

Week-05-L-02

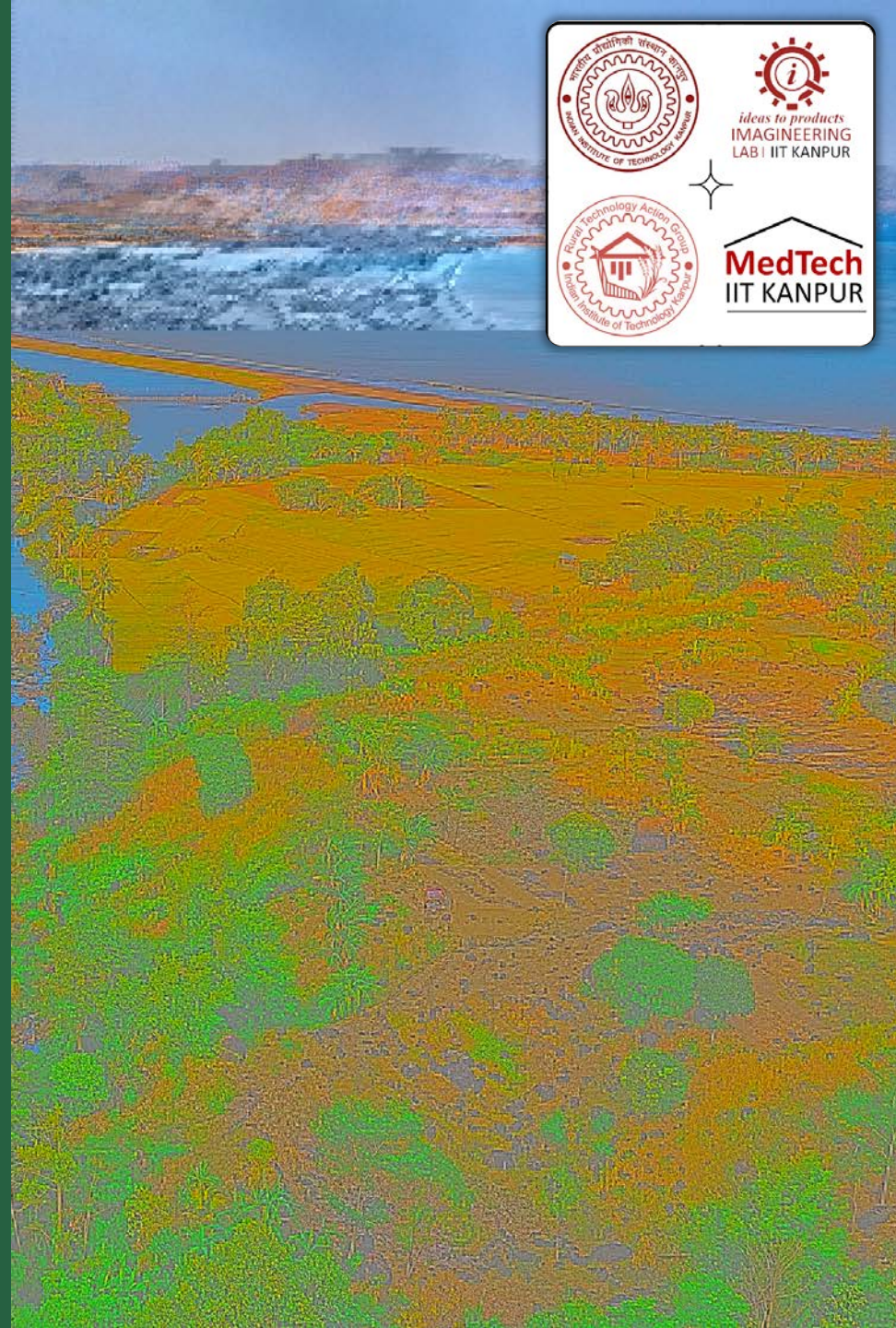
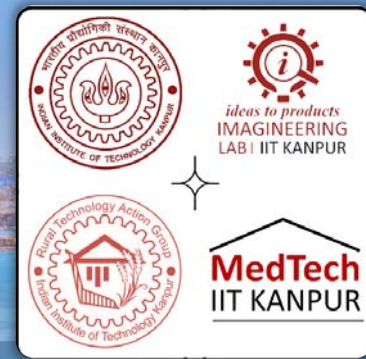
Value Engineering Agricultural Plan

Development and Implementation Phase

Sustainable Concepts Part – 2

**Prof. J. Ramkumar &
Dr.Amandeep Singh**

Dept of Mechanical Engineering & Design
Indian Institute of Technology Kanpur

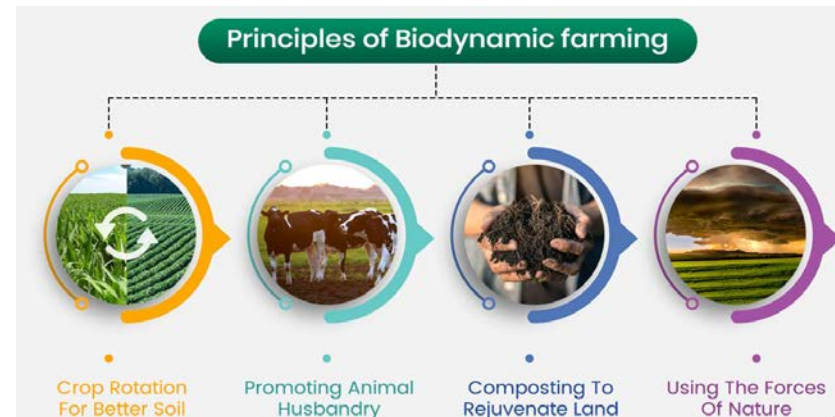
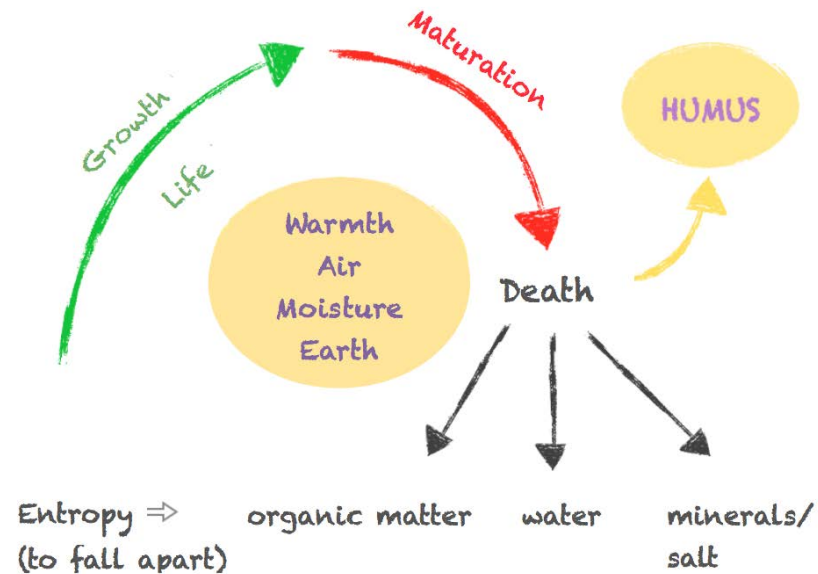


Biodynamics

- Carved from Rudolf Steiner's 1924 lectures, it treats farms & gardens as holistic living systems.

Principles:

- Prioritizes synergy between plant & animal production, addressing root causes instead of surface-level problems.
- High-quality produce results from harmony with natural ecosystem, influenced by economic viability, resources, and environmental conservation.
- Focuses on soil life, diversity, & crop rotation to maintain soil quality.



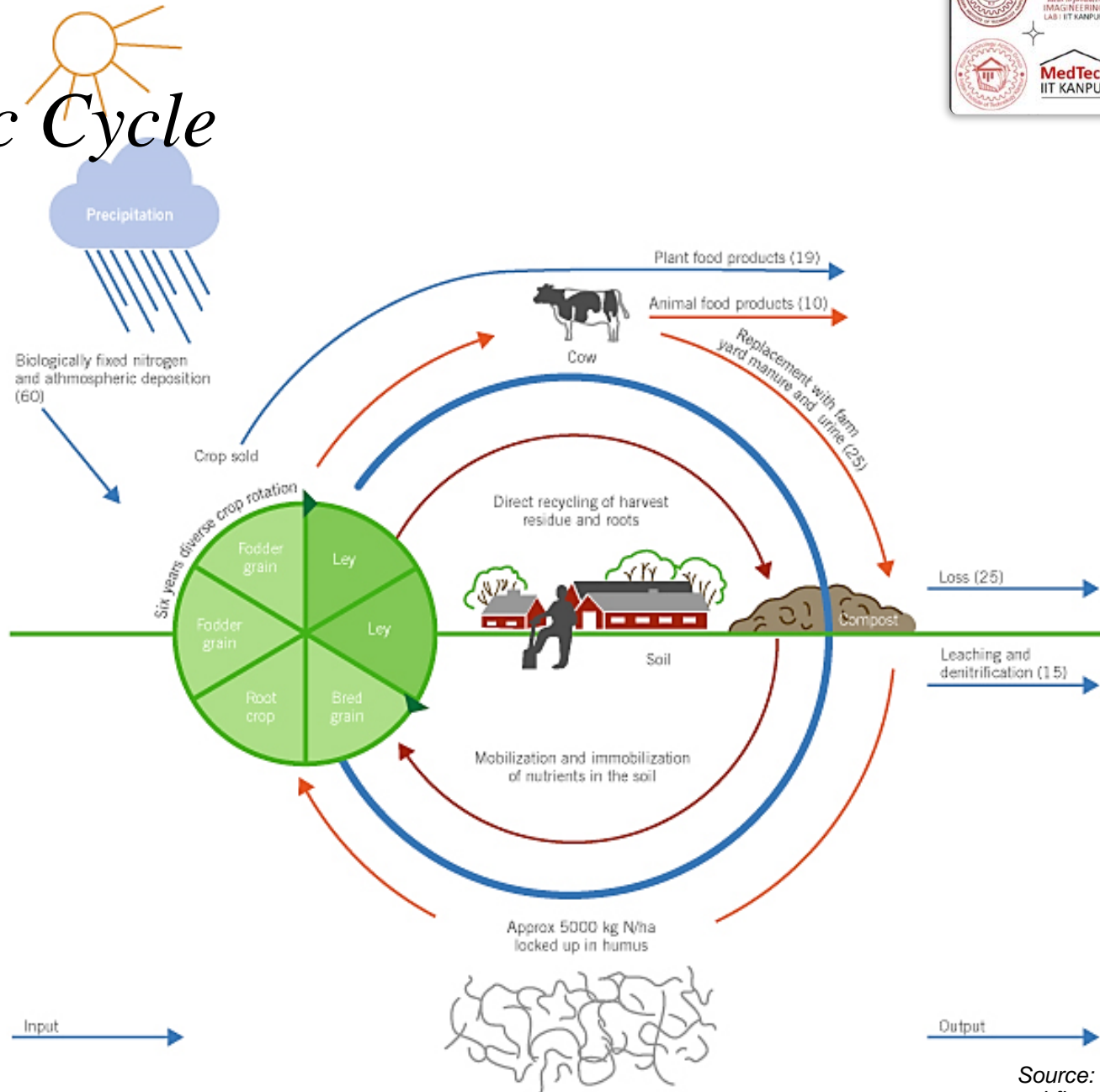
Biodynamics

- Property as an Organism: Property changes impact all its component parts.
- Biodynamic Preparations: Utilizes unique preparations/sprays for improved plant health and growth.
- Examples of Preparations: 500 & 501 quartz and cow manure sprays, fermented insect control sprays, compost-enhancing preparations from various plant sources.



Biodynamic Cycle

- Internal Cycle:** Yearly nutrient exchange between soil and crops, with crop residues enriching soil humus and releasing nutrients.
- Crop Rotation Cycle:** Strategic crop rotation, using nitrogen-fixing legumes to enhance soil humus. Extractive crops deplete humus.
- Greater Cycle:** Part of harvest feeds animals; their manure & urine enrich soil via compost. Farmer's role is crucial in enhancing land productivity & well-being for all.



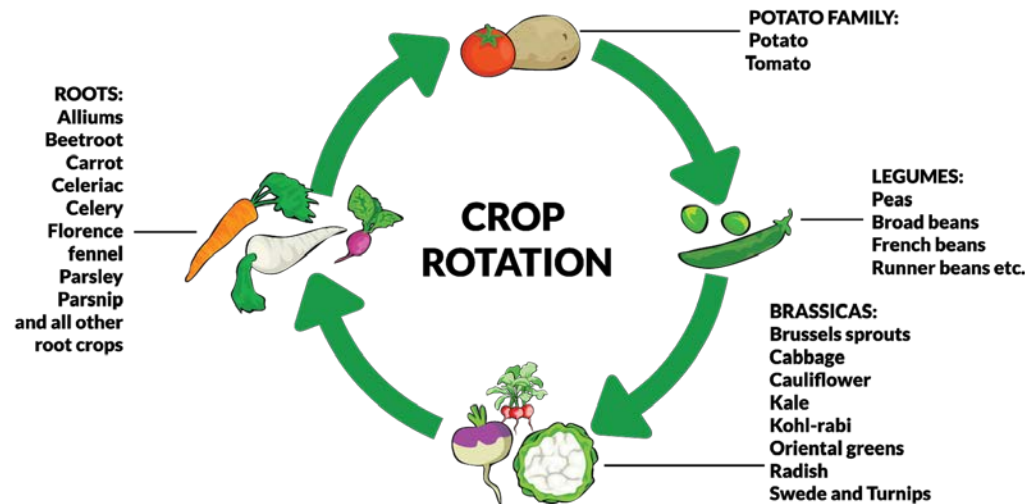
Crop Rotation

- **Pest Control:** Diversifies crops to disrupt pest life cycles and manage populations effectively.
- **Soil Nutrient Preservation:** Prevents soil nutrient depletion and promotes natural nutrient enhancement, reducing the need for synthetic fertilizers.
- **Broad Application:** Applicable to various farming methods, including broadacre, row crops, and pastures.

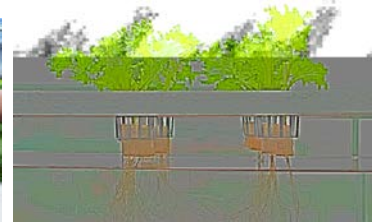


Vegetable Crop Rotation

- Rotate vegetable groups to:
 - **Deter Pests:** Prevents pests by avoiding the same crop in the same area.
 - **Maintain Soil Health:** Ensures soil fertility and reduces the need for chemicals.
 - **Improves Sustainability:** Fosters resilient & healthy vegetable growth.



Hydroponics



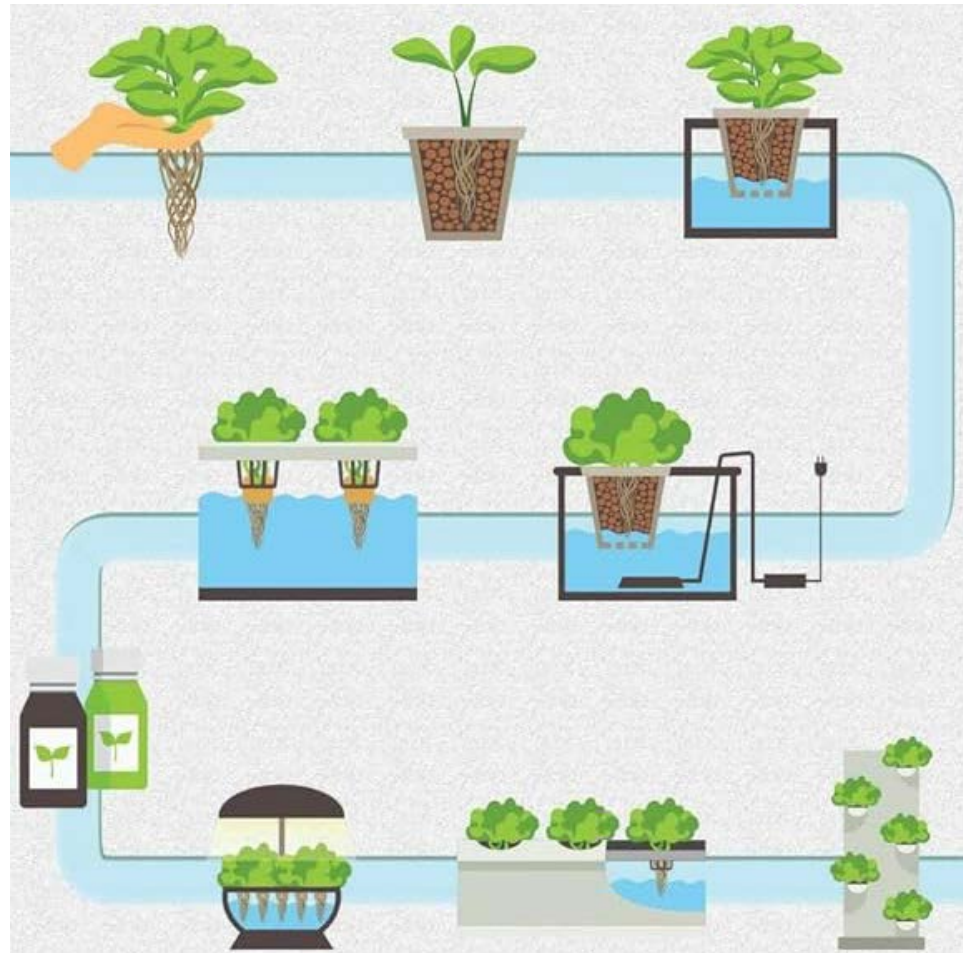
- **Soil-Free Plant Growth:** Hydroponics is a method of growing plants without soil, allowing precise control of the root environment.

Advantages:

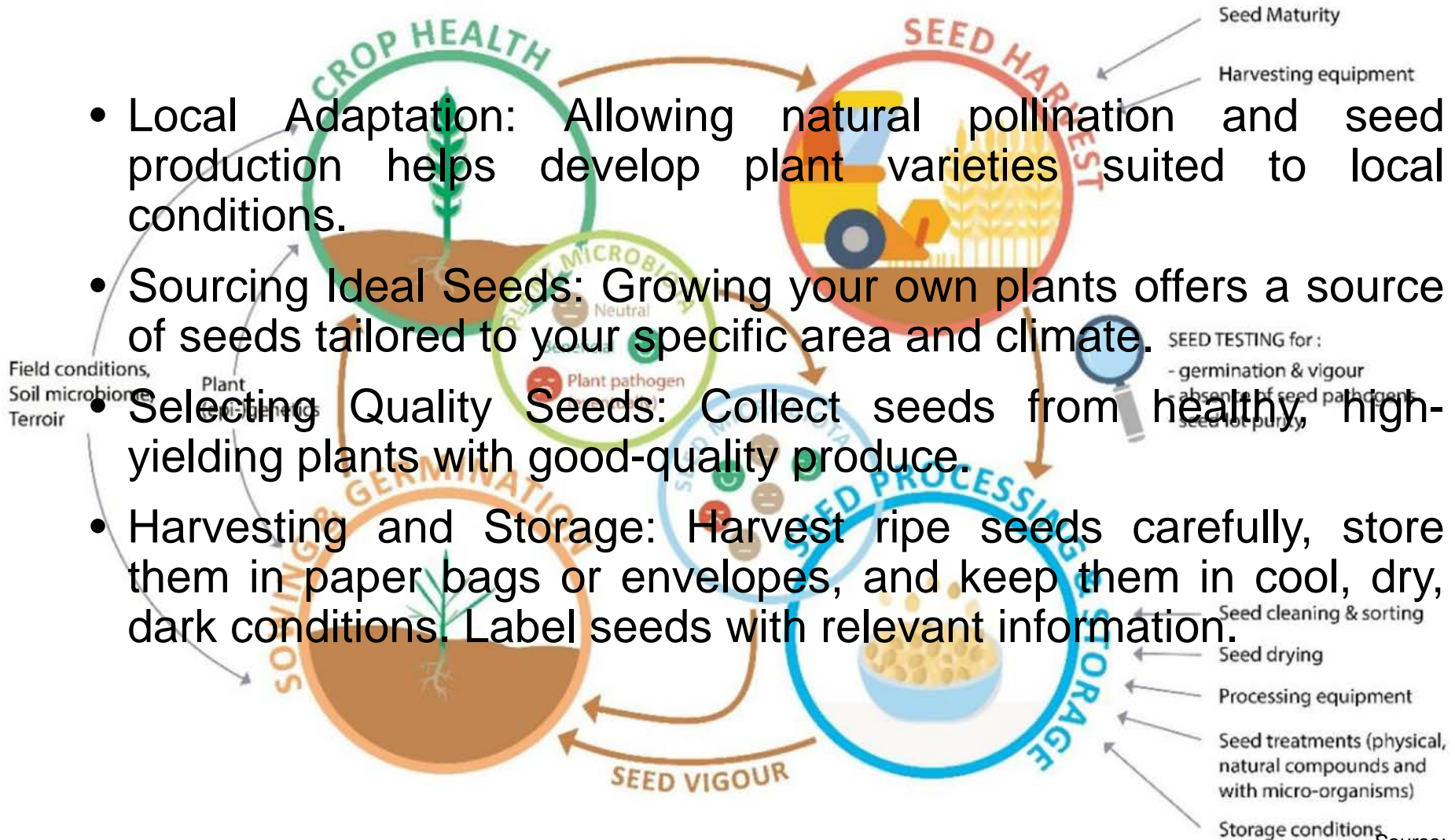
- **Reduced Physical Work:** Eases physical labor in gardening.
- **Water Efficiency:** Decreases water consumption for plant growth.
- **Resource Efficiency:** Enables efficient use of fertilizers and pesticides, reducing chemical usage.
- **Environmental Benefits:** Better waste control minimizes soil degradation and environmental damage.
- **Space Saving:** Increases growing capacity in a limited area.

Knowledge Requirement:

Growing plants hydroponically requires a deep understanding of plant growth processes and control over factors like temperature, water, oxygen, and nutrients in the root zone.



Seed Saving



- Local Adaptation: Allowing natural pollination and seed production helps develop plant varieties suited to local conditions.
- Sourcing Ideal Seeds: Growing your own plants offers a source of seeds tailored to your specific area and climate.
- Selecting Quality Seeds: Collect seeds from healthy, high-yielding plants with good-quality produce.
- Harvesting and Storage: Harvest ripe seeds carefully, store them in paper bags or envelopes, and keep them in cool, dry, dark conditions. Label seeds with relevant information.

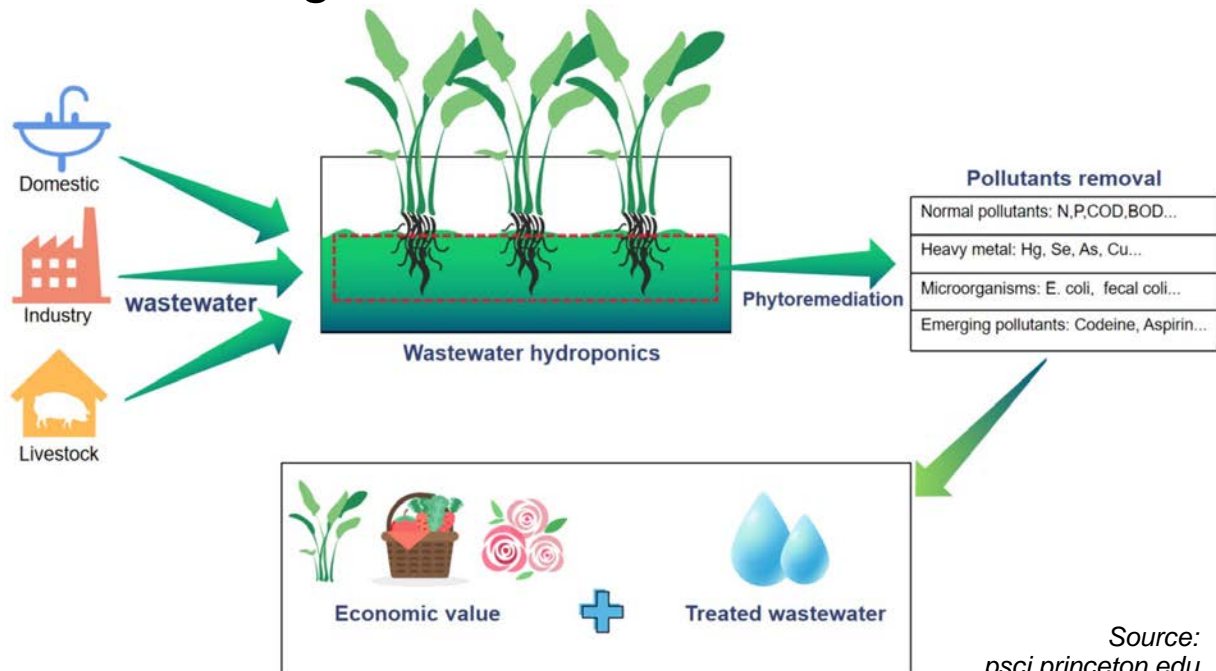
Hydroponics

- Hydroponics is a method of growing plants without soil, allowing precise control of the root environment.



Advantages:

- Eases physical labor in farming
- Water Efficiency = Decreases water consumption
- Resource Efficiency = Reducing chemical usage



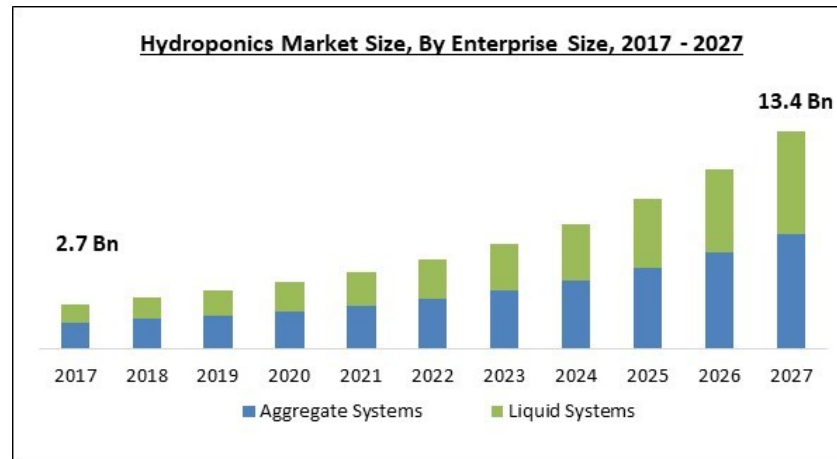
Hyrdoponics

Advantages:

- Better waste control minimizes soil degradation and environmental damage.
- Increases growing capacity in a limited area.

Knowledge Requirement:

- Growing plants hydroponically requires a deep understanding of plant growth processes and control over factors like temperature, water, oxygen, and nutrients in the root zone.



Thank You

