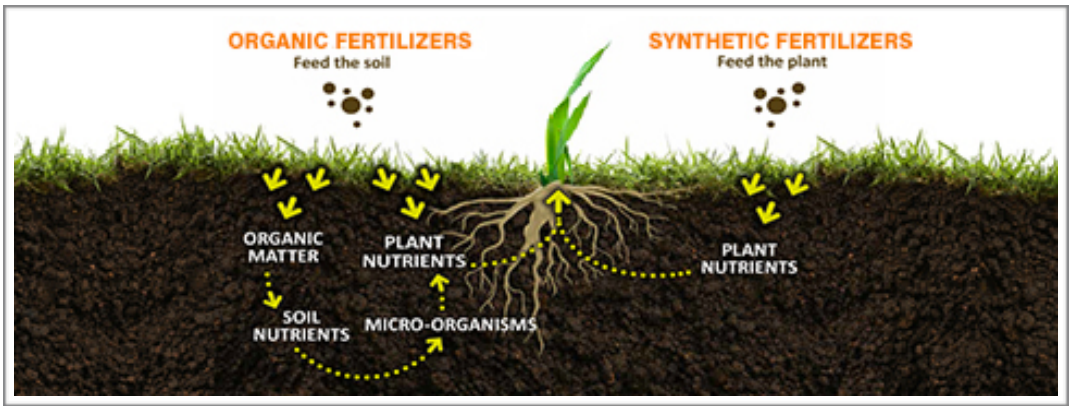
Comparison between Organic Gardening and Chemical Gardening

Organic



natural fertilizers: manure, compost

depends on healthy soil

- drains well
- stores moisture
- resists erosion
- absorb nutrients

natural pest management

- crop rotation
- natural pesticides
- bio-control (ducks eat pests)
- biodiversity: intercropping
- increase in soil microorganism activity

Conventional (Chemical)

synthetic pesticides

- potent, long-lasting
- decrease in soil bacteria and fungi
- pests become resistant to pesticides

soil fertility

inorganic N

produce

emphasis on growth and production

inorganic fertilizers cause:

- soil hardening
- salty soil
- less soil microbial activities=less
- nutrients
- reduced soil water holding capacity
- increase soil erosion

chemical agriculture

- plants need at least 14 nutrients from soil other than C, H, O
    - if lack; add fertilizer
- not enough rainfall
    - irrigation
- soil too compacted
    - plow
- plant disease
    - pesticide

- too much machinery = compact soil
- monoculture = soil deteriorates
    - lessens productivity of soil
- insecticides, fungicides
    - expensive, toxic pollutants, diseases resistance
    - carcinogenic
- herbicides: toxic pollutants, more resistant weeds
- less cooperation among neighbours
- lower quality nutrient levels in produce

Inorganic fertilizers

problem:

- micronutrient depletion
- high energy consumption

Organic fertilizers

lower nutrient content, solubility, nutrient release rates than inorganic fertilizers

Advantages

- improve soil aggregate
  - improve moisture-retaining capability
- prevent topsoil erosion
- increase nutrient absorptions in soil
  - use less fertiliser
- release nutrients at slower, more consistent rate
  - less nutrient waste
- prevent disease
- long-lasting

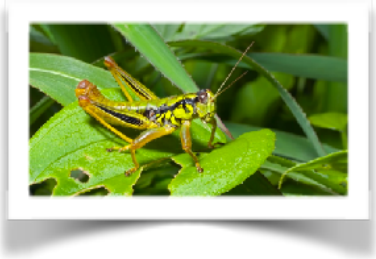
Disadvantages

- dilute source of nutrients compared to inorganic
- more variable than inorganic
- may contain pathogens
- more labor needed to compost organic fertiliser

PEST CONTROL

Pest is an organism that cause damage to agriculture by feeding on it

pathogens



insects

rats

Control Methods

1. **Resistant varieties:** pest cannot eat it
2. **Mechanical control:** destroy diseased plant by burning
3. **Crop rotation:** plant non-host plant of pathogen
4. **Trap crops:** attractive host plant to leer insects away from main crops
5. **Natural chemicals:** soap water
6. **Biological control:** control pathogens by natural enemies
    - antibiosis
        - nematode trapping fungi
    - competition
        - biocontrol agents out-compete pathogenic microbes
    - parasite
        - control by trichoderma
7. **Bacterial antagonists**
    - bacillus, pseudomonas, streptomycin
8. **Fungal antagonists**
    - gliocladium, trichoderma

Insect control

Repel plants for pest insects:

Anise Hyssop - cabbage moths

Borage - Aphids, Colorado potato Beetles, Squash Bugs

Pot Marigolds - Asparagus beetles

Bacterial pathogens of insects:

- Bacillus popilliae(milky disease)
- Bacillus thuringiensis - kills caterpillar

Fungal pathogens of insects

- zygomycota
- ascomycotina
- cordyceps sinensis
- metarhizium anisopliae (green fungus)
- beauveria bassina (white fungus)