

## Sustainable Food Production

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## Sustainable Agriculture

- A good working definition has not been agreed upon; some see it as developing a sustainable, healthy environment
- An agricultural environment sustainable and healthy for both agriculture and non-agricultural populations

## Sustainable System

- Globalization - food is commonly shipped around the world
- The system that must ultimately be considered is the whole earth

## Background

- Sustainable agriculture developed from:
  - Organic farming which was espoused and popularized by JI Rodale
  - Low input (LISA low input sustainable agriculture) farming

## Background

- Long term availability of farm inputs
  - Energy - oil
  - Fertilizer - phosphate
- Also of concern:
  - Effect of presently used agricultural inputs:
    - Herbicides, insecticides,
    - Fertilizer elements - nitrate

## Sustainable Agriculture

- Returning to the golden olden days  
OR
- A brave new thrust into a more dynamic and productive agricultural future

The latter will appeal to farm populations!

### Developing Sustainable Systems

- Developing sustainable food production systems high-end technology and complex solutions
- Application of simple, well-known and inexpensive strategies for increasing food sustainability are most often the most needed

### Aspects

- First, must have sustainable increase in food production
- Second, the sustainable system must be global
  - Increasing globalization - the system is the whole earth
  - Is composed of many subsystems
- Third, earth systems are constantly changing
  - No single answer will work today and tomorrow
  - Knowledge is increasing and produces new opportunities to implement new sustainable approaches to problems

### Aspects

- Fourth, broad generalizations provide guiding principles but cannot provide answers for:
  - All agricultural regions because each has unique opportunities and needs if its food production is to be sustainable
- Fifth, imposition of “answers” from outside will not provide sustainability

### Inputs

- Their sources and limits.
  - Plant nutrients, energy, transport, and support all controllable inputs
  - Irrigation both controllable and uncontrollable components

### Inputs

- Fundamental components
  - Soil, water, energy
  - Carbon dioxide
  - Seeds (propagation of plants)
- First step - conservation and recycling of basics

### Fundamental Agricultural Components

- Soil, water, sunlight (and other sources of energy) and carbon dioxide being the most fundamental
- Soil, water and their components must be used in a sustainable way

### Fundamental Agricultural Components

- Plant nutrients are basic for maintaining food production and soil
  - Three primary nutrients are: N,P,K
  - Phosphate is most limited of these elements
    - Careful, judicious use of phosphate
    - Better understanding of phosphate in the environment
    - Ways to recycle available forms of phosphate

### Fundamental Agricultural Components

- All plant nutrient elements:
  - Used in the correct amounts
  - To prevent harm to non-agricultural and agricultural environments

### Energy for Agriculture

- Doubtful that agricultural production will ever be a sustainable source of energy for the world at large
- Serious need for sources, other than oil, coal or biofuels, of energy

### Energy for Agriculture

- Animal and human power is energy free????
- Energy is needed for animal or human power
- The animal or human machine cannot be turned off!

### Other Fundamentals

- There is only one soil and one water
- Soil is essential to plant and animal life
  - Soil erosion has two parts
    - Geologic
    - Accelerated

### The More Fundamental Components

- Conserving soil conserves:
  - Soil
  - Plant nutrients
  - Water
  - Organic matter - a soil essential

### The More Fundamental Components

- Conserve water by:
  - Not overusing
  - Keeping clean

### Other Resources

- Natural insecticides, herbicides
- Ways of protecting harvest
- Genetic resources

### Conclusion

- Sustainable food production and agriculture in general depends on the sustainable use of the basic, fundamental agricultural inputs. This is accomplished by recycling and the judicious use of basic needed resources