated by large farms?

National Economic Development and 'Bubble-Up' Economics

In turns out that a relatively equitable, small farmer-based rural economy does provide the basis for strong national economic development. This "farmer road to development" is part of the reason why, early on in its history, the United States developed more rapidly and evenly than Latin America, with its inequitable land distribution characterized by huge haciendas and plantations interspersed with poverty-stricken subsistence farmers. In the United States, independent "yeoman" farmers formed a vibrant domestic market for manufactured products from urban areas, including farm implements, clothing and other necessities. This domestic demand fueled economic growth in the urban areas, and the combination gave rise to broad-based growth.

More recently the post-war experiences of Japan, South Korea and Taiwan demonstrate how equitable land distribution fuels economic development. At the end of the war circumstances, including devastation and foreign occupation, conspired to create the conditions for 'radical' land reforms in each country, breaking the economic stranglehold of the landholding class over rural economic. Combined with trade protection to keep farm prices high, and targeted investment in rural areas, small farmers rapidly achieved a high level of purchasing power, which guaranteed domestic markets for fledging industries.

The post-war economic 'miracles' of these three countries were each fueled at the start by these internal markets centered in rural areas, long before the much heralded 'export orientation' policies which much later on pushed those industries to compete in the global economy. This was real triumph for 'bubble-up' economics, in which re-distribution of productive assets to the poorest strata of society created the economic basis for rapid development. It stands in stark contrast to the failure of 'trickle down' economics to achieve much of anything in the same time period in areas of U.S. dominance, such as much of Latin America.

A further benefit of small farm development through land reform in East Asia was the dispersal of political power. Economically enfranchised small farmers became an important political base that politicians had to respond to, avoiding the kind of urban biases in policy-making that have sabotaged economic development in much of the Third World.

More generally, there is now a growing consensus among mainstream development economists, long called for by those on the left, that inequality in asset distribution impedes economic growth. This is leading even such institutions as the World Bank to call for land reform, albeit of a 'non-radical,' 'market-led' variety I do not necessarily endorse.

Ecosystem Services & Sustainability

The benefits of small farms extend beyond the economic sphere. Whereas large, industrial-style farms impose a scorched-earth mentality on resource management — no trees, no wildlife, endless monocultures — small farmers can be very effective stewards of natural resources and the soil. To begin with, small farmers utilize a broad array of resources and have a vested interest in their sustainability. At the same time, their farming systems are diverse, incorporating and preserving significant functional biodiversity within the farm. By preserving biodiversity, open space and trees, and by reducing land degradation, small farms provide valuable ecosystem services to the larger society.

In the United States, small farmers devote 17% of their area to woodlands, compared to only 5% on large farms. Small farms maintain nearly twice as much of their land in "soil improving uses," including cover crops and green manures. In the Third World, peasant farmers show a tremendous ability to prevent and even reverse land degradation, including soil erosion.

Many small farm agroecosystems in the Third World are located on a wide variety of slopes, aspects, microclimates, elevational zones, and soil

types. They are surrounded by many different vegetation associations. There are numerous combinations of diverse biophysical factors which have led to the diverse cropping patterns developed by farmers to exploit site-specific characteristics. Descriptions of the species and structural diversity and management of these traditional systems are found throughout the literature on agroecology.

In many areas traditional farmers have developed and/or inherited complex farming systems which are highly adapted to local conditions, allowing them to sustainably manage production in harsh environments while meeting their subsistence needs, without depending on mechanization, chemical fertilizers, pesticides or other technologies of modern agricultural science.

Compared to the ecological wasteland of a modern export plantation, the small farm landscape contains a myriad of biodiversity. The forested areas from which wild foods and leaf litter are extracted, the wood lot, the farm itself with intercropping, agroforestry and large and small livestock, the fish pond, the backyard garden, allow for the preservation of hundreds if not thousands of wild and cultivated species. Simultaneously, the commitment of family members to maintaining soil fertility on the family farm means an active interest in long-term sustainability not found on large farms owned by absentee investors.

If we are truly concerned about rural ecosystems, then the preservation and promotion of small, family farm agriculture is a crucial step we must take.

Conclusions: Free Trade Threatens Small Farm Agriculture

Throughout this paper I have examined the multiple functions played by small farms, and the myriad benefits they provide for society and for the biosphere. If we are concerned about food production, small farms are more productive. If our concern is efficiency, they are more efficient. If our concern is poverty, land reform to create a small farm economy offers a clear solution. The small farm model is also the surest route to broad-based economic development. If the loss of biodiversity or the sustainability of agriculture concern us, small farms offer a crucial part of the solution.

Despite decades of anti-small farm policies taken by nation states, small farmers have clung to the soil in amazing numbers. But today we stand at a crossroads. As a world we are poised to take steps toward global economic integration that pose far greater threats to small farmers than they have ever faced before.

Trade liberalization—the move toward global free trade policies—poses a grave threat to the continued existence of small farms throughout the world. Over the past couple of decades Third World countries have been encouraged, cajoled, threatened, and generally pressured into unilaterally reducing the level of protection offered to their domestic food producers in the face of well-financed foreign competitors. Through participation in GATT, NAFTA, the World Bank, the International Monetary Fund and the World Trade Organization, they have reduced or some cases eliminated tariffs, quotas and other barriers to unlimited imports of food products. On the face of it, this might sound like a good thing. After all, more food imports might make food cheaper in poor, hungry countries, and thus make it easier for the poor to obtain enough to eat. However, the experiences of many countries suggest that there are downsides to these policies which may outweigh the potential benefits.

photo courtesy Food & Agriculture Organization

Panamanian farmer harvests papaya. The small farm is the surest route to broad-based and sustainable economic development

Typically Third World economies have been inundated with cheap food coming from the major grain exporting countries. For a variety of reasons (subsidies, both hidden and open, industrialized production, etc.) this food is more often than not put on the international market at prices below the local cost of production. That drives down the prices that local farmers receive for what they produce, with two related effects, both of which are negative.

First, a sudden drop in farm prices can drive already poor, indebted farmers off the land over the short term. Second, a more subtle effect kicks in. As crop prices stay low over the medium term, profits per unit area—per acre or hectare—stay low as well. That means the minimum number of hectares needed to support a family rises, contributing to abandonment of farm land by smaller, poorer farmers—land which then winds up in the hands of the larger, better off farmers who can compete in a low price environment by virtue of having very many hectares. They overcome the low profit per hectare trap precisely by owning vast areas which add up to good profits in total, even if they represent very little on a per hectare basis. The end result of both mechanisms is the further concentration of farm land in the ever fewer hands of the largest farmers.

A penalty is paid for this land concentration in terms of productivity, as large farmers turn to monocultures and machines to farm such vast tracts, and in terms of the environment, as these large mechanized monocultures come to depend on agrochemicals. Jobs are lost as machines replace human labor and draft animals. Rural communities die out as farmers and farm workers migrate to cities. Natural resources deteriorate as nobody is left who cares about them. Finally, food security is placed in jeopardy: domestic food production falls in the face of cheap imports; land that was once used to grow food is placed into production of export crops for

Figure 2. On-Farm Income of the Average U.S. Farmer vs. Total U.S. Farm Exports, 1963-1994. Sources: Farmer Income—Economic Research Service, U.S. Department of Agriculture, Current and Historic Operator Household Income Tables. Exports—Food and Agriculture Organization, FAOSTAT Agriculture Data.

distant markets; people now depend on money—rather than land—to feed themselves; and fluctuations in employment, wages and world food prices can drive millions into hunger.

This process should be a more or less familiar one to North Americans, who have seen low crop prices and the "get big or get out" mentality of government policy drive four million farmers off the land since World War II. We have paid, and continued to pay, a heavy price of runaway soil erosion from excessive mechanization and "fence row to fence row" planting, of urban problems because our inner cities never did absorb the excess labor expelled from rural America, and of the collapse of rural life.

The major drive to export grain from America's heartland, which began in the 1970s, contributed to a 40 percent increase in soil erosion in the corn and soybean belts. Today about 90 percent of U.S. crop land is losing topsoil faster than it can be replaced. The export boom also contributed to a 25 percent increase in average farm size, which was accompanied by the loss of one third of all American farmers between 1970 and 1992. In Figure 3 we see that the average American farmer has not benefited from the export boom at all. Rather, the profits have accrued to the giant grain cartels.

In a very real sense, then, the U.S. drive to dominate global grain markets has hurt family farmers and damaged rural ecosystems both at home and abroad.

What is euphemistically known as a "fair and market-oriented agricultural trading system"—almost totally free trade in farm products—is unfortunately the agenda of American government negotiators in the Millennium Round of trade negotiations under the World Trade Organization, begun in the fall of 1999 in Seattle.

This represents the single gravest threat faced today by the world's rural peoples and ecologies. The further "liberalization" of trade in agricultural products would mean greater freedom for the big to drive out the small, for forcing people everywhere to depend on distant global markets—with unpredictable price swings—for the daily meals, another mass exodus from rural areas and the further growth of cities, and could lead to the final triumph of inefficient and ecologically destructive monocultures over ecologically rational and sustainable farming practices.

There is less than unanimous support among the world's nations for the U.S position. A number of countries have taken up the call made in Chapter 14 of Agenda 21, the declaration drawn up at the 1992 Earth Summit in Rio, that "agricultural policy review, planning and integrated programming [be carried out] in the light of the multifunctional aspects of agriculture, particularly with regard to food security and sustainable development."

According to this viewpoint, agriculture produces not only commodities, but also livelihoods, cultures, ecological services, etc., and as such, the products of farming cannot be treated in the same way as other goods. While a shoe, for example, is a relatively simple good whose world price can be set by supply and demand, and the trade in which can be regulated through tariffs or de-regulated by removing them, not so for farming, whose roles are far more complex.

The Japanese government, in a preparatory document for the Seattle negotiations, put it this way:

> Agriculture not only produces/supplies agricultural products, but also contributes to food security, by reducing the risks caused by unexpected events or a possible food shortage in the future, to the preservation of land and environment, to the creation of a good landscape and to the maintenance of the local community, through production activities in harmony with the natural environment. All of these roles are known as the "multifunctionality" of agriculture.
>
> The multifunctionality of agriculture has the following characteristics: (a) Most aspects of multifunctionality are regarded as economic externalities and it is difficult to reflect their values properly in market prices. Though it is closely related to production, it cannot be subject to trade; (b) Market mechanisms alone cannot lead to the realization of an agricultural production method that will embody the multifunctionality of agriculture.

Norway has also endorsed the concept of multifunctionality as the basis for special treatment of farming for reasons of environmental protection, food security and the viability of rural areas, as has the European Union to some extent, and as have some other countries.

As an expert in small farm production, I completely endorse this view. Ignoring the multiple functions of agriculture has caused untold suffering and ecological destruction in the past. The time is long overdue to recognize the full range of contributions that agriculture—and small farms in particular—make to human societies and to the biosphere. Farms are not factories that churn out sneakers or tennis racquets, and we cannot let narrow arguments of simple economic expediency destroy this legacy of all human kind.

I call on the world's civil society to demand that our governments respect the multi-functionality of agriculture and grant each country true sovereignty over food and farming, by stepping back from free trade in agricultural products. Instead of deepening policies that damage small farms, we should implement policies to develop small farm economies. These might include genuine land reforms, tariff protection for staple foods—so that farmers receive fair prices, and the reversal of biases in policies for credit, technology, research, education, subsidies, taxes and infrastructure which unfairly advance large farms at the expense of smaller ones. By doing so we will strike at the root causes of poverty, hunger, underdevelopment and degradation of rural ecosystems.

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From Shallow To Deep Organics; More Than Just A Shift In Technology

by Stuart B. Hill

photo courtesy of Food & Agriculture Organization

African woman uses solar energy to dry mango slices.

Those who practice 'organic' and ecological approaches to agriculture have done amazingly well, particularly given the lack of support (research, legislation, marketing, promotion etc.), misinformation in the media and the ridicule to which many producers have been subjected. Yet, at the same time, it is important to realize that we have still hardly scratched the surface of what is possible, particularly in relation to the application of ecological knowledge and ancient wisdoms to our food systems. We also need to acknowledge that we are divided and weakened by our attachments to subcategories of 'alternative' agriculture, and that most of us have difficulty acknowledging the flaws associated with our particular models and approaches. Because of this we are prevented from making some of the progress that would otherwise be possible. Most of us are more interested in production than marketing, which often gets neglected to our detriment. Many of us tend to blame others for the difficulties we face, and some of us have become prickly characters (I'm sure you know some – you may even be one)!

The good news is that progress is well within our reach, but we do need to be willing to work on this in an integrated way at personal, social and ecological levels. This means composting our psychological shit and reclaiming our power and awareness, revising our visions and goals, and reflecting on our values and world-views. It also means collaborating across differences to find commonalties (finding our "WEs" with others), and learning from nature and indigenous knowledges and from those who know about them. Perhaps most importantly, it requires us to become better at working with the unknown. Modernism, science and an overemphasis on knowing have led us to forget that most of reality remains unknown and hidden (for some it may help to picture this as over 95%; for others it is more easily conceived as an ever unfolding mystery). What is important to acknowledge is that these mysterious processes are as essential to our lives and the wellbeing of the planet as are those that are known. The widespread failure to acknowledge this goes a long way to explaining why so many are surprised by such crises as the 'Mad Cow Disease'. It is also why so many overconfident statements are made by many scientists about the benefits and safety of genetic engineering, and also about the use of pesticides. It is clearly naive to try to base our actions only on the small amount of knowledge that we know we know; yet this is exactly what our culture encourages us to do. Biodynamics has made some attempt to address this situation; although most modern practitioners have failed to recognize the nature of the gift that Steiner gave us and they have turned his lessons on working with the unknown into dogmas.

A voice for taking a social ecology approach from down under. Who am I and how dare I be saying these things? In 1969 I joined the Agriculture Faculty of McGill University in Montreal, and by 1974 had established what became Ecological Agriculture Projects (EAP), Canada's largest and most active resource center for organic and sustainable agriculture. In 1996 I became the Foundation Chair of Social Ecology at the Hawkesbury Campus of the University of Western Sydney in Australia. In fact, I call the imperatives that I am talking about above "taking a social ecology approach".

During the 1970s, 1980s and 1990s my children and I attended and presented workshops at most NOFA conferences. I have published dozens of papers on ecological approaches in agriculture (see the EAP web site at *http:// www.eap.mcgill.ca*), and my work in this area continues in Australia

My focus remains 'the big picture', the interrelationships between the separate issues we face and the need for more embracing holistic approaches. This is in contrast to the more common, reductionist, fragmented approaches favored by conventional science and most of society.

Take energy, food quality and rural decline, for example. They are invariably dealt with as separate issues, but in reality they are all interrelated; to such an extent that if we take an holistic approach to one of these in a particular context, there is every likelihood that we will also be helping to solve all of the others. On the other hand, if we try to solve any one in isolation it is likely that over the longer-term that we will impact adversely on all the others.

Working with the processes of change. Many years ago I developed a model for change, which I dubbed the 'ESR' (efficiency, substitution, redesign) model. The efficiency approach involves finding ways to make a conventional solution to a problem more efficient. With spraying, for example, the efficiency approach might involve improving nozzles, improving formulations, using Integrated Pest Management (which tragically is usually just Integrated Pesticide Management) to reduce the amount of chemical used, and so on. There is room for huge improvements in efficiency, as Amory Lovins (Factor Four, Natural Capitalism etc.) has become famous pointing out. Pesticide use is incredibly inefficient, for example. Usually less than one per cent of pesticides applied to crops actually reach the target. The remainder is wasted and creates havoc, usually over a longer time frame than any benefits are experienced, throughout the rest of the ecosystem.

While efficiency focuses on improving the current inputs and methods, 'substitution' involves replacing the current inputs to the system with less impacting or disruptive ones, such as bio-controls. However, our problems can only really be solved when we start to 'redesign' the systems involved so that they don't give rise to the problems being addressed by our use of curative inputs.

Redesign is a 'deep' approach compared with the more 'shallow' strategies of efficiency and substitution. Redesign addresses the underlying issues by changing the structure and functioning of the systems involved so that the problems — symptoms of maldesigned and mismanaged systems — do not arise.

Efficiency and substitution approaches can be either stepping stones or stages in a progressive spiral towards redesign, or they can be barriers. Substitution, because it makes the system appear workable, at least in the short-term, often acts as a barrier. This is helped by the fact that it is compatible with our market economy, which is based on the repeated purchase of products whose benefits are not long lasting.

Most modern organics is dependent on substitution strategies, with synthetic chemicals being replaced by 'natural' fertilizers and sprays, and by biological controls. Organic producers commonly purchase things like humates, seaweed sprays, micro-organism inoculants and bio-controls; all of which provide benefits that could be created on-site if the systems were designed and managed in better ways.

For example, optimal decomposition of organic matter in soil results in the production of growth promoting hormones, such as cytokinin, and the release of trace minerals, which are two of the main benefits that seaweed products provide. Decomposition also results in the formation of humate-like materials.

The problem with imports is that their benefits are always temporary. At least some of the resources that they are made from are exhaustable and will eventually run out, so systems dependant on them can never be sustainable. Taking such approaches also encourage us to postpone dealing with the underlying causes of our problems. Many parallels can be recognized in the health field and in society in general.

What I am describing here is a progression from taking a "deceptively simple" approach, in which we think pesticides and fertilizers or their substitutes are the solution, progressing to a "confusing, and sometimes paralyzingly, complex" approach, in which we try to understand, control and micromanage everything. We usually need to pass through this frustrating stage in order to achieve the more sustainable and rewarding "profoundly simple" approaches, which usually involve paradox, and tuning in to the wisdoms of natural systems, including our own often untapped natural intelligence and intuition.

Sadly there is virtually no support for genuine redesign in our society, primarily because of the influence of the pharmaceutical and petrochemical industries on governments - they know that with appropriate redesign many of their products would no longer be needed.

The beginnings of redesign strategies are evident, however, in some aspects of Permaculture, Fukuoka's Natural Farming, Biodynamics, Deep Organics and Holistic Resource Management, but they have a long way to go to reach their full potential. We could learn so much from nature if we would just pay better attention to it - instead of so often trying to control it with interventions based on physics and chemistry.

For example, we know that soluble nitrogen fertilizers inhibit the nitrogen-fixing organisms in soil. So an ecological soil management strategy designed to minimize this might be to manage land in alternating strips that are high and low in nitrogen (and probably also some other elements), with the crops being grown between them so that their roots have access to diverse rather than homogenous conditions. Some recent work in Australia has shown, for example, that irrigating on one side of a tree, rather than all around it, results in a dramatic increase in the efficiency of water uptake. Being more creative in working with complexity, chaos, diversity and the unknown can certainly be expected to lead to a diverse range of improvements. Most modern farming systems, and indeed most modern lives, are far too homogenized and simplified.

If we are to develop sustainable systems we will need to get together with one another and with the larger community, including industry and government, to initiate programs for fundamental redesign. This is paradoxically being made easier by both the benefits and challenges of globalization. Only through such collaborative and participatory processes can we hope to significantly reduce our wasteful levels of consumption and achieve genuine sustainability.

The type and level of change needed to develop sustainable systems of food production will occur only when growers start to be paid fairly for their 'systems maintenance' work, either by government or by consumers. In natural systems over 90 percent of the available resources are used for system maintenance, which is what genuine sustainability is all about. Because in our society we only reward productivity, and not maintenance, it is not surprising that producers tend to neglect and over-tax their production systems. If we were to reward producers for the maintenance of the environments they manage they would be able to build up the natural capital in the system, and so establish the basis for sustained productivity. This is what Paul Hawken and Amory and Hunter Lovins are arguing for in their book "Natural Capitalism", although their chapter on the food system also only scratches the surface of what is possible. Paying producers to maintain the environment and the natural systems upon which they rely, whether through higher food prices or through government subsidies, would be a national investment in natural capital, an investment in which the benefits over time would far exceed the costs.

The key to sustainable change is to start small with achievable goals. So often people embark on huge, undoable, Olympian tasks, go off half-cocked, and then hit a barrier, get discouraged and burn out and give up. When I'm working with producers in Australia I encourage them to work with the 'smallest meaningful initiative they can guarantee to carry through to completion', even if it is only phoning someone to talk through an issue. This gets them into the habit of starting to do things. In parallel with this, I encourage them to publicly celebrate completing their small initiatives and achievements in order to make them contagious. As I said at the beginning, the possibilities are endless. Go for it and celebrate as you go!

Professor Stuart B. Hill is committed to working for change that improves ecological sustainability, community and personal wellbeing, and our psychosocial co-evolution. He is critical of the still dominant tinkering (shallow) responses to problems, as well as their endless measurement, and is a tireless campaigner for the proactive, fundamental (deep) redesign of our lifestyles, our institutional structures and processes, our managed ecosystems and our technologies. His background in ecology, soil biology, entomology, agriculture, psychotherapy, education, policy development and international development, and his experience of working with change, have enabled him to be an effective facilitator in complex situations that demand both collaboration across difference and a long-term evolutionary approach to situation improvement. As this is a focus of social ecology, he is currently in an euphoric state as a member of a dynamic learning and action community (of over 300 staff and students) with overlapping values and mutually supportive projects. Enquiries about the Social Ecology programs at the University of Western Sydney should be directed to Kathy Adam, Faculty of Social Inquiry, UWS-Hawkesbury, Locked Bag No. 1, Richmond, NSW. 2753. Phone: 612 4570-1288. Fax: -1531. Email: k..adam@uws.edu.au.

10 Reasons Why Biotechnology Will Not: Ensure Food Security, Protect the Environment or Reduce Poverty in the Developing World

by Miguel A. Altieri & Peter Rosset

Biotechnology companies often claim that genetically modified organisms (GMOs) — specifically genetically altered seeds — are essential scientific breakthroughs needed to feed the world, protect the environment, and reduce poverty in developing countries. The Consultative Group on International Agricultural Research (CGIAR) and its constellation of international centers around the world charged with research to enhance food security in the developing world echo this view, which rests on two critical assumptions. The first is that hunger is due to a gap between food production and human population density or growth rate. The second is that genetic engineering is the only or best way to increase agricultural production and, thus, meet future food needs.

Our objective is to challenge the notion of biotechnology as a magic bullet solution to all of agriculture's ills, by clarifying misconceptions concerning these underlying assumptions.

1. There is no relationship between the prevalence of hunger in a given country and its population. For every densely populated and hungry nation like Bangladesh or Haiti, there is a sparsely populated and hungry nation like Brazil and Indonesia. The world today produces more food per inhabitant than ever before. Enough food is available to provide 4.3 pounds for every person everyday: 2.5 pounds of grain, beans and nuts, about a pound of meat, milk and eggs and another of fruits and vegetables. The real causes of hunger are poverty, inequality and lack of access to food and land. Too many people are too poor to buy the food that is available (but often poorly distributed) or lack the land and resources to grow it themselves .

2. Most innovations in agricultural biotechnology have been profit-driven rather than need-driven. The real thrust of the genetic engineering industry is not to make Third World agriculture more productive, but rather to generate profits. This is illustrated by reviewing the principle technologies on the market today: (1) herbicide resistant crops, such as Monsanto's "Roundup Ready" soybeans, seeds that are tolerant to Monsanto's herbicide Roundup, and (2) "Bt" (Bacillus thuringiensis) crops which are engineered to produce their own insecticide. In the first instance, the goal is to win a greater herbicide market-share for a proprietary product and, in the second, to boost seed sales at the cost of damaging the usefulness of a key pest management product (the Bacillus thuringiensis based microbial insecticide) relied upon by many farmers, including most organic farmers, as a powerful alternative to insecticides . These technologies respond to the need of biotechnology companies to intensify farmers' dependence upon seeds protected by so-called "intellectual property rights" which conflict directly with the age-old rights of farmers to reproduce, share or store seeds. Whenever possible corporations will require farmers to buy a company's brand of inputs and will forbid farmers from keeping or selling seed. By controlling germplasm from seed to sale, and by forcing farmers to pay inflated prices for seed-chemical packages, companies are determined to extract the most profit from their investment .

photo courtesy Food & Agriculture Organization

Biotechnology advocates brag about designing a rice which contains Vitamin A. But is it really a boon to the poor in developing countries?

3. The integration of the seed and chemical industries appears destined to accelerate increases in per acre expenditures for seeds plus chemicals, delivering significantly lower returns to growers. Companies developing herbicide tolerant crops are trying to shift as much per acre cost as possible from the herbicide onto the seed via seed costs and technology charges. Increasingly price reductions for herbicides will be limited to growers purchasing technology packages. In Illinois, the adoption of herbicide resistant crops makes for the most expensive soybean seed-plus- weed management system in modern history — between $40.00 and $60.00 per acre depending on fee rates, weed pressure, and so on. Three years ago, the average seed-plus-weed control costs on Illinois farms was $26 per acre, and represented 23% of variable costs; today they represent 35-40%. Many farmers are willing to pay for the simplicity and robustness of the new weed management system, but such advantages may be short-lived as ecological problems arise.

4. Recent experimental trials have shown that genetically engineered seeds do not increase the yield of crops. A recent study by the United States Department of Agriculture (USDA) Economic Research Service shows that in 1998 yields were not significantly different in engineered versus non-engineered crops in 12 of 18 crop/region combinations. In the six crop/region combinations where Bt crops or herbicide tolerant crops (HTCs) fared better, they exhibited increased yields between 5-30%. Glyphosphate tolerant cotton showed no significant yield increase in either region where it was surveyed. This was confirmed in another study examining more than 8,000 field trials, where it was found that Roundup Ready soybean seeds produced fewer bushels of soybeans than similar conventionally bred varieties.

5. Many scientists claim that the ingestion of genetically engineered food is harmless. Recent evidence, however, shows that there are potential risks of eating such foods as the new proteins produced in such foods could: (1) act themselves as allergens or toxins; (2) alter the metabolism of the food producing plant or animal, causing it to produce new allergens or toxins; or (3) reduce its nutritional quality or value. In the case of (3), herbicide resistant soybeans can contain less isoflavones, an important phytoestrogen present in soybeans, believed to protect women from a number of cancers. At present, developing countries are importing soybean and corn from the United States, Argentina, and Brazil. Genetically engineered foods are beginning to flood the markets in the importing countries, yet no one can predict all their health effects on consumers, who are unaware that they are eating such food. Because genetically engineered food remains unlabeled, consumers cannot discriminate between genetically engineered (GE) and non-GE food, and should serious health problems arise, it will be extremely difficult to trace them to their source. Lack of labeling also helps to shield the corporations that could be potentially responsible from liability.

6. Transgenic plants which produce their own insecticides, closely follow the pesticide paradigm, which is itself rapidly failing due to pest resistance to insecticides. Instead of the failed "one pest-one chemical" model, genetic engineering emphasizes a "one pest-one gene" approach, shown over and over again in laboratory trials to fail, as pest species rapidly adapt and develop resistance to the insecticide present in the plant. Not only will the new varieties fail over the short-to-medium term, despite so-called voluntary resistance management schemes, but in the process may render useless the natural Bt-pesticide which is relied upon by organic farmers and others desiring to reduce chemical dependence. Bt crops violate the basic and widely accepted principle of integrated pest management (IPM), which is that reliance on any single pest management technology tends to trigger shifts in pest species or the evolution of resistance through

one or more mechanisms. In general, the greater the selection pressure across time and space, the quicker and more profound the pests' evolutionary response. An obvious reason for adopting this principle is that it reduces pest exposure to pesticides, retarding the evolution of resistance. But when the product is engineered into the plant itself, pest exposure leaps from minimal and occasional to massive and continuous exposure, dramatically accelerating resistance. Bacillus thuringiensis will rapidly become useless, both as a feature of the new seeds and as an old standby sprayed when needed by farmers that want out of the pesticide treadmill.

7. The global fight for market share is leading companies to massively deploy transgenic crops around the world (more than 30 million hectares in l998) without proper advance testing of short-or long-term impacts on human health and ecosystems. In the United States, private sector pressure led the White House to decree "no substantial difference" between altered and normal seeds, thus evading normal Food and Drug Administration (FDA) and Environmental Protection Agency (EPA) testing. Confidential documents made public in an on-going class action lawsuit have revealed that the FDA's own scientists do not agree with this determination. One reason is that many scientists are concerned that the large scale use of transgenic crops poses a series of environmental risks that threaten the sustainability of agriculture.

8. There are many unanswered ecological questions regarding the impact of transgenic crops. Many environmental groups have argued for the creation of suitable regulation to mediate the testing and release of transgenic crops to offset environmental risks and demand a much better assessment and understanding of ecological issues associated with genetic engineering. This is crucial, as many results emerging from the environmental performance of released transgenic crops suggest that in the development of resistant crops not only is there a need to test direct effects on the target insect or weed, but the indirect effects on the plant. Plant growth, nutrient content, metabolic changes, and effects on the soil and non-target organisms should all be examined. Unfortunately, funds for research on environmental risk assessment are very limited. For example, the USDA spends only 1% of the funds allocated to biotechnology research on risk assessment, about $1-2 million per year. Given the current level of deployment of genetically engineered plants, such resources are not enough to even discover the "tip of the iceberg." It is a tragedy-in-the-making that so many millions of hectares have been planted without proper biosafety standards.

9. As the private sector has exerted more and more dominance in advancing new biotechnologies, the public sector has had to invest a growing share of its scarce resources in enhancing biotechnological capacities in public institutions, including the CGIAR, and in evaluating and responding to the challenges posed by incorporating private sector technologies into existing farming systems. Such funds would be much better used to expand support for ecologically based agricultural research, as all the biological problems that biotechnology aims at can be solved using agroecological approaches. The dramatic effects of rotations and intercropping on crop health and productivity, as well as of the use of biological control agents on pest regulation have been confirmed repeatedly by scientific research.

10. Much of the needed food can be produced by small farmers located throughout the world using agroecological technologies. In fact, new rural development approaches and low-input technologies spearheaded by farmers and non-governmental organizations (NGOs) around the world are already making a significant contribution to food security at the household, national, and regional levels in Africa, Asia and Latin America. Yield increases are being achieved by using technological approaches, based on agroecological principles that emphasize diversity, synergy, recycling and integration; and social processes that emphasize community participation and empowerment . When such features are optimized, yield enhancement and stability of production are achieved, as well as a series of ecological services such conservation of biodiversity, soil and water restoration and conservation, improved natural pest regulation mechanisms, and so on. These results are a breakthrough for achieving food security and environmental preservation in the developing world, but their potential and further spread depends on investments, policies, institutional support, and attitude changes on the part of policy makers and the scientific community; especially the CGIAR who should devote much of its efforts to the 320 million poor farmers living in marginal environments. Failure to promote such people-centered agricultural research and development due to the diversion of funds and expertise towards biotechnology will forego an historical opportunity to raise agricultural productivity in economically viable, environmentally benign, and socially uplifting ways.

Organic Farming Will Feed the World

Astonishingly, it's more productive than high-tech agriculture

by George Monbiot

The advice could scarcely have come from a more surprising source. "If anyone tells you that GM is going to feed the world," Steve Smith, a director of the world's biggest biotechnology company, Novartis, insisted, "tell them that it is not... To feed the world takes political and financial will - it's not about production and distribution."

Mr Smith was voicing a truth which most of his colleagues in the biotechnology companies have gone to great lengths to deny. On a planet wallowing in surfeit, people starve because they have neither the land on which to grow food for themselves nor the money with which to buy it.

There is no question that, as population increases, the world will have to grow more, but if this task is left to the rich and powerful - big farmers and big business - then, irrespective of how much is grown, people will become progressively hungrier. Only a redistribution of both land and wealth can save the world from mass starvation.

But in one respect Mr. Smith is wrong. It is - in part - about production. A series of remarkable experimental results has shown that the growing techniques which his company and many others have sought to impose upon the world are, in contradiction to everything we have been brought up to believe, actually less productive than some of the methods developed by traditional farmers over the past 10,000 years.

Last week, Nature magazine reported the results of one of the biggest agricultural experiments ever conducted. A team of Chinese scientists had tested the key principle of modern rice-growing - planting a single, high-tech variety across hundreds of hectares - against a much older technique: planting several breeds in one field. They found, to the astonishment of the farmers who had been drilled for years in the benefits of "monoculture", that reverting to the old method resulted in spectacular increases in yield. Rice blast - a devastating fungus which normally requires repeated applications of poison to control - decreased by 94 per cent. The farmers planting a mixture of strains were able to stop applying their poisons altogether, while producing 18 per cent more rice per acre than they were growing before.

Two years ago, another paper published in Nature showed that yields of organic maize are identical to yields of maize grown with fertilisers and pesticides, while soil quality in the organic fields dramatically improves. In trials in Hertfordshire, wheat grown with manure has produced consistently higher yields for the past 150 years than wheat grown with artificial nutrients.

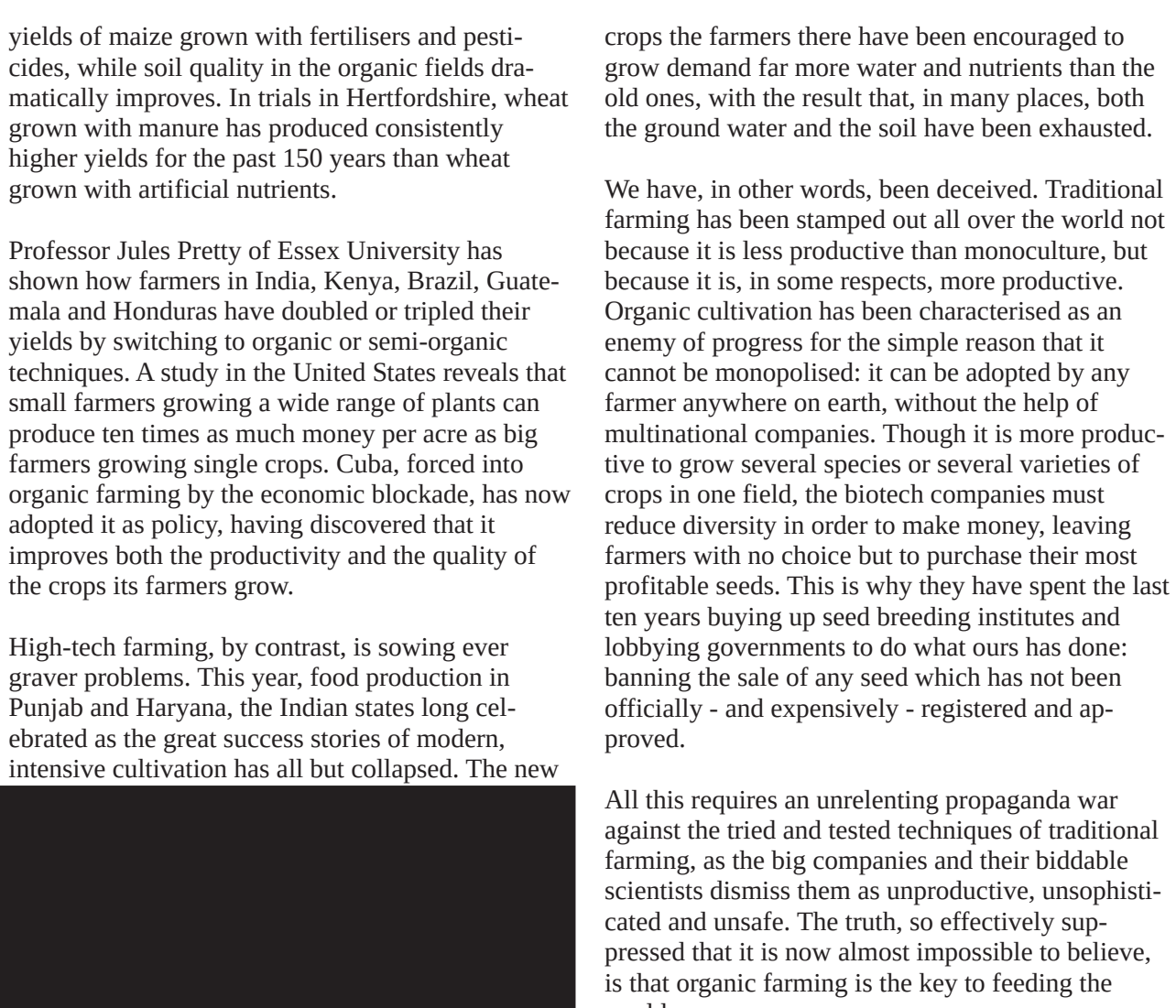

photo courtesy Food & Agriculture Organization

Farmer erects barriers to desertification in Niger. Labor-intensive management by small-holding owners is only way to assure best management of developing world's land resources.

Professor Jules Pretty of Essex University has shown how farmers in India, Kenya, Brazil, Guatemala and Honduras have doubled or tripled their yields by switching to organic or semi-organic techniques. A study in the United States reveals that small farmers growing a wide range of plants can produce ten times as much money per acre as big farmers growing single crops. Cuba, forced into organic farming by the economic blockade, has now adopted it as policy, having discovered that it improves both the productivity and the quality of the crops its farmers grow.

High-tech farming, by contrast, is sowing ever graver problems. This year, food production in Punjab and Haryana, the Indian states long celebrated as the great success stories of modern, intensive cultivation has all but collapsed. The new crops the farmers there have been encouraged to grow demand far more water and nutrients than the old ones, with the result that, in many places, both the ground water and the soil have been exhausted.

We have, in other words, been deceived. Traditional farming has been stamped out all over the world not because it is less productive than monoculture, but because it is, in some respects, more productive. Organic cultivation has been characterised as an enemy of progress for the simple reason that it cannot be monopolised: it can be adopted by any farmer anywhere on earth, without the help of multinational companies. Though it is more productive to grow several species or several varieties of crops in one field, the biotech companies must reduce diversity in order to make money, leaving farmers with no choice but to purchase their most profitable seeds. This is why they have spent the last ten years buying up seed breeding institutes and lobbying governments to do what ours has done: banning the sale of any seed which has not been officially - and expensively - registered and approved.

All this requires an unrelenting propaganda war against the tried and tested techniques of traditional farming, as the big companies and their biddable scientists dismiss them as unproductive, unsophisticated and unsafe. The truth, so effectively suppressed that it is now almost impossible to believe, is that organic farming is the key to feeding the world.

*This article is reprinted from the **Guardian**, August 24, 2000*

photo courtesy Food & Agriculture Organization

Afghan Herds Goats.

Eliot Coleman 2000 Keynote Address

(continued from page 1)

become healthy, happy, energized, and self-reliant. Now that may sound like an idealistic dream, but I believe it's true. I believe we're working in that direction, but I want to try and talk about some of the things that make me nervous about what I see today.

The inspiration for the early organic farmers was their realization that the living systems in a truly fertile soil contain all sorts of yet-to-be discovered benefits for plants and animals. Those benefits, in the form of organic matter and mineral availability, affect the nutritional value of the plants for the human and animal consumers. And the early organic farmers in their development of what they had learned (and have subsequently taught us), were aware of how ignorant we all are of the unknowns. They knew there was so much more to learn than the little bits of knowledge they had acquired or those that had been determined scientifically. Now, much of what concerns me at the moment arises from the assumption that organic farming can be defined by a list of approved products. That's a little like defining some Christian religion by the type of flour in the communion wafer or the vintage of the Eucharist wine. The truth is, that organic agriculture is based on the gut feelings of farmers who were trying to reconcile what they saw in their own fields with the illogical dogma of the science of the moment. And those farmers came to very different conclusions than science did. They then worked on developing agricultural techniques that followed the direction in which those "unscientific conclusions" were leading them.

Now that process is an ongoing process and, just as with any holistic system, the yet to be discovered parts of organic farming far outnumber the knowns. And those unknowns are to me what make organic farming so compelling. Unfortunately, what I see as an incredible adventure into a clearer understanding of the soil-plant-animal nutritional cycle and how we can learn to make it work better is seen as just too complicated by the industrial food giants. My opinion is the same today as it was when the national organic programs began. There is a better way of achieving cleaner, more nutritious food for consumers than imposing a national definition of organic. And this better way was in use in Europe in the seventies and eighties. In Europe there were individual labels that defined themselves. There was Nature et Progres, there was Lamaire Boucher, The Soil Association, ANOG, Demeter. They each defined and published the standards to which their food was grown based on their different theories on how to produce the best quality food. And there was even a Swiss supermarket chain by the name of Migros which contracted with Swiss farmers to grow food to specific standards that banned the chemical inputs that the Swiss consumers were most worried about and allowed the ones that people were not as concerned about. It was a wonderful open system, and it had numerous advantages for European consumers. Not only was there a range in price and quality, but there was also the power to upgrade the system.

Whenever agricultural research expressed concern about a previously acceptable input or a previously acceptable practice, the consumer shift to the labels not using that input or practice, forced the other labels to improve their standards. Now this was a system that was driven to become ever better in response to the concerns of astute consumers. Rather than as with any politically controlled system, ever more watered down in response to the influence of powerful lobbyists. Now you all as consumers and farmers, but especially as consumers, ought to be aware that the virtues of that successful European model are presently seen as it's fatal flaws. Such a wide range of consumer options and flexibility for improvement is unacceptable now that organic has become big business. The "big boys" just want a simple mechanistic list of ingredients so that they can sell in a world marketplace. They are uncomfortable with what they deride as belief systems, and they are loath to admit there are things we don't know enough about yet to mess with.

So what do I think the future holds? Well, I think for the last ten years, as far as I'm concerned, organic has been dead as a meaningful term. I think it was a goner from the first moment the organic spokes-people, whoever they were, got into bed with the big boys. When organic can be defined by a simple list of ingredients, quality is the loser. So what am I going to do? Well, I share the gut feelings of the original pioneers. The science of my moment is also inadequate. And I'm engaged in a quest to grow better and better food because as I said, I believe that real food makes the most enormous contribution to human well-being. Like the original pioneers, maybe I need to come up with a new word to define my quest. Who knows, maybe we could call it "real food".

Now some new ideas. Organic was a new idea back thirty-five years ago or longer that that, and new ideas that directly challenge an established orthodoxy, always meet the same fate. Jack told me earlier tonight that he'd studied history in college. Well, if you study history you learn this. First, the orthodoxy says the new idea is rubbish. Then it says it isn't important. And, finally, when the idea gains enough followers, the orthodoxy claims it as its own. Nowadays, since organic has become an obvious force, the food industry wants to take it over. And the first step in the process of taking things over is to redefine the word. He who controls the words, controls the world. Now these people are very good at that. And it's a familiar pattern.

I don't know if you noticed twelve years ago or so when the wall -the iron curtain - started falling, in Europe and all the governments got sacked and supposedly changed. However, it only took a few years before the old, discredited leaders managed to morph themselves into the new, social democratic movement, or whatever it was called. And the reason is obvious. They're all very skilled at the political game being played. Well the same goes for the food industry. The food people are all very good at morphing themselves and taking over your food system anew. So, do I want to put the responsibility for organic food in the hands of the U. S. Department of Agriculture whose secretary Dan Glickman said and I quote, "organic does not mean it is

superior, safer, or more healthy than conventional food. All foods in this country must meet the same high standards of safety regardless of their classification."

Now, I wonder how they can be coming up with a special classification for a category of food that they consider is neither superior, safer, nor more healthy. It is like the GMO people saying there is no difference between their soybeans and other soybeans and then applying for a patent because their soybeans are so different. Now Dan Glickman is nobody new at this game and he is part of a long tradition. Take the Food and drug Administration. The first director was a wonderful gentleman, a man named Harvey Wiley who was sincere in his concern for the well being of the American public. Unfortunately his sincerity caused him to step on a number of toes and he was thrown out of office. His biggest mistake was taking on and suing the Coca-Cola company for putting caffeine in their soft drinks at a time when the laws of the US said that caffeine was an adulterant and you couldn't put it anywhere. Well Harvey was soon out of a job, but one of his successors named Elmer Nelson, who did not share Harvey Wiley's integrity, was the head of the Food and Drug Administration division of nutrition in 1949. Elmer Nelson said and I quote "it is wholly unscientific to state that a well-fed body is more able to resist disease than a less well-fed body. My overall opinion is that neither degenerative disease, infectious disease, nor functional disease could possibly result from nutritional deficiency."

And he testified and his minions testified to that effect in front of congressional committees all through those years.

Could that level of government misinformation still be going on? I mean we've really gotten beyond that haven't we? Well back in 1978 I was asked to be on a Washington committee. It was the Office of Technology Assessment Food and Agriculture committee. I realized when I got to the first meeting that I was the "token" oddball. Most of the committee members were "the suits", but there were the few other tokens, women, minorities, and then there was the guy in Birkenstocks. And I remember sitting around at a coffee break at one of those early meetings and chatting with the assembled suits and I said," Well, let's get the smokescreen aside, let's not talk about organic or whatever. If I grew a carrot on a sandy soil in Maine and I grew that same carrot on a beautiful deep loam in Iowa, is that the same carrot?" And they said, "Absolutely, it is genetically determined. If you plant the same variety, it is the exact same carrot." And I said "Gee I thought there were foods from areas where there wasn't any iodine in them."

"Oh, well, that's a totally, totally separate thing." "Well, I thought there were pastures where if cobalt was missing the food still grew but the animals didn't thrive ." " Oh that's a totally, totally separate thing." So between that meeting and the next meeting I went up to the University of Maine library and quickly Xeroxed out a dozen articles from scientific journals that contradicted what they had told me. I put them in three separate folders with the suits names on them, and took them to the next meeting and when coffee break started I went up to them and I said, "Apropos of our discussion last month I think you guys might be interested in reading this."

One of those three who happened to be the chairman of the department of nutrition at a major university never would speak to me again. He was absolutely horrified that I would question the word of God which they were passing down to me that there was absolutely no difference.

Well, so what's going on now, what bothers me. Well, there's a great line in Thomas Pynchon's Gravity's Rainbow, in which he says, "if they can get you asking the wrong questions, they don't have to worry about the answers."

Well what's the wrong question that everyone's asking now? The wrong question is whether it's "organic" or not. We should be asking whether it's nutritious or not. We don't ask because there's an awful lot of complacency out there. People think, oh good, we won, organics is accepted now. Well, I'll tell you something about winning battles like this. It isn't a goal, it's a process. The struggle never ends. the minute you stop you'll have the bad guys galloping up behind you and you'll soon find they've morphed themselves and taken over. A few years ago I was on the purchasing committee of the Blue Hill Coop and I remember two of us on the committee read the Blue Hill Coop standards that were made years ago, back when people read certain books that came out that seemed to indicate that refined white sugar wasn't good for you. And in the Blue Hill Coop standards it said that there wouldn't be any items containing white sugar sold in the Co-op. Well Gayle and I wandered into the Coop the next day after this meeting and went through the aisles and came back to the next purchasing meeting and said, "Well you know there's about twenty percent of the items in there that do not correspond with the Blue Hill Coop standards." Well, after six months of the type of meetings that make you never want to join a food coop again, the powers that be disbanded the purchasing committee so we couldn't be heard.

But that is typical with food issues. It's really interesting but when I started reading weird books back in 1965, I remember reading that margarine wasn't good for you, that it was a trans-fat, and that it was worse for you than anything else. And I remember thinking well that made a lot of sense so I never ate margarine. Well it wasn't until an awful lot later, it was 1988 I believe, before I started seeing articles in the paper suggesting that maybe Mrs. Smith shouldn't have been poly-unsaturating her husband with corn-oil margarine. How did I learn that back in 1965? Well it turns out that the first person to say anything about it were studies that were published in 1958 by Ansel Keyes who was one of the early fat researchers and he claimed that the partially hydrogenated vegetable oils with their trans-fatty acids were the culprits in heart-disease.

That was 1958. What happened? The edible oil industry did not waste a minute. They attacked heavily to squelch that information and they shifted the emphasis to saturated fat. So that's how it was thirty years after the research came out that I had read part of a few years later before people even started thinking about that, and I'm in the Blue Hill Coop in 1998 and I said "why are we still selling margarine in here?" And they said "Oh but people want it." Well I kept pressing a lot of these things in the Blue Hill Coop and finally I was told that they had phoned Northeast, their natural food distributor, and were told that Northeast had gotten rid of all its standards. They had no standards at all. They were supplying anything anybody wanted. Well that's a little dismaying to me. But nothing out of the ordinary.

It was back two years ago in August 1998 that I happened to see a guy with a truck outside the Coop carrying in containers and refilling the "Fresh" Samantha display. Well I had been drinking Fresh Samantha and I thought "Wow, fresh juice that's made in Maine, isn't this wonderful." So I said to him in my chatting way, "they must have a heck of a compost heap down there in wherever it is in Maine that they make all those juices." And he said "Well uh, ah, um, well no actually um no we buy pre-squeezed frozen juices and concentrates from elsewhere, and that's how they're made." And I said "But it says fresh on there." And he said, "Well that's always been the name." So I phoned the Food and Drug Administration and I got one of those wonderful recordings that says if you're blond push seven sort of thing. Well they had one button that said if you're the press you should push it so I pushed it. And man did they answer that one quickly. And I told them I was writing an article and within two minutes I was speaking to the person I needed to speak to and I said "I want to know what your definition is of fresh and could you fax it to me." And they did and I had section seven paragraph nine et cetera and the Food and Drug Administration's definition of fresh says that you cannot use fresh anywhere on your label if any of the ingredients have been processed in any way.

Well I phoned up Fresh Samantha and I said "Gee guys, according to section seven paragraph so and so..." and they said "oh the name has nothing to do with that. We named the company after our little daughter Samantha when she was such a sweet, fresh child." And I said "yeah, but according to the Food and Drug Administration that's illegal." And they said "Oh no, I'm sure our lawyers checked on that." So, to make a long story short, I phoned the Food and Drug Administration, got the forms, filled them out, made a complaint, and the guy said "Oh my gosh yes that's in violation of section seven paragraph so and so" and sent it in in August of '98, and I hadn't heard anything by February of '99 so I phoned them and I said " What's going on with my complaint of section seven paragraph so and so?" And they said "We can't tell you." I said "Why can't you tell me?" And they said, "You have to go through the Freedom of Information Act." So, figuring my government was actually trying to serve me, I went through the Freedom of Information Act, filled out all the forms, and three weeks later I got a letter with a bill for twenty-four dollars for going through the Freedom of Information Act, and a letter that said, "Dear Mr. Coleman, Nothing has been done on your petition." Well, I haven't done anything since then, but I had such luck pretending I was the press that I keep thinking if I wasn't spending so much time farming I should phone one of my senators and tell them I was about to write an article

on how well my government served me, but before I wrote it I wanted to give Senator So and So a chance to look into this for me and report on her efforts.

Anyway, this is what's going on in the world. You can walk into any health food store and there are products on the shelf that started out as organic and haven't been organic in years but never said anything about it. There are products that have proudly announced that they are now sweetening with dehydrated cane juice. Despite the double talk folks, that's sugar. Horizon Dairy, which bought out Organic Cow, is now ultrapasteurizing all their cream. Now the nice thing about ultrapasteurized cream is it doesn't go bad, that's because it stays bad. They killed it off in the factory. So I phoned Horizon Dairy - I can be a real pain in the butt sometimes - I phoned Horizon Dairy and they said, "Oh but people like it because it keeps forever." And I said "Yeah but that's because it has no food value, that's why it keeps forever." I said "Isn't organic food supposed mean anything?" No answer. And so I got this woman's name and I gave her my name, and I said "Listen, could I talk to somebody higher up the chain of command?" And she said, "Well nobody's available right now." And I said, "Well here's my phone number and you have somebody call me." Well, that was four months ago and I haven't heard from them.

When you walk into your food coop most of the food in there is from long ago and far away. It says organic on it, but it's a week old by the time it gets here. There's another research project I looked into. I asked a friend who was the dean of nutrition at a major university, if she could get one of her graduate students to put together for me a whole list of all the studies that indicate that really fresh food from a local supplier is better than week old. She said, "I'd be glad to do that for you Eliot but it wouldn't be worth the trouble." I said "Why not?" And she said, "There aren't any studies because the people who fund studies don't want to find that out."

Now this is from the dean, and I thought that was a very honest statement. I feel very strongly that if we want a local agriculture, we should be eating local food, and I really think that your food shouldn't spend more time on the road than it does in your digestive tract.

If you just define organic you miss out on the subtleties. Subtleties? Yeah, there's subtleties. Back in the mid-eighties, when I was teaching at the Mountain School, there was actually some organic fruit available that was delicious, and the nearby coop had these organic plums, they were picked ripe and they were so sweet I couldn't believe it. So I bought a huge bag of them, and I took them back. When I was feeding the summer crew that night, there were about twelve kids, I said "Okay, I'm in charge of dessert. I've got a deal for you. I have here dessert. It's fresh fruit. If any of you, after eating this want me to get in the truck and drive into town and get a couple gallons of Ben and Jerry's, I will do that. But first I want you to eat this." And they all ate it and they said, "My god, is that what fruit is supposed to taste like?" And I said "Yes. And do you know why you crave all those artificial sweet things? It's because you eat fruit that's been picked unripe and your taste buds are telling you, 'Hey man there's supposed to be something there and it isn't there', and so you end up with Ben and Jerry's."

What else is going on with unripe fruit? Well, we're finding out now, and there've been articles coming out for the last ten or twelve years, that fruit and vegetables are good for you. Somehow scientists just discovered they contain "beneficial phytonutrients."

Now, I remember my mom telling me vegetables were good for me, and I think it's wonderful scientists are finally finding this out. My mom died a few years ago, but her sister's still alive from that generation so I phoned her up and I said, "Aunt Isabelle, how did my mom know that fruits and vegetables were good for me?" And she said, "Our mother told us." Well, obviously, the information's been out there for a while, but unripe stuff is another thing entirely according to the scientists. Unripe fruit has none of the phyto-nutrients because all these things that are heart protectants and all these things that are anti-oxidents don't form until the final stages of the ripening process. So now that organic fruit is coming in from long ago and far away and was picked just as green as the other store fruit, there's nothing there folks. I'm sorry to tell you. It has to be local, and the only way it's going to be ripe is if it's local.

Barbara and I took a research trip for the winter harvest to Europe back in '96, and in the process we visited growers I had visited before. We were talking with them about winter crops and summer crops and I said, "Boy, you guys still growing that fantastic Charantais melon, Bastion, you used to grow?" And they said, "Well, no we grow..." and I forget what other name they told me, and I said, "But that one tastes like cardboard, doesn't it?" And they said, "Yeah but it ships well, and organic has gotten so big now, that everything we grow here in Provence is shipped to Germany and we've got to have a shipping variety." And I said, "Doesn't that bother you?" And they said, "Yeah it does, we still grow Bastion out back for us."

Interesting new research is coming out every day detailing more of the subtleties such as grass-fed versus grain-fed meat and milk. It turns out that there are some wonderful things that are supposed to be in meat and in milk, that are not in there if they are grain-fed cattle. For example, there's a compound called conjugated linoleic acid, which is very good for your heart and is also a cancer protector. It is only in grass-fed beef and in the milk, butter, and cheese from grass-fed animals. There is also a very important ratio in meat, between omega six and omega three fatty acids. You feed grain to beef, cattle, or cows for milk, and it puts it up to twenty-to-one omega sixes to omega threes, when it's four to one in your grass-fed animals. These are the things that protect your heart. They have also been found to be very important in protecting people from unipolar depression.

I mean there's some very interesting subtleties that are not seen at all in the definition of organic. Its just our human ignorance in thinking that these animals that were designed to eat grass, should be stuffed into barns and fed grain. And we are stuffing them into barns and feeding them grain because we want quantity. And the organic market out there that is ultra-pasturizing the milk wants quantity. They don't want quality. Organic eggs are the same thing. I bought organic eggs to see what they were like at my local food coop, and the yolks were so pale, you could hardly tell the difference from the yolk and the white. Now that's because an organic egg is an egg from a chicken fed organically grown grain. Is that all they need? No, they need grass and bugs and sunlight. The ratio between omega threes and omega sixes is so skewed in those eggs. There are also principles in egg yolk that protect you—thirty percent more vitamin E in eggs from grass-fed poultry. Egg yolks are the richest known source of lutine and zeaxanthin. Essential vitamins which protect against macular degeneration. They are only found in the deep orange-yellow color of eggs from chickens that get to eat grass. It isn't food when it's done wrong even though they may be able to put it out there and make it look like food and even put organic on it.

The things we should be thinking about are far deeper than what "organic" alone allows us to think about. Now however, back to the spin doctors. The Mayo clinic experts have proclaimed whether hens are raised free-range or in cages has no effect on the nutrients in the eggs they lay. Feed and yolk color don't alter the nutrient content in the egg. And that is a study from the journal Poultry Science. The study I just mentioned that indicates that egg yolks are the richest known source of lutine and zeaxanthin only if they are bright orange and yellow in color is from the American Journal of Clinical Nutrition. So here you have the doctors quoting Poultry Science Magazine and the poultry people finding that they are getting backed up in the American Journal of Clinical nutrition. You have to read carefully in this world, there's a lot of stuff going on out there.

What's going on with soil organic matter? More and more information is coming out all the time on the subtle connection between soil organic matter and the plant's ability to pick up nutrients. Now, if some of these things in plants are good for us, why don't we put them into pills? Well, I don't know if you have noticed what happened with the beta-carotene craze? They put beta-carotene into pills and they found out not only was it not good for you, it was bad for you. Because it didn't have all the things that were supposed to be attached to it. Very important. I'm sure someone will probably put a pill with conjugated linoleic acid on the market. I guarantee it won't have all the things it's supposed to have.

I go in the food coop and buy organic grapes from California. Nice, big grapes, in fact, gee they're just as big as in the supermarket. My grapes don't grow that big. Well, these are what the boys out in California will admit to you, if you ask, are "gibbed grapes." They've been treated with gibberellic acid. Why? Because the organic people said, "Well, we can't get our grapes big enough unless we can still put gibberellic acid, a plant hormone, on them the way they do in the non-organic grapes." I sure don't want gibberellic acid on my grapes. Corn oil? Corn oil has the worst omega six to omega three fatty-acid ratio of any oil out there. Why is that being pushed? Because the big food processors are making money on it. All of this is what I call "pseud-food." When I came up with that word, I thought of the connection to sued food. People are suing tobacco companies for knowingly putting out dangerous products when the scientific evidence indicates that they are dangerous. I'm just waiting for the first suit against the fast-food companies. Why couldn't we do that? Why couldn't we take them to court? There is a lot of scientific evidence saying their products are dangerous to human health.

One last point. We need a better o-word than organic. I like optimum, but we're probably not going to use it because it's too easy to co-opt. But it does mean that we're aiming for quality. We're aiming to produce the very best we can, not the most we can. The choice is ours. I have one wonderful final quote here. I thought we'd be literary tonight. This is from Shakespeare, Othello. Act one, scene three:

> "'Tis in ourselves that we are thus or thus. Our bodies are our gardens. To which our wills are gardeners, so that, if we will, plant nettles, or grow lettuce, set hyssop, and weed up thyme. Supply it with one gender of herbs, or distract it with many, either to have it sterile with idleness, or manured with industry. Why, the power and corrigible authority of this lies in our will."

So let's get willful!

Book Reviews

The Legal Guide for Direct Farm Marketing
By Neil D. Hamilton
Drake University Agricultural Law Center
reviewed by Eric Toensmeier NESFI Librarian

When you are thinking about starting a new organic crop or livestock enterprise, it makes sense to look into what kinds of pests and diseases are likely to be a problem in your region. You can investigate preventative measures to neutralize the problems before they occur – like planting a resistant crop variety, or developing a grazing plan to minimize parasites. This bit of planning can save you a lot of headaches later.

Legal issues can be viewed in much the same way. By investigating what regulations might effect you in a new enterprise, you can avoid costly mistakes, some of which could even cause your farm to be shut down. Neil Hamilton's Legal Guide to Direct Farm Marketing was written to help farmers avoid legal problems. It was written with a grant from SARE to bring hard-to-find information together in one place. Believe it or not, it is one of the most popular books in the New England Small Farm Institute Library.

The 230 page Guide covers issues of concern to farms involved in the following direct marketing activities: CSA and pick-your-own operations which bring customers onto their farms; farms which market value-added products which are processed on the farm; farms which direct market meat, poultry, eggs, or dairy products; and farmers who sell at roadside stands or farmers' markets. Hamilton also covers financial issues; how to organize a direct marketing business; advertising and labeling; land use, property law, and zoning issues; labor laws (including apprentices!); insurance and liability; and more.

It is full of practical advice like:
"Five Questions to Ask the Local Land Use Officials
- Which political jurisdiction has legal authority over your property?
- If the land is zoned, how is it classified?
- Are farming and direct farm marketing allowed as 'permitted uses' on the property?
- How is your farm direct marketing operation classified, as a farm or a commercial business?
- Are you subject to 'commercial' standards concerning the design of facilities?"

I was surprised to find myself enjoying reading a book on legal issues. It is quite accessible for a legal guide. It also does not intimidate its readers or try to scare anyone out of direct marketing. At the same time it encourages farmers to take a good look at what they are getting into, and to understand the laws which effect their operation. Hamilton is a market gardener himself (as well as a lawyer and professor), who understands and is inspired by the proliferation of small, sustainable farms in the U.S. He has done all of us a great service.

Available for $20 from Drake University Agricultural Law Center, Des Moines IA 50311, and of course it may be browsed or borrowed from the NESFI Library.

CT NOFA Conference Scheduled For March 3

Mark your calendars! Connecticut NOFA is planning to finish off Winter with a burst of Maine sunshine. We are delighted to announce that C.R. Lawn, organic farmer, gardener, and founder of FEDCO Seeds, will be the keynote speaker at our annual End of Winter Conference scheduled for Saturday, March 3, at the Unitarian Society of Hartford.

This year's theme is "Sowing the Seeds of an Organic Future." A number of workshops for farmers, gardeners, land care professionals, and consumers are in the works. Of course there will be a farmers' market and exhibits, as well as our world class pot luck lunch.

Anyone interested in being a vendor or exhibitor may call Alice Rubin at(860) 423-4906.For further information, brochures and registration forms, call CT NOFA at(203) 484-2445, E-mail: nofact@connix.com, and be sure to visit our website at www.connix.com/~nofact

Vermont Grazing Conference to be Held February 3

Roman Stoltzfoos, grass based seasonal dairy farmer from PA, and Dr Ann Clark, a pasture researcher from Ontario will speak at this year's Vermont Annual Grazing Conference. Join us in Randolph Center, Vermont at Vermont Technical College on Saturday, February 3.

Roman Stoltzfoos farms with his family in Eastern PA, where in addition to grazing and milking 100 cows, they also raise 9000 organic turkeys and make and sell a lot of compost. At the grazing conference he will lead several workshops, including: "Quality of Life - The Family Farm Ideas and Practice" on the sustainable philosophies that his farm and family goals are built on; Increasing Profits on a Grass Based Dairy Farm" which he describes as a management tune-up and ideas for reducing costs while increasing output; and he'll also lead a workshop on soil fertility and composting.

Dr. Clark is an Associate Professor in the Plant Agriculture department of the University of Guelph, with specific interests in pasture and grazing management and in the design of ecologically sustainable production systems. She has written one book, several book chapters, and more than 130 publications. In addition to her teaching and research on pasture management, she is a frequently invited speaker at conferences throughout Canada and the northern United States. Dr Clark will speak on "Using Your Farmland to Its Strengths" on how to use an ecological approach to your farm, with strategic fencing to capture the strengths of each part of your farm.

Workshop topics will include milking parlor design for grass based dairy farms, pastured poultry, grazing beef, raising pigs, herbs in your pasture for animal health, grazing goats and sheep, marketing grass raised farm products and much more!

This event is co-sponsored by the Vermont Grass Farmers Association and the Northeast Organic Farming Association of Vermont's Dairy Technical Assistance Program, with support from the UVM Center for Sustainable Agriculture and the Natural Resources Conservation Service Grazing Lands Conservation Initiative. The cost to attend is $30 per family plus $10 per person for lunch if you preregister before January 15 .

For more information you can call 802-656-5459.

REAL FOOD, FARMS, & MARKETS: Defining Sustainable Agriculture for the 21st Century

NOFA-NY ANNUAL CONFERENCE 2001

January 12, 13 & 14

Sheraton University Hotel, Syracuse

The definition of sustainable agriculture is an integrated production system that is environmentally sound, economically viable and socially responsible. After a year like 2000, some farmers will be asking the question of whether they can afford to continue to farm. Yet many farmers are finding that making their farm operations more dependent on biological processes - the real engines of production - can also improve the bottom line. Workshops will include what farmers are doing in each of these areas to move towards more sustainable production. We think the working definition of sustainable agriculture may boil down to, "real food, real farms and real markets."

Michael Sligh, Sustainable Agriculture Director for the Rural Advancement Foundation International, RAFI, based in North Carolina, will be our keynote speaker. He is a former organic farmer, and currently sits on the National Organic Standards Board, the UN/FAO Codex Food Labeling Commission and board of the Carolina Farm Stewardship Association. He is a founding member of key groups, including the 50 member Southern Sustainable Agriculture Working Group, the National Campagin for Sustainable Agriculture and National Family Farm Coalition.

Farmers and food advocates working together are changing the opportunities for obtaining quality foods. The more we can work together, creating new ways of reconnecting people with farming and farm-quality foods, the more small farms will survive and flourish. This two-day conference is packed with workshops, opportunities to mingle and build alliances with like-minded people and organizations. You can learn what others are doing to meet the multiple challenges of farming and also contribute to our general success by sharing your approach. When more than one person tackles a problem, multiple options usually materialize.

Did you find yourself behind by thousands of dollars in sales in June? And did you know how to change your farming operation to increase income in the remainder of the season? Did you know that farmers in NYS have been using a new product, kaolin clay, to dramatically reduce plum curculio on apples? Do you know why some vegetable farmers had an average or better than average year in terms of yields, despite the incredible challenge of this season's weather? And did you know that some diversified vegetable farmers are adding poultry and livestock for added diversity, extra income and on-farm fertility? Our workshops will answer these questions and more.

Below is a tempting list of half the workshops on the roster.

1000 Pastured Chickens, 200 at a Time
Kaolin Clay for Insect Control - Two Years of Experience in NYS
On-Farm Plant Breeding
Practical Applications of Recent Compost Research
CSA Marketing & Regional Cooperation
On-Farm Yogurt Production
Shiitake Mushroom Production for Small Production
Chicken Feeds & Fodder - Beyond Corn
Genetically Engineered Crops - Update on NYS Legislation
Tarnished Plant Bugs - On-Farm & Northeast Research Update
Intern Education Using the CRAFT Model
Connections between National & State Farm Policy & Your Farm
Marketing Strategies - Regional Promotions
County Government Ag. Development Initiatives
Heirloom Variety Conservation on the Farm
Food Safety Issues - Fighting Back Against Misinformation

Join us! Please call or write the Northeast Organic Farming Association of New York (NOFA-NY) for a conference flier. Our address is: P.O. Box 880, Cobleskill, NY 12043. Voice: (518) 827-8495. Fax (518) 827-8496. Or look up the details of the conference on our website: http://ny.nofa.org.

NOFA

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Calendar

Friday, January 12 - Sunday, January 14, 2001: NOFA-NY Annual Conference 2001, Syracuse, NY, *for more info contact (518) 827-8495 or http://NY.NOFA.org.*

Wednesday, January 17 - Friday, January 19, 2001: Biotechnology Conference for Leaders, Binghamton, NY, *for info contact (607) 255-7654 or E-mail NRAES@CORNELL.EDU. Info also posted on WWW. NRAES.ORG*

Friday, January 19 - Sunday, January 21, 2001: Fourth Annual Farmer-to-Farmer Workshop for Organic and Ecological Growers, Saratoga Springs, NY, *for info contact (518) 427-6537 or 426-9331.*

Saturday, January 27, 2001: NOFA/CT Transition Conference at Windsor Station of the CT Agricultural Experiment Station, *for more info contact Rob Durgy: rdurgy@canr1.cag.uconn.edu or phone (203) 484-2445*

Saturday, February 3, 2001: NOFA/Mass Winter Conference, Barre, MA, *for more info contact (978) 355-2853*

Saturday, February 10, 2001: 11th Annual NOFA/RI Winter Conference. Johnson and Wales University, Providence RI, *for more info: Isabel Barten 401-941-8684*

Friday, February 16, 2001: Ecological Landscaping Assoc. Winter Conference, Boxborough, MA, *for more info: (978) 232-9047 or (413) 545-0895*

Tuesday, February 27, 2000: Organic Vegetable Production: Soil and Nutrient Management, Geneva, NY, *for more info: 315-787-2422*

Saturday, March 3, 2000: Organic Vegetable Production: Weed Management, Geneva, NY, *for more info: 315-787-2422*

Saturday, March 3, 2001: Connecticut NOFA End-of-Winter Conference, Hartford Unitarian Society in West Hartford, CT, *for more info 203-248-4727 or VGER42@aol.com.*

Tuesday, March 13, 2001: Organic Vegetable Production: Insect and Disease Management, Geneva, NY, *for more info: 315-787-2422*

Saturday, March 31, 2001: NOFA/Mass PEAS (Providing Education through Agriculture for Students) Conference, Greenfield Community College, Greenfield, MA, *for more info contact Pat Stewart at (978) 827-1305, or Farm@hamesaxle.com*

NOFA Membership

You may join NOFA by joining one of the seven state chapters. Contact the person listed below for your state. Dues, which help pay for the important work of the organization, vary from chapter to chapter. Unless noted, membership includes a subscription to The Natural Farmer.

Give a NOFA Membership! Send dues for a friend or relative to his or her state chapter and give a membership in one of the most active grassroots organizations in the state.

Connecticut: Individual or Household: $35, Business/Institution: $50, Supporting: $100, Student (full time, supply name of institution) $20
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Julie Rawson, 411 Sheldon Road, Barre, MA 01005, (978) 355-2853

New Hampshire: Individual: $25, Student: $18, Family: $35, Supporting: $100, 4 Park St., Suite 208, Concord, NH 03301

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Rhode Island: Student/Senior: $20, Individual: $25, Family: $35, Business: $50
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Vermont: Individual $25, Family/Business: $35, Sponsor: $75
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Winter, 2000-01

photo courtesy Food and Agriculture Organization

Rice is the most important grain on the globe for human consumption. According to United Nations figures global rice production must grow at 1.23% per year for the next 20 years to meet growing demand, but yields from the Green Revolution crop varieties are falling off, having proven expensive and ill-adapted to many climates and terrains. What can we do? Is it possible for low-input local and organic farming to produce enough to feed the world's people?

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