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Organic Farming for Sustainable Agricultural Production

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Lecture 32 : Integrated Farming System and Urban Agriculture

What is Integrated Farming System???

Integrated Farming System (IFS) represents an appropriate combination of farm enterprises viz. Cropping systems, horticulture, livestock, fishery, forestry, poultry and the means available to the farmers to raise them for profitability. It interacts adequately with environment without dislocating the ecological and socio-economic balance on one hand and attempt to meet the national goal on the other. The IFS in its real sense will help in different ways to lift the economy of agriculture and standard of living of the farmers of the country as a whole.

In IFS, the farm resources are allocated to the needs and priorities of the farmers in his local circumstances which depends on:

- ✓ Climatic condition such as quantity and distribution of rainfall, temperature, humidity, sunshine hours, etc
- ✓ Soil type and topography
- ✓ Market opportunities, economic, institutional and infrastructure facilities and technology

Why IFS?

- To ensure income throughout the year, there is need to reorient the present ways of agricultural practices and develop suitable multi-enterprise agricultural system for farmers, as single crop production enterprises are subject to a high risk of natural calamities, irregular and uncertain income and employment of the farmers.
- Shifting from single to integrated multi-enterprise system will help to conserve natural resources and restore the farmer's confidence in agriculture besides increasing income of the farmer per unit land and water.
- The governing idea behind multi-enterprise agriculture system is that a farmer can adopt enterprises such as dairy, horticulture, floriculture, bee keeping, vegetable, poultry, duckery, piggery, mushroom, fisheries, bio-gas plant and solar heater etc. The entire philosophy of multi-enterprise farming system revolves efficient utilization of resources, time and family labor while attaining food and nutritional security of poor farmers.

Key principles of IFS

- **Cyclic**

The IFS is essentially cyclic (organic resources – livestock – land – crops). Therefore, management decisions related to one component may affect the other.

- **Efficient use of resources**

Using crop residues and organic waste more rationally is an important activity in IFS. For resource-poor farmers, the correct management of organic waste, together with an optimal allocation of scarce resources, leads to sustainable production.

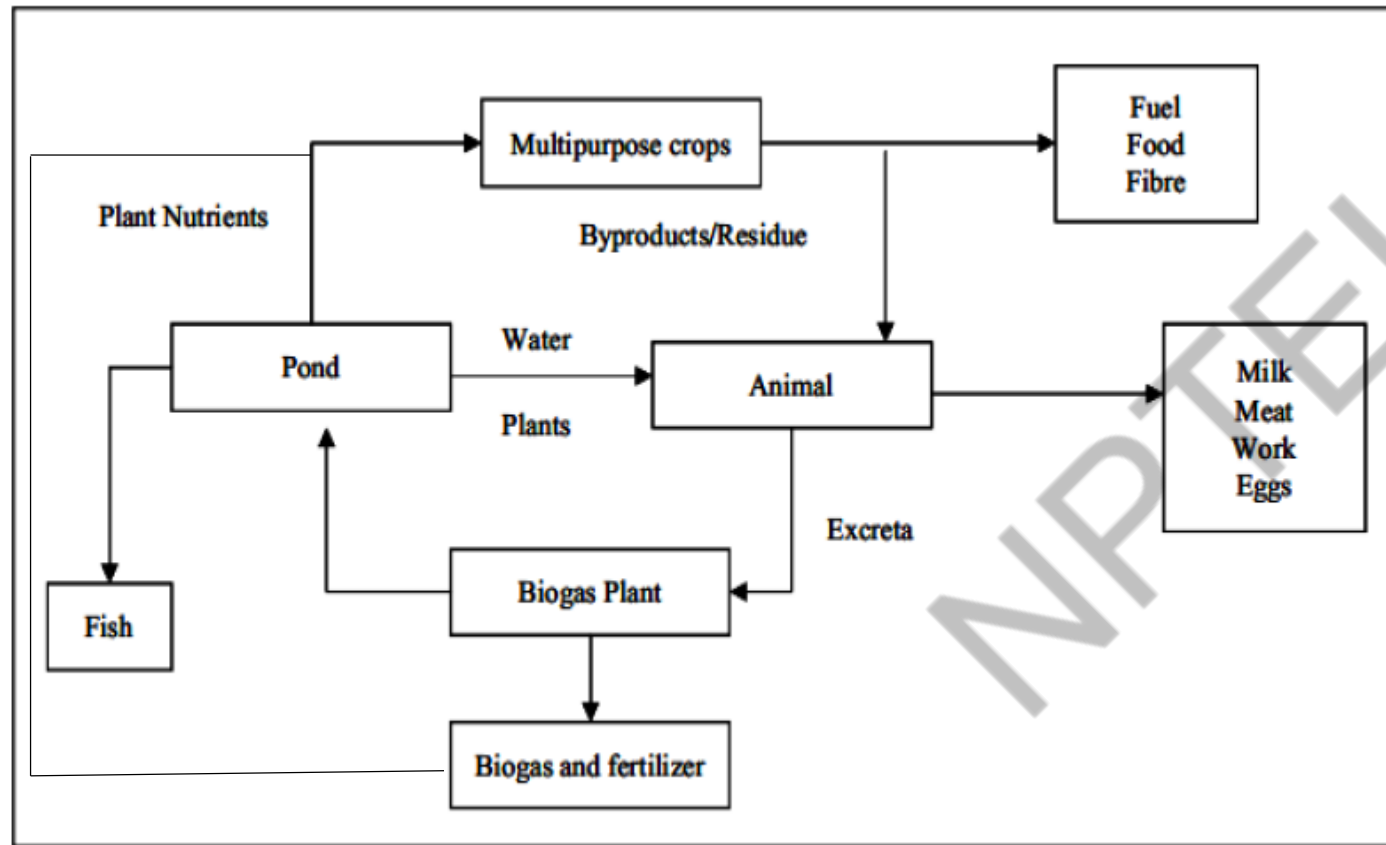
- **Eco-sustainable and economic viable**

Combining ecological sustainability and economic viability, the IFS maintains and improves agricultural productivity while also reducing negative environmental impacts.

Objectives of IFS

- It should formulate location specific models involving main and allied enterprises for different farming situations.
- It should ensure optimal utilization and conservation of natural resources with efficient recycling within each system for sustainable production.
- It should raise the net return of the farm household by complementing main activity with allied enterprises.
- It should concentrate on developing institutional and market linkages by inclusions of new interventional technologies.
- It should address the nutritional insecurity of resource poor farmers, vulnerability and poverty of landless labourers.

Out line of Integrate Farming System



Crop-fishery-livestock farming system



Crop

- Upland paddy
- Maize

Horticulture

- Leechi
- Guava
- Papaya

Livestock

- Dairy cattle
- Pig
- Chicken
- Duck
- Rabbit

Fish

- Rohu
- Catla
- mrigal

Benefits of IFS

- Recycling of resources
- Improves the soil fertility & health
- Reduction in production costs
- Decreases farm input requirements
- Efficient utilization of family labour
- Reduction in animal feeding requirements
- Minimize the use of chemical fertilizers
- Provides balanced nutritious food for the farmers
- Solves the energy problems with biogas
- Enhance employment generation
- Pollution free environment
- Increasing economic yield per unit area
- Multiple income sources and family income support
- Improves the status & livelihood of the farmer



IFS in Upland Ecosystem

Crop component



**Intercropping: Sunflower + Cowpea,
Maize + Green gram**



Fodder crops



Livestock component



cow



Goat Farming



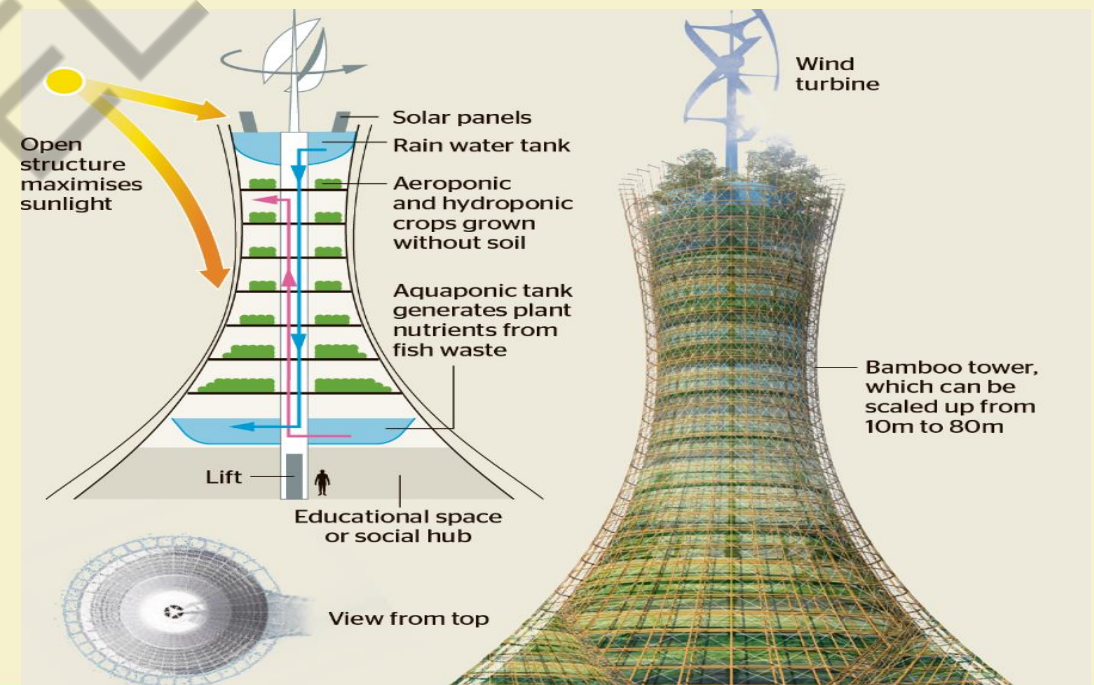
Poultry

Urban Agriculture

Hydroponics



Vertical farming



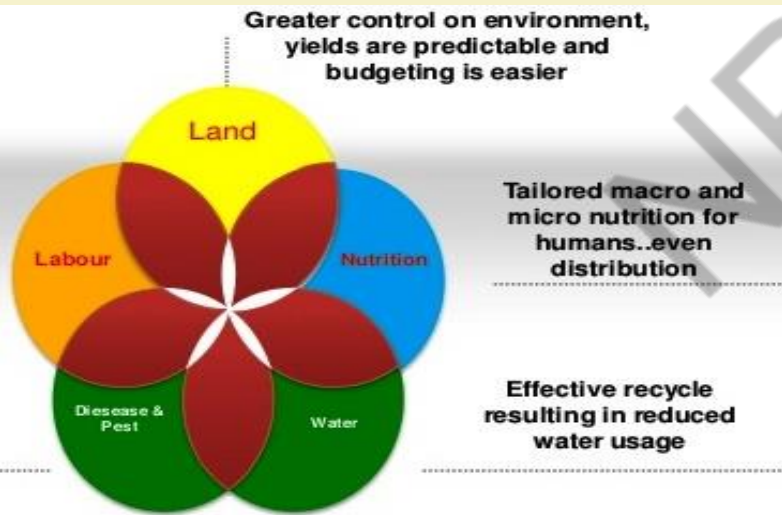
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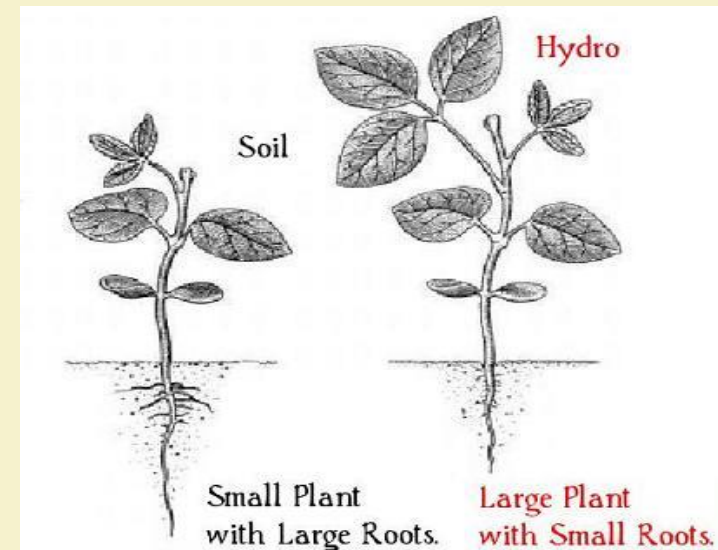
Hydroponics

- Hydroponics is a method of growing plants without using soil (soil less culture)
- This technique uses a mineral nutrient solution in a water solvent, allowing the nutrient uptake process to be more efficient than when using soil.
- Hydroponic growing allows a clean and controlled environment.



Why Hydroponics?

- Does not require soil, can be done in homes
- Crops grow at a fast pace than in soil
- Require very less amount of water
- Zero use of pesticides
- No problem of weeds
- Can be adopted easily in the concept of **vertical farming**



Nutrient Solutions in Hydroponics Organic system

Nutrients	Vermicompost	Vermi wash
pH	6.9	6.9
Organic carbon (%)	14.1	-
N (%)	1.6	0.05
P (%)	0.98	0.003
K (%)	1.1	0.06
Fe (ppm)	11200	0.20
Cu (ppm)	38.0	0.12
Zn (ppm)	180	0.13
Mn (ppm)	1290	213

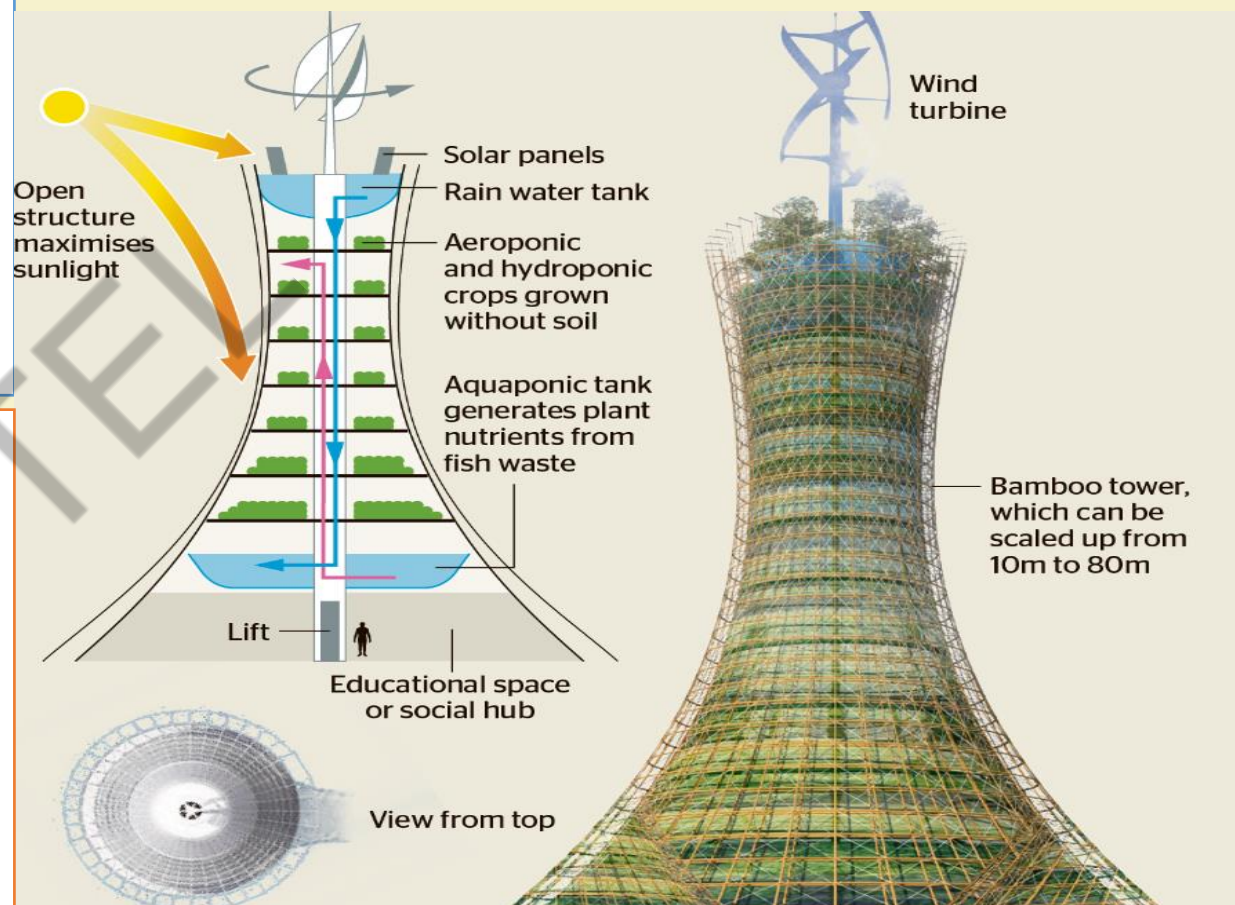


Why Vertical Farming?

In 2050 about 80% of world population will be around Urban Centers + 3 Billion more People.

About 70% of all fresh water is used in irrigation for traditional agriculture. However water is going to be limited for future agricultural production , so also the land area for farming.

- Multi-storeyed buildings growing different crops at each floor.
- Integrated assembly line including: seed sorting facilities and distribution.
- Continuous planting system including monitoring growth and harvesting.
- Creating a 'miniature eco-system' that acts to enable the urban population to manufacture and produce food locally.



Systems Used in Vertical Farming

- Hydroponics-Cultivation of plant through continuous flow of oxygenated, nutrient rich water.
- Float Stem- aquaponics - combine hydroponics and aquaculture.
- Aeroponics- exposes roots, nutrient rich mist pumped into air chamber

