The Green Revolution & Sustaining Agriculture

Requirements of a Green Revolution

- Monoculture crops of GM crops – usually annuals
- High input of :
  - Inorganic fertilizers
  - Irrigation
  - Energy from machinery
  - Pesticides
- Multiple cropping (plantings in one year)

Pros & Cons of the Green Revolution:

Pros

-- High yield from crops
-- Increased food reserves for world
-- Enhanced learning and effectiveness of GM crops

Cons

-- High cost of equipment
-- Excessive use of water
-- Increased salinization
-- Excessive use of inorganic fertilizers
-- Compaction of soil due to lack of humus
-- Less natural resistance to pests with hybrid GM crops
-- Excessive use of pesticides
-- Increased pest resistance to pesticides

Methods to *decrease* Soil Erosion

- Contour farming
- Minimum-tillage farming (Conservation tillage)
- No-till farming
- Terracing
- Strip cropping
- Cover crops
- Alley cropping (agroforestry)
- Grassed waterways & gully control
- Planting perennial crops
- Using drip irrigation vs conventional irrigation
- Windbreaks, Shelterbelts
- Land classifications that establish what lands are farmable due to slope
- Stubble mulching
- Snow management

Methods to *decrease* Salinization

- Use of salt tolerant crops
- Use of drought resistant crops
- Flexible cropping (fallow land)
- Planting Deep-rooted crops
- Snow management
- Increase surface drainage in low-lying areas
- Irrigation methods that use less water
  - Drip irrigation
  - Center pivot irrigation
  - LEPA sprinklers

Methods to *INCREASE* Soil Fertility & Crop Production

- Adding manure
- Polyvarietal cultivation
- Polyculture
  - Alley cropping
- Intercropping
- Strip cropping
- Green manure cover crops
- Increasing the amount of humus in soil
- Adding compost to soil
- Crop rotation

Methods to *decrease* use of <u>Pesticides</u>

- Strip cropping
- Alley cropping
- Bio-pesticides (i.e. soap)
- Biological pest control
- Light boxes
- Polyculture
- Insect birth control and/or hormones
- GM resistant crops
- Pheremones to attract pests (i.e. Japanese Beetle traps)
- Hot water
- Spraying only when and where a pest outbreak occurs
- Crop rotation
- A barrier hedge that surrounds the crop that provides a habitat for the pest's natural enemies
- Changing planting times so that pests either starve or are eaten by their natural predators
- Trap crops that can lure pests away from the main crop
- Introduce microbes (like Bt thurengensis) to disrupt the metabolism of pests
- Use of IPM