Food System Sustainability

Martha Rosemeyer

Course:Farm to Table

April 7, 2005

rosemeym@evergreen.edu

Outline

- What is a food system
- What is a sustainable food system
- What are some sustainable alternatives
  - Organic farming
  - Regional food system

What is sustainability as applied to agriculture?

- How is sustainability defined?
  - Economically viable
  - Ecologically sound
  - Socially just
- An integrated system including:
  - natural resources: land/soil, crops, animals, water, climate
  - Socioeconomic resources: capital, labor and mgmt

Systems theory

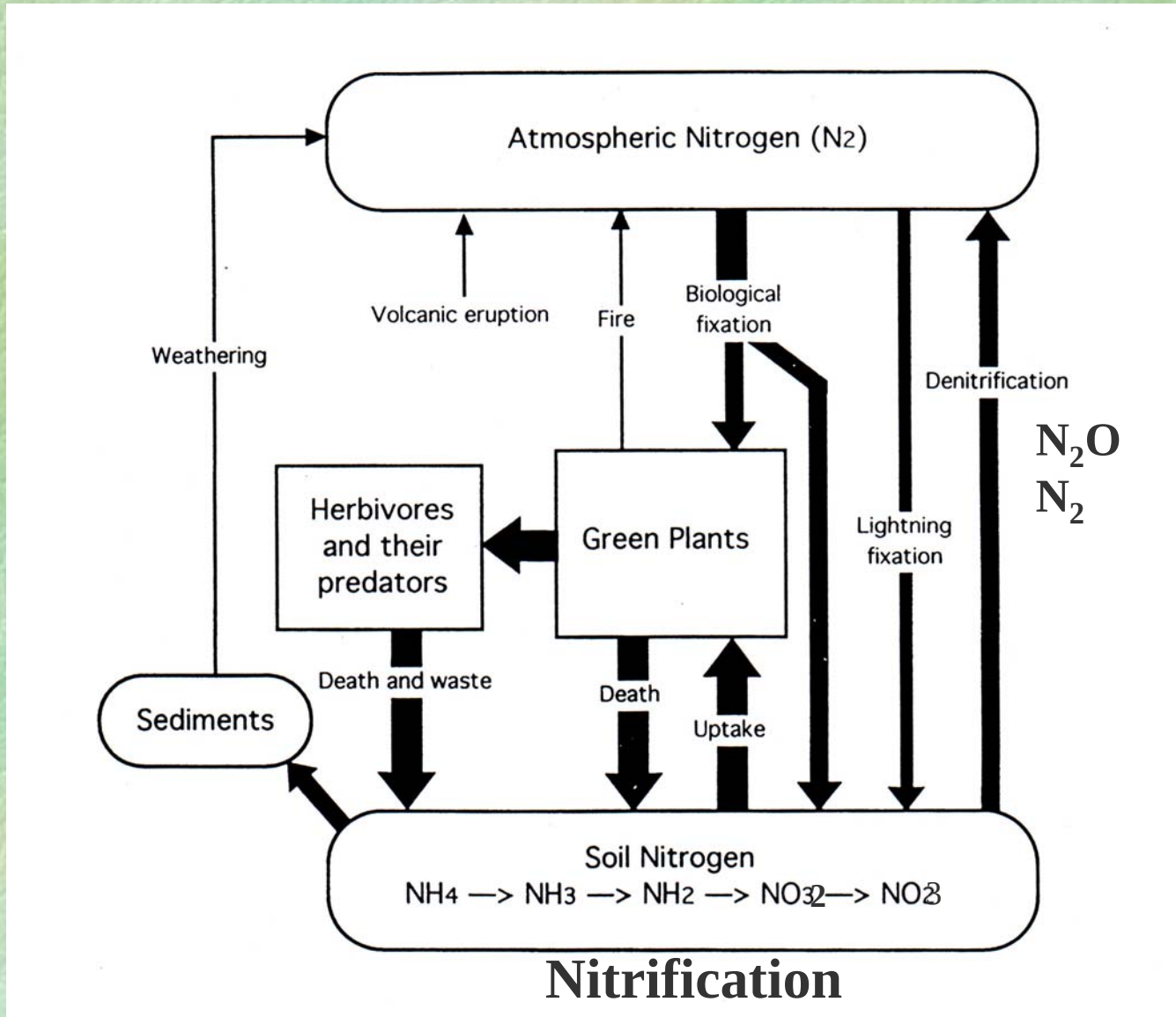
- A system is a group of interacting, interrelated and oftentimes interdependent elements that function together as a complex, unified whole.
  - A changes in one element affects change in another
  - Provides a holistic perspective
  - Components (stocks) cannot be considered in isolation
  - Flows are the interactions between components

Systems thinking

- Occurs when there is deliberate consideration of interrelationships
- Impossible to examine any change in a component or subsystem in isolation

Wilkins, J. 1999. The Food System in Extension and Research.

Nitrogen cycle



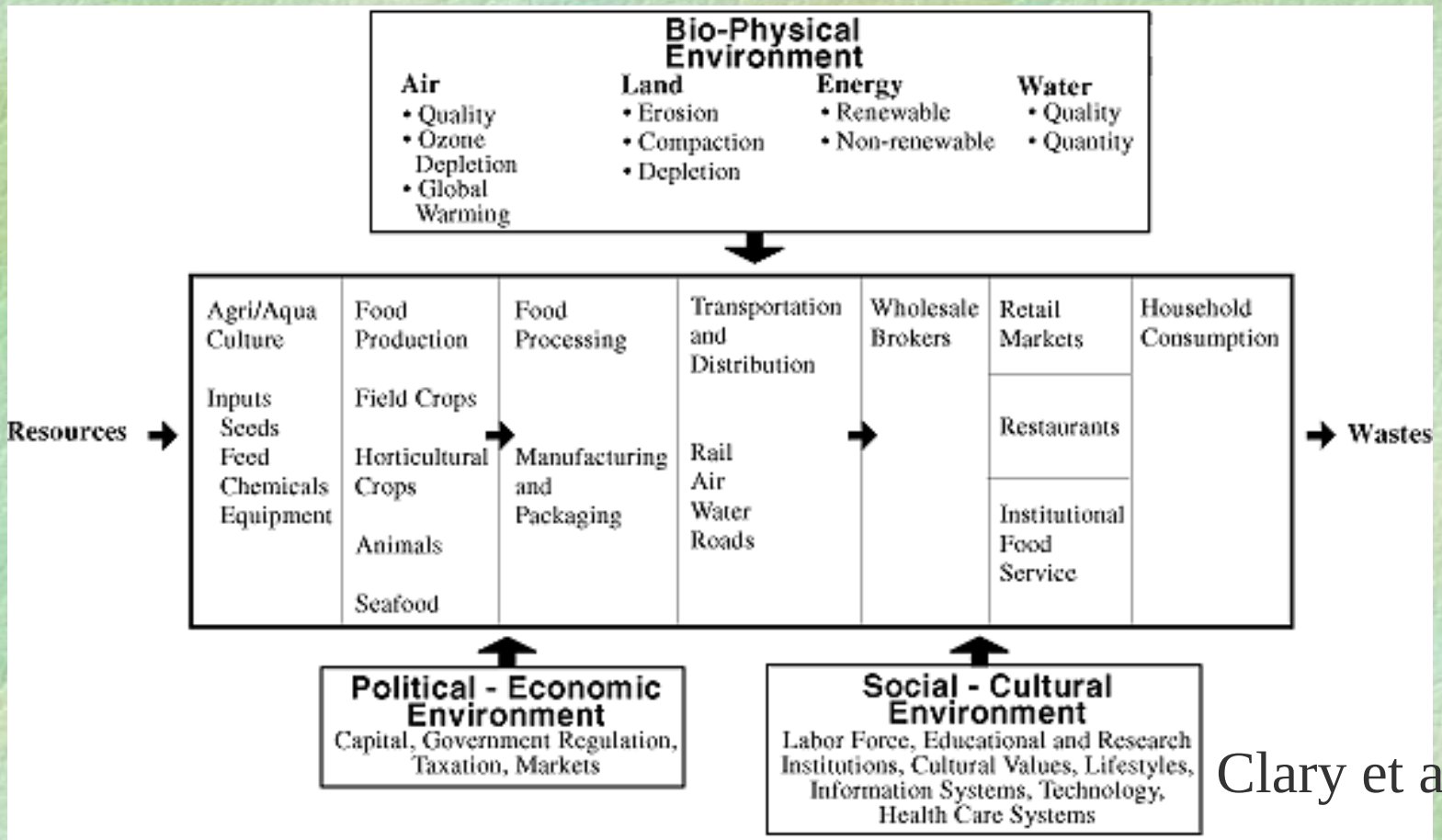
Gliessman, 1998 modified

Food system

- Conceptualization of the food system requires thoughtful application of systems theory and systems thinking
  - What are the components?
  - What are the boundaries?
  - How are the components of the food system arranged? Linear, circular, web-like or other

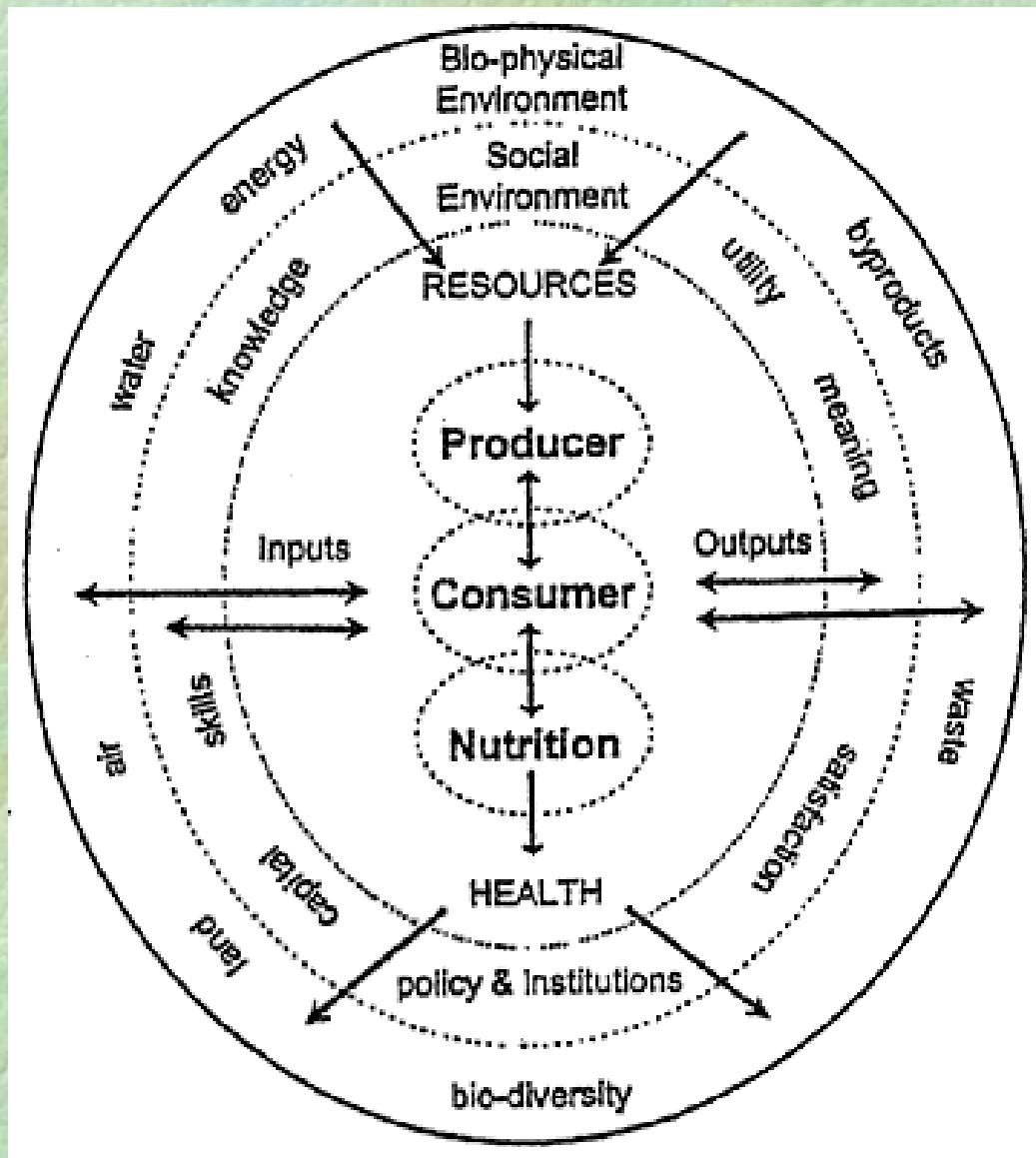
Interacting processes or subsystems

- e.g. production , processing, storage, distribution, marketing, waste disposal



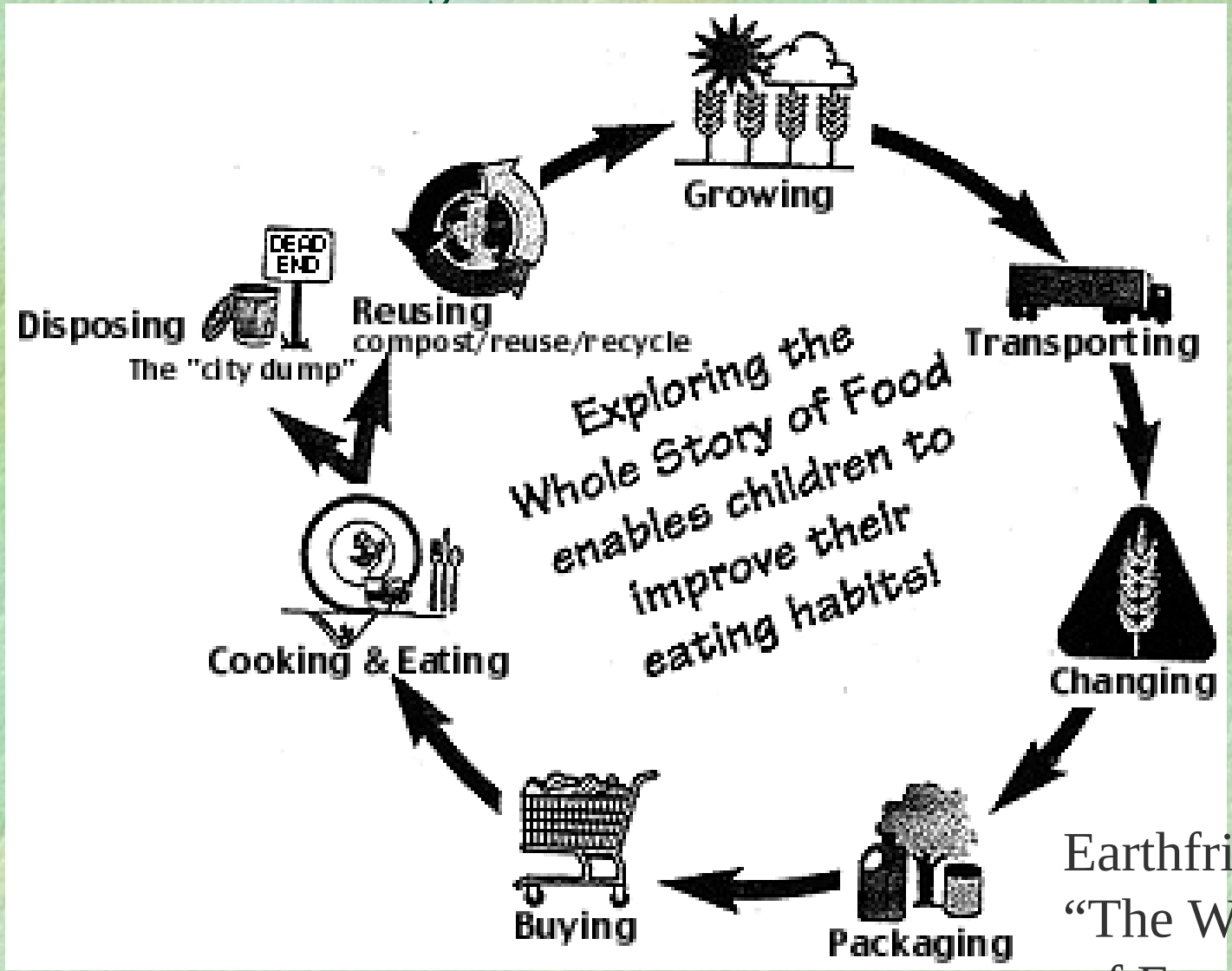
Clary et al. 1991

Linear but in a broader context



Sobal et al. 1998

Circular, Circular arrangements may more clearly define relationships



Earthfriends 1995 "The Whole Story of Food"

Waste [should] equal food!

- If biological and technological cycles don't mix
- *Cradle to Cradle* suggests that we have a design flaw in our material flows, McDonough and Braunert
- *Do we also have "design flaws" in our food system?*

Easier to determine what ***is not*** sustainable

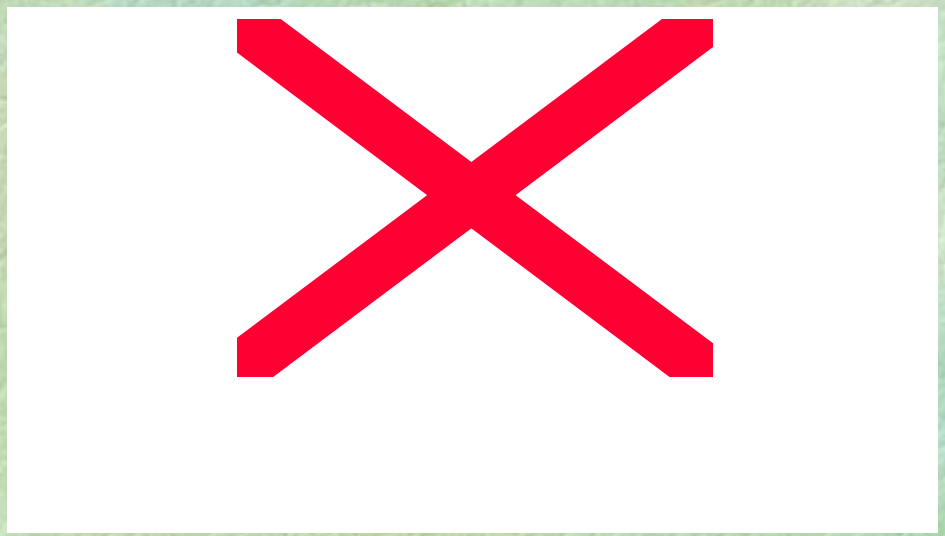
Abelman, M. 1993. *The Good Earth*

Plant and animal production separated for sake of “efficiency”

- Plants considered factories
- Animals considered separate factories
- Put inputs in
- Get saleable products out
- Waste disposal an externality not included in production costs

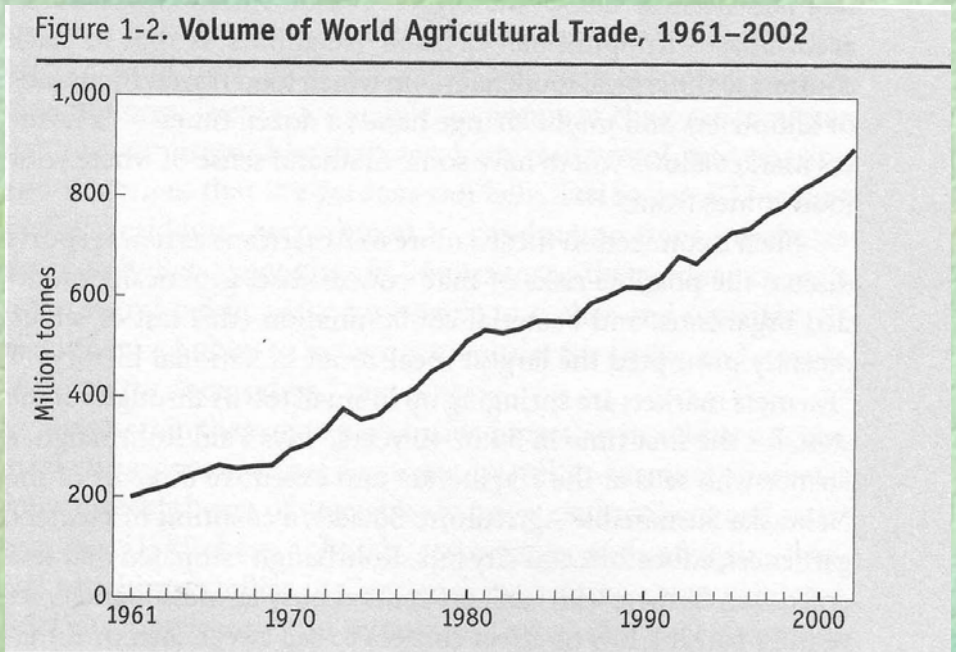
Sociological effects of modern agriculture

- In the US tremendous loss of farmers from 30% to 1% of the population in 70 years
- Globalization of US food supply



Hendrickson 2002. Food Circles Website

- World agricultural trade is now 4x tonnage what is was in 1961 though the population has only doubled (Halweil 2005)
- Historically the US agricultural trade balance was positive (more exported than imported) until 2004



Halweil 2005 p9

We will leave further diagnosis until:

- Later in quarter
- Ecological Agriculture

A sustainable food system is one in which… (Kloppenburg et al. 2000)

- **Proximate**
- **Economically sustainable**
- **Participatory**
- **Just/ethical**
- **Sustainably regulated**
- **Sacred**
- **Healthful**
- **Diverse**
- **Culturally nourishing**
- **Seasonal/temporal**
- **Value oriented economics**
- **Relational**

What does “proximate” or “local” mean?

- From one’s nation
  - 2003 regulations Country Of Origin Labeling (COOL) for all fruits and vegetables. Being blocked. Vote at Lou Dobbs, CNN website.
- One’s state
- 400 kms from house (Gary Nabhan)
- 50 km of your house
- Within a day’s leisurely drive from your house (Joan Gussow)
  - From Halweil 2005 p179

Examples of the food system moving toward regional sustainability

- Perennial locally adapted polyculture, organic production
- Restoration of native environments
- Urban agriculture and farm trusts
  - Backyard farming/gardening in US and Cuba
- Value Added products through community kitchens
- Farmer's markets and direct marketing (U-Pick), Community supported agriculture (CSA)
- Farm to Cafeteria programs
- Buy Local production campaigns labels- Puget Sound Fresh
- Legislation to prevent corporate farming
- Food Policy Councils

“Natural Systems Agriculture is a new paradigm for food production, where nature is mimicked rather than subdued and ignored. Because we are located in native prairie, we look to the prairie as our model for grain crops. As a result, we are investigating the feasibility of perennial polycultures or mixtures of perennial grains.”

OR

“Think like a prairie”

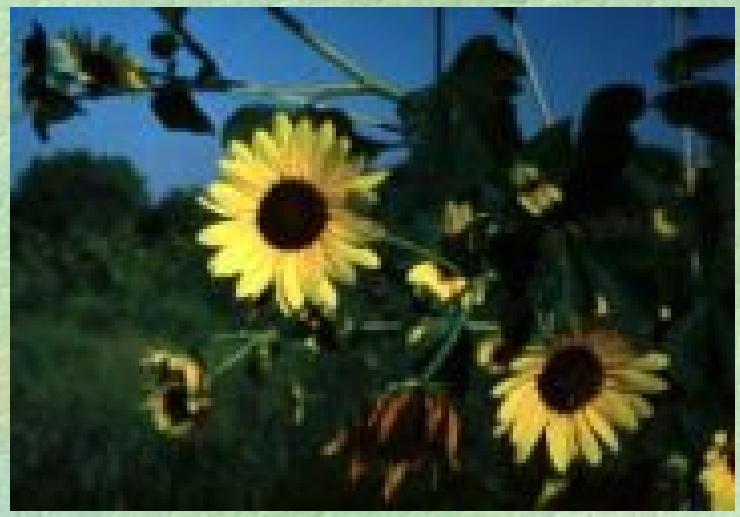
“Ecosystem function follows structure”

- Have identified four functional groups in prairie: cool-season grasses, warm-season grasses, legumes and composites. Has identified perennials in all groups:
  - cool-season grasses: wild rye, perennial wheat,
  - warm-season grasses: bunchgrass (3x higher in protein than corn),
  - legumes (Fabaceae): Illinois bundleflower (38% protein),
  - composite (Asteraceae): Maxmillian sunflower (oil)

Tall grass prairie: perennial and polyculture

Perennial polyculture at the Land Institute
Maxmillian sunflower and Monarch Butterfly (upper)

Polycultures
-Land Institute



- Do perennial polycultures outyield perennial monocultures?
- 25 years research
- Yes, they are viable agroecological solution

Perennialization

Marty Bender and Jerry Wild (KSU) looking for sunflower moths

- Breed perennial characteristics into existing grains like wheat (with Steve Jones, WSU breeder)
  - oats, barley, wheat, rye, perren. wild rye and intermed. wheatgrass
- Breed edible grain characteristics into perennials
- Suggests genetic engineering may be a useful approach

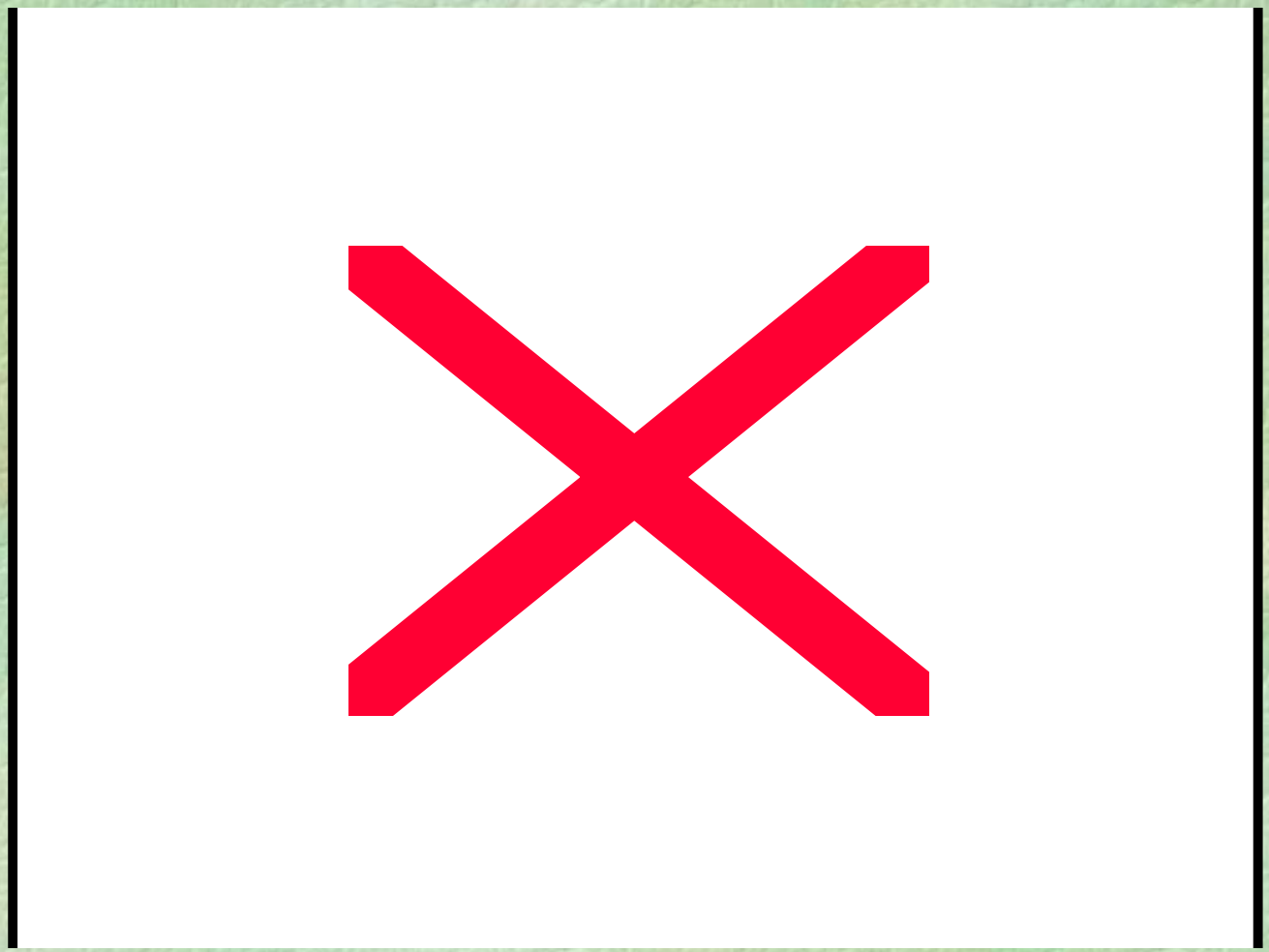
Does organic = sustainable?

- A very important step toward sustainability
- Does not totally mimic a natural systems, does not include following all ecological rules (in US esp. plant-animal coupling)
- Emphasis on internal nutrient cycling
- Not always economically profitable or socially just
- BUT VERY SIGNIFICANT STEP!

What is organic?

- Organic = simplest def'n prohibits agrochemicals, but encourages positive practices, such as prevention of erosion
- Prohibit the use of:
  - irradiation
  - sewage sludge
  - genetically modified organisms
  - antibiotics in meat and poultry
  - unapproved materials either natural or chemical
- Requires 100% organic feed for livestock

Organic sales increasing at 20+%/yr in US and world



Organic Trade Asso. website

Explosion in organic production and demand worldwide

- Organic production in 130 countries
- Worldwide 7 million ha (S. Carolina)
- US .2-1% ac certified to 10% in Italy and others
- Faster growing sector in US economy, also Japan at 20+%/year and increasing
- $22 Billion per year spent

Organic Trade Association website

Are the yields grossly reduced as in the days of our great-grandparents?

- Yields of organic approximately 90+% of conventional, depending on the crop:
  - Corn (69 growing seasons) 94% of conventional
  - Soybeans (55 growing seasons) 94%
  - Wheat (16 growing seasons) 97%
  - Tomatoes (14 cropping seasons) no yield difference

    Leibhardt, Organic Farming Research Foundation

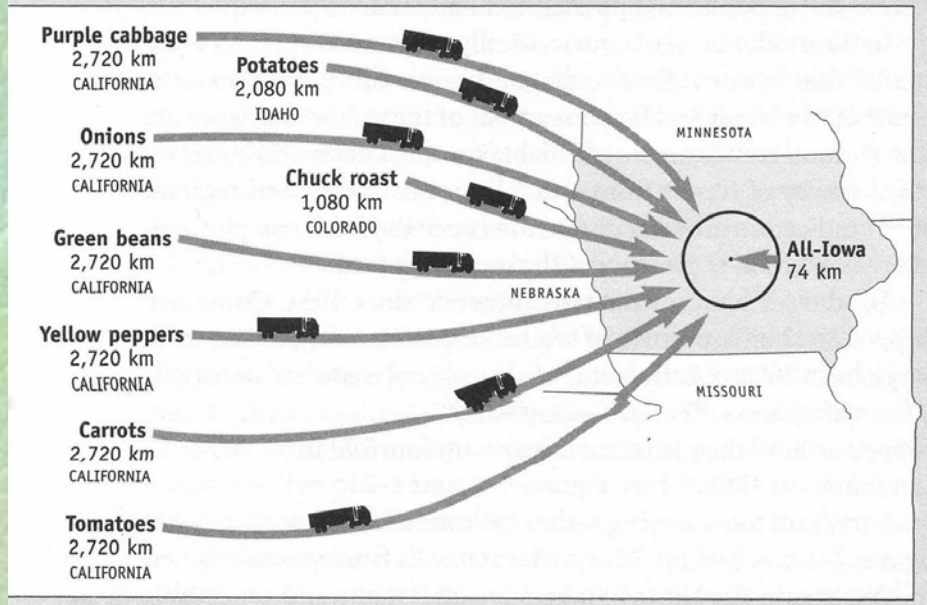
Organic uses less energy

- EU study over 20 years
  - 20% reduction in yield
  - 50% to 70% of energy
  - 3% of pesticides

Energy used in food transportation

- Iowa- direct marketing food travels average of 45 miles vs. 1550 miles if bought in conventional market (Iowa State, 2001)
  - 5-17x less carbon dioxide produced with direct marketing
- Agriculture may be responsible for more than 50% of all greenhouse gases if transport is included

Figure 2-1. **Local Versus Imported Ingredients: Iowa**



The foods going into an "All-Iowa" meal traveled an average of 74 kilometers to reach their destination, compared with 2,577 kilometers if they had been shipped from the usual distant sources nationwide. Researchers estimated that local and regionally sourced meals entailed 4 to 17 times less petroleum consumption and 5 to 17 times less carbon dioxide emissions than a meal bought from the conventional food chain.

Source: See Endnote 22 for Chapter 2.

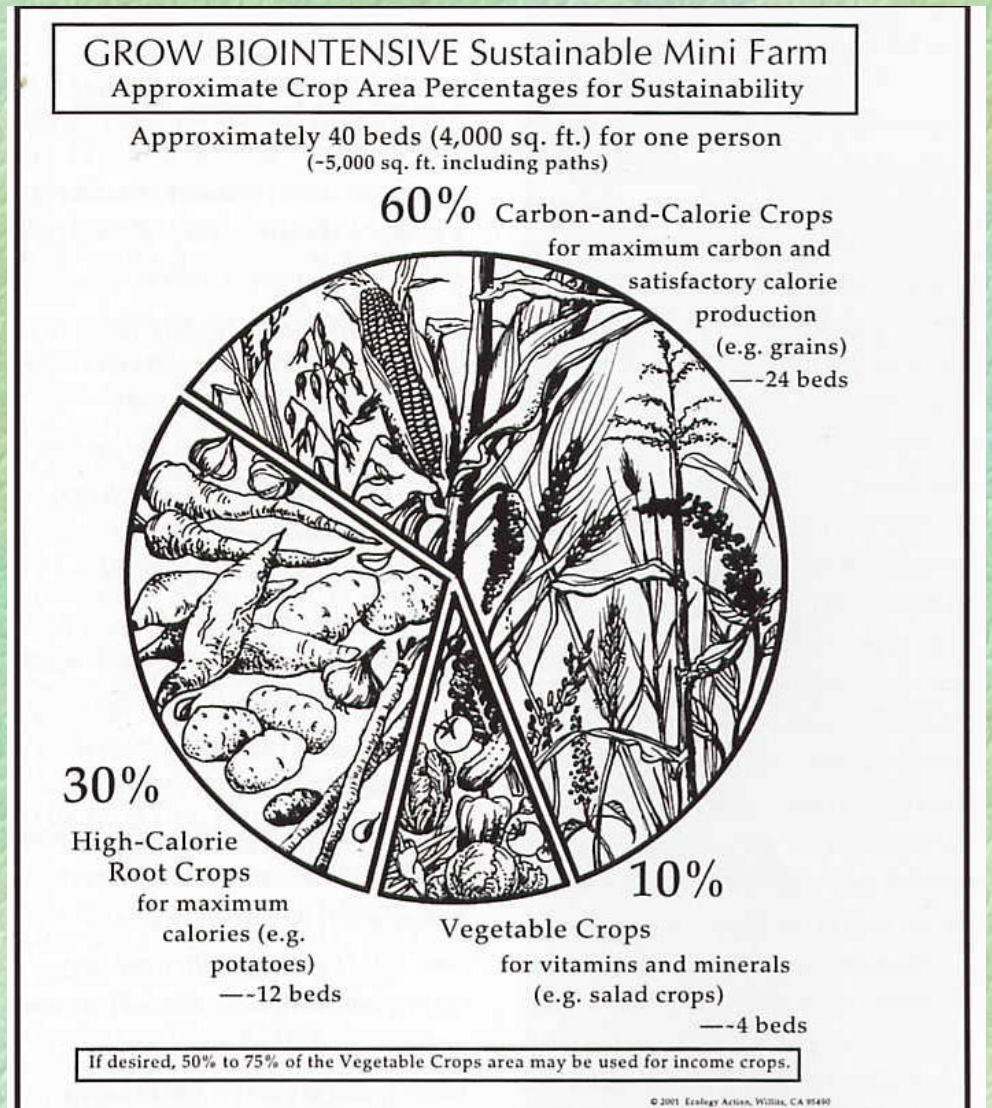
Halweil 2005 p30

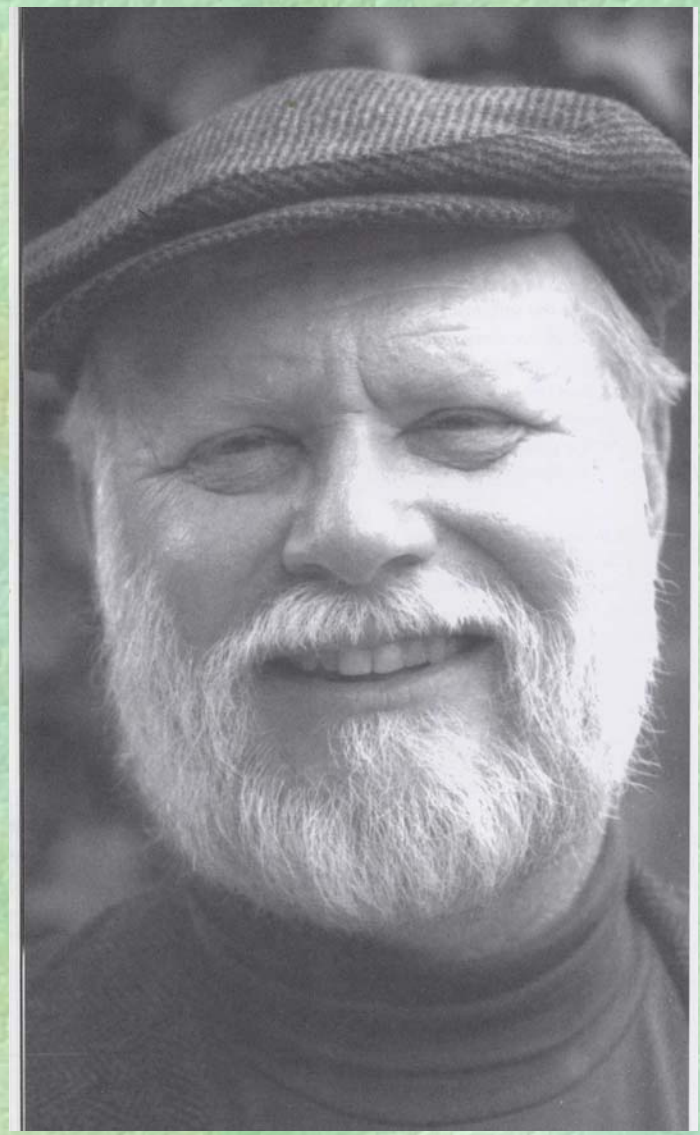
Self provisioning and Backyard Gardens

Yields of small scale and Intensively managed land is Higher than conventional management

Corn grown with Mucuna cover crop in Honduras, Bunch

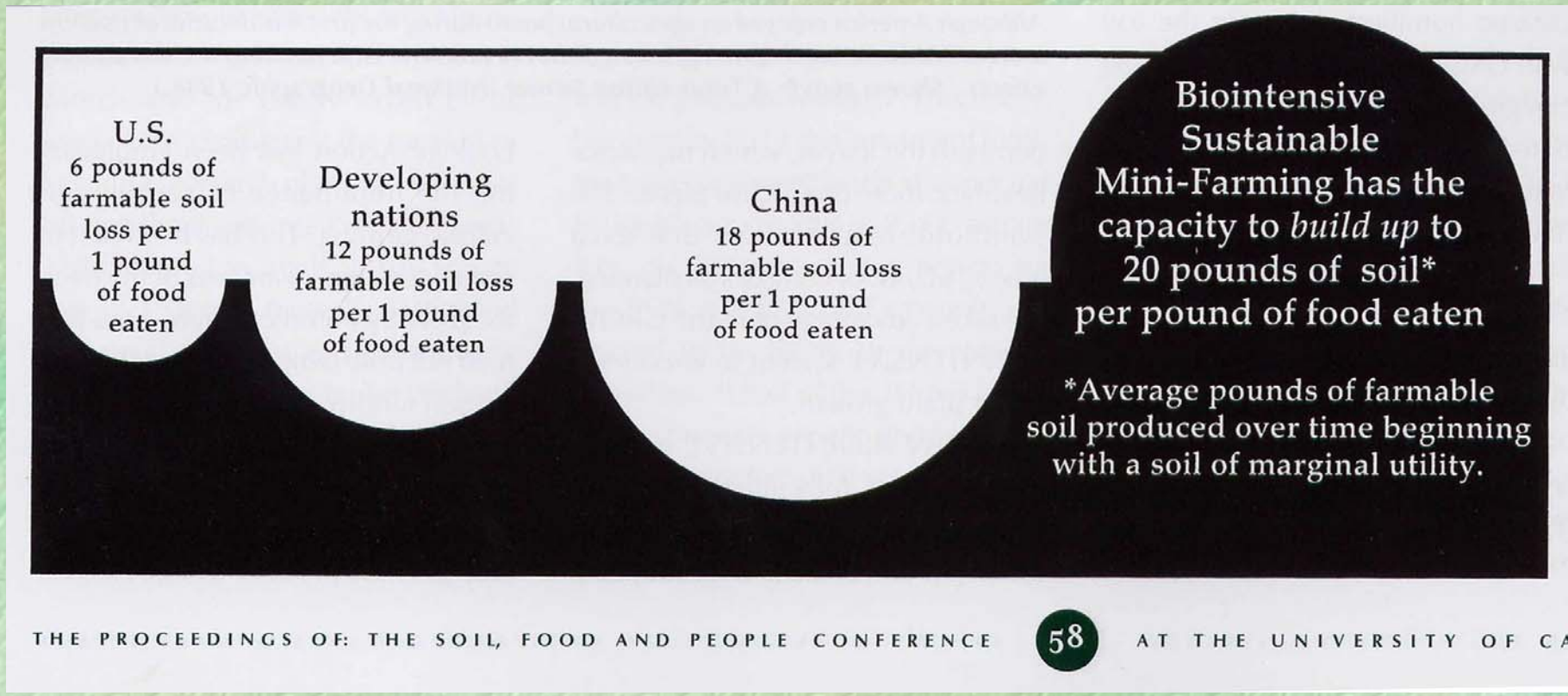
Jeavon's Biointensive mini-farm **Ecology Action**





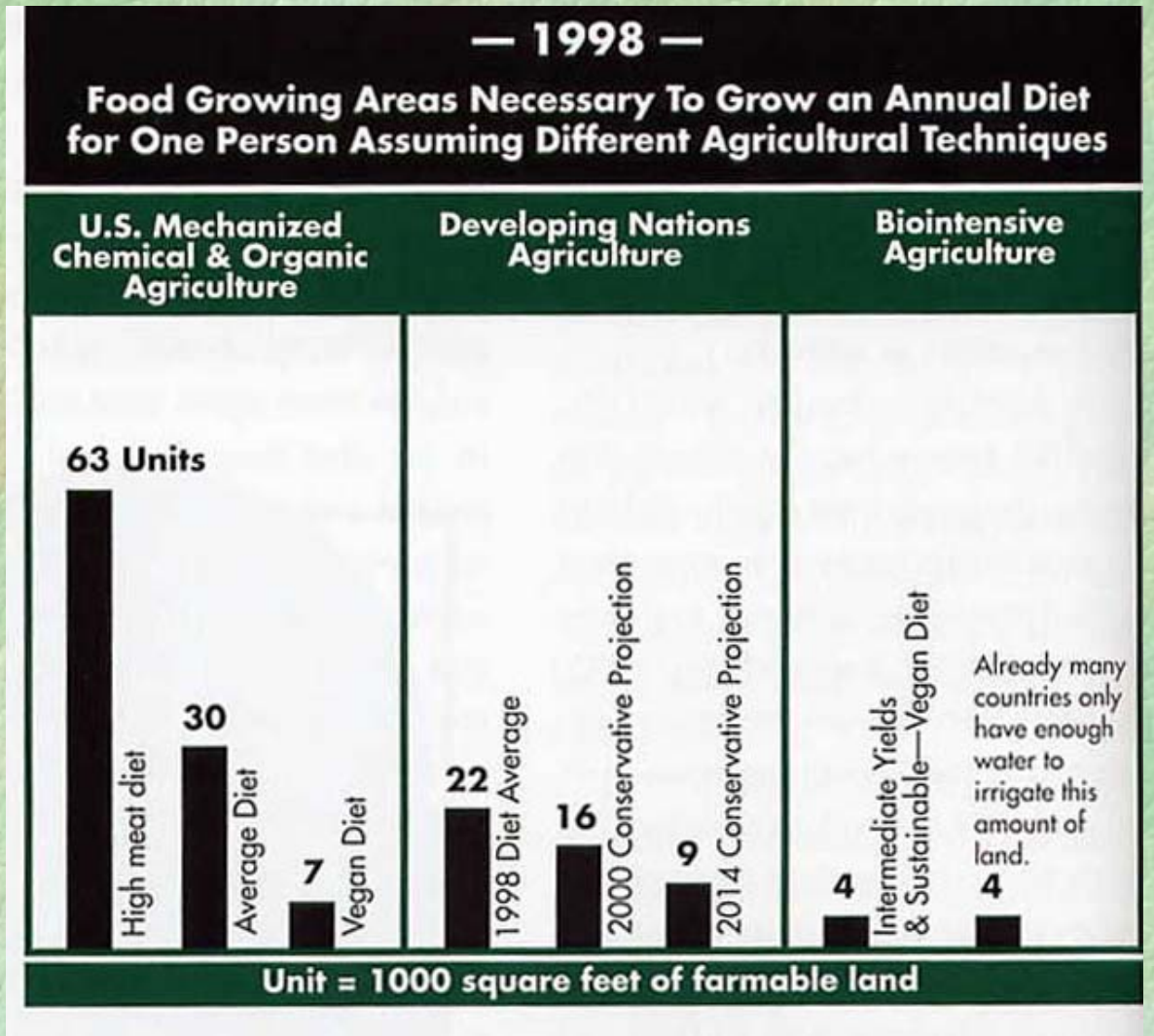
Workshop Schedule
www.growbiointensive.org

Adopted worldwide, intensive, resource conserving



Proceedings of the Soil, Food and People Conference, 2001

Biointensive: 4000 sq ft/person vs. 63000 sq ft/person modern ag



Organic agriculture in Cuba

-65% rice production is organic,

-50% vegetable production

Technician from the Rice Research Institute and campesino *share experiences in evaluating new varieties.*

Funes, F., et al. 2002. *Sustainable Agriculture and Resistance. Transforming Food Production in Cuba.* Food First Books, Oakland, CA.

Funes et al. 2002. *Sustainable Agriculture and Resistance*. Food First

Organoponicas used in urban Havanna- 95% vegetable production

Funes et al. 2002. *Sustainable Agriculture and Resistance*

Kona Kai Farms, Berkeley
Urban farm

Grosses
$250,000 on
2/5 of an acre

Abelman, M. 1993
The Good Earth

Fairview Gardens in Santa Barbara

Abelman, M.
1993 *The Good Earth*

Support integrated farms that involve both crops and livestock, restoration

Highland cattle foraging on brush and grass
and hopefully restoring oak savanna, Rathbun farm WI

Farmers' markets:

Increased 79% between 1994-2002

3100 farmers' markets in US (2002)

USDA farmers' market in Washing-ton, DC

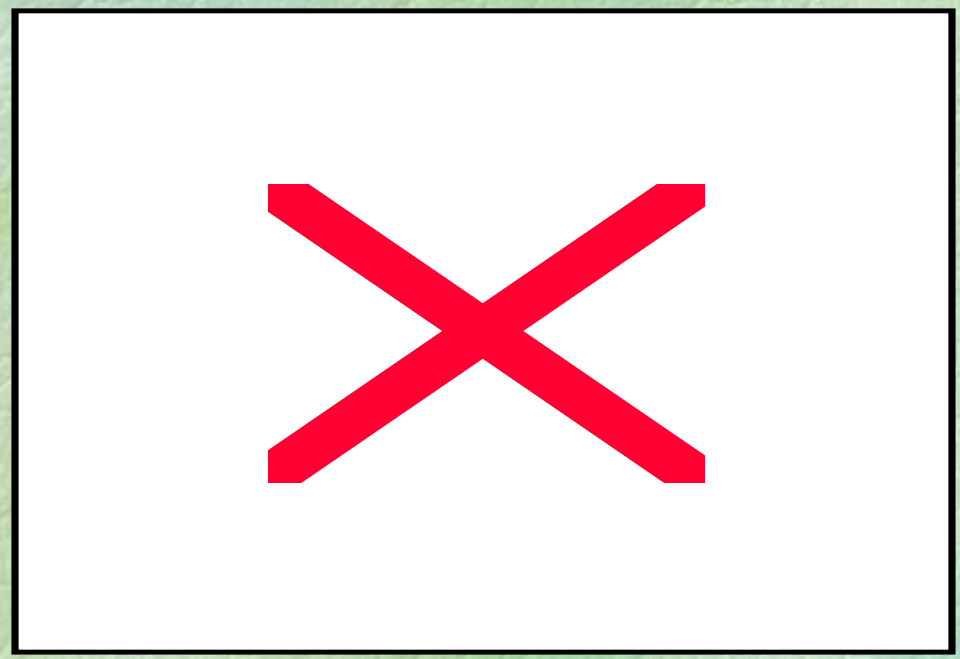
Data source: www.ams.usda.gov/farmersmarkets/facts.htm

Washington has 77 farmers' markets
Olympia's second largest (2002)

www.ams.usda.gov/farmersmarkets/facts.htm

Community supported agriculture CSA

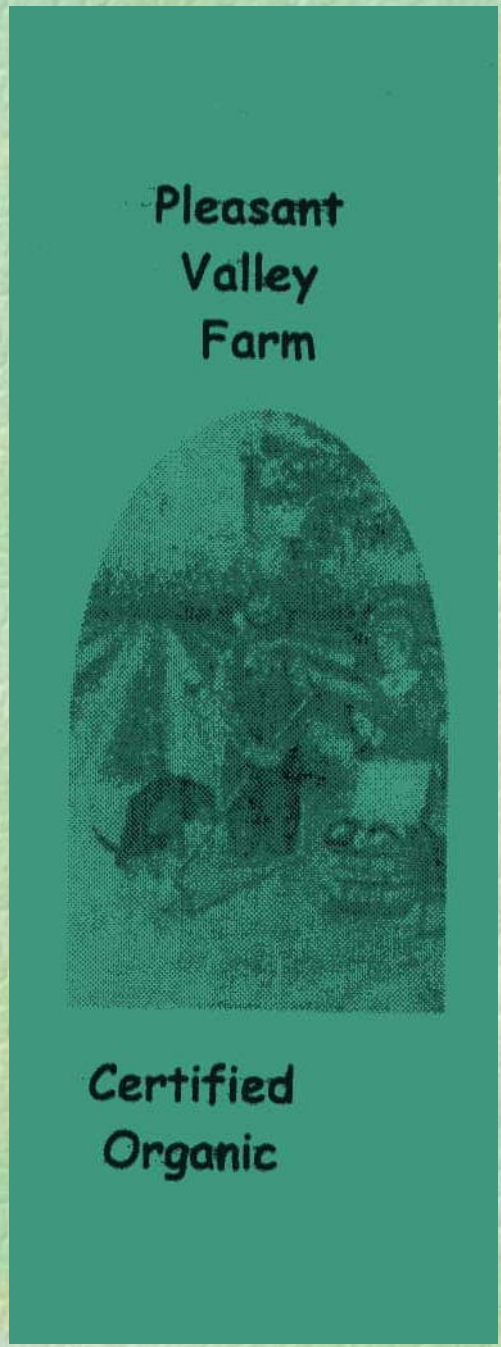
- Started 1965 in Japan "Tei-kei" or "putting a farmer's face on food"
- Connects urban and rural people
- Helps farmer with $ up front
- Consumers get a weekly box of food



Source: www.csacenter.org

Washington has 50
Thurston Co. 8

Source: www.csacenter.org



Policy: Nebraska and Counties in PA

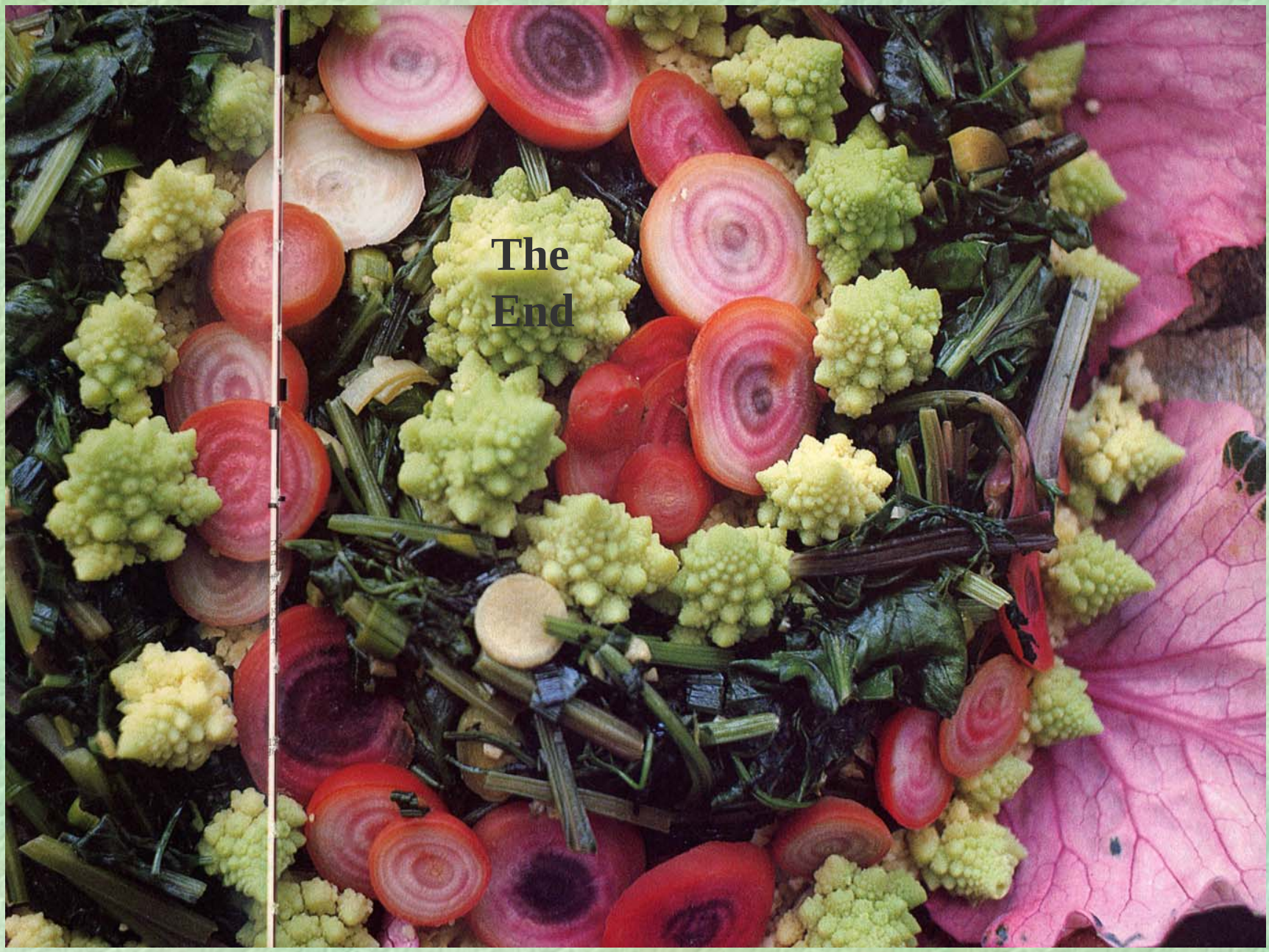
- Have limited corporately owned farming to various extents through legislation
- Jan 2003: Coalition of 127 groups delivered a letter to Congress calling for the restoration of competition and fairness to livestock markets (Feb 03 newsletter of the Center for Rural Affairs: www.cfra.org)

What can you do?

- Grow your own maintaining agrobiodiversity, buy seed from locally adapted varieties
- Buy locally
- Patronize farmers' markets and other direct markets
- Subscribe to a CSA
- Buy through coops that support local businesses and farms
- Support restaurants that buy locally
- Work politically on local/national regulations to support sustainable agriculture and limit corporate farming
- Develop a food policy council for your city or county

Does this work to help local farmers?

- NE Iowa's Buy Fresh, Buy Local campaign
  - Raised the profile of locally produced food through advertising, placing signs and banners
  - sent weekly faxes to restaurants, institutions and grocery stores
- Doubled the annual money spent on locally produced
- All participating farmers increased sales- 28% of farmers increased 11-20% sales


The
End

Useful References

- Corum, V. 2000. *The New Farmers' Market*.
- WSU new cooperative extension publication: "Sustaining the Pacific Northwest"
- Producers' group: Washington Tilth: www.tilthproducers.org
- Urban agriculture: www.seattletilth.org
- Sustainable Ag Info: Appropriate Technology Transfer for Rural Areas: www.attra.org
- For corporate consolidation in ag information: www.foodcircles.missouri.edu

- Kloppenburg, J., S. Lezberg, K. De Master, G. Stevenson, J. Hendrickson. 2000. Tasting food, tasting sustainability: Defining the attributes of an alternative food system with competent, ordinary people. Human Organization 59(2) 177-186.
- Wilkins, J.L and R.D. Smith. 1999. "The food system in extension and research". Ch. in: Sustainable Agriculture and Food Systems White Paper. Cornell University. www.cce.cornell.edu/food

- Clary, B.A., A.J. Hahn, and A.N. Maretzki. 1991. Facilitator's Manual. The Northeast Network for Food , Agriculture and Health Policy. Cooperative Extensions System, Cornell.
- Sobal, J., L.K. Khan and C. Bisogni. 1998. A conceptual model of the food and nutrition system. Social Science and Medicine 47: 853-63
- EarthFriends. 1995. The whole story of food. Nutrition Educations Resources Project. Teacher's College, Columbia University, NY