

Chapter No. 2 INTEGRATED FARMING SYSTEM (IFS): DEFINITION, OBJECTIVES AND PRINCIPLES

Integrated Farming System (IFS):- A sub system of a high level land use system like a village or a watershed which includes crop production, raising livestock, fishery, poultry, beekeeping etc. on a particular farm with a objective of higher profitability without altering ecological and socio-economic balance on one hand and to meet the national goals on the other hand.

OR

Integrated Farming System (IFS) also defined as biologically integrated farming system which integrates natural resources and regulation mechanisms into farming activities to achieve maximum replacement of off-farm inputs, secures sustainable production of high quality food and other products through ecologically preferred technologies, sustain farm income, eliminates or reduces sources of present environment pollutions generated by agriculture and sustains the multiple function of agriculture.

OR

Integrated Farming System (IFS) is a combination of many systems, it attempts to increase farmers income using natural resources on sustainability basis which can be obtained by integrating crop husbandary with allied enterprises is called as IFS.

Objectives of IFS:-

- Efficient recycling of farm and animal wastes
- Minimizing the nutrient losses
- Maximizing nutrient use efficiency
- Adoption of efficient cropping systems and crop rotations
- Complementary combination of farm enterprises.
 - ❖ **Definition – Enterprise in farm business** is defined as the production of single crop or a kind of stock.
 - ✓ Generally farmers take more than one enterprise on their farms.
 - ✓ The main objectives of the farming is to get maximum profit with minimum expenditure by combining enterprises.
 - ✓ The combination of enterprises on a farm is influenced by the relationship that exists between the enterprises.
- **Types Enterprise relationships:-**

1) Independent enterprises:- These enterprises do not have direct bearing on each other. There is no effect on the other enterprise when level of one enterprise is increased or decreased.

2) Complementary enterprises:- Are those enterprises which help each other in production and do not compete for resources.

3) Competitive enterprises:- Are those enterprises which compete each other for the resources.

✓ Farmers have limited resources and therefore all crop and livestock enterprises become competitive at some point.

4) Supplementary enterprises:- Are those which do not compete for resources but to increase income of the farmers.

✓ A small poultry enterprise is supplementary to other enterprise of the farm.

▪ **Advantages of Integrated Farming System (IFS):-**

1. Productivity
2. Profitability
3. Sustainability
4. Balanced food
5. Environmental safety
6. Recycling of waste
7. Saving energy
8. Adoption of New Technology
9. Money Round the year
10. Availability of fodder, fuel and timber
11. Employment round the year
12. Agro-industries
13. Increases input efficiency
14. Standard of living
15. Avoid degradation of forest etc.

1. Productivity:- Integration of crop and allied enterprises helps to increase economic yield per unit area per unit time. Intensification of cropping and allied enterprises in space and time dimension found to increase the productivity.

2. Profitability:- Produce/waste material of one enterprise can be used for other enterprise at least for crop, thus reducing the cost of production and increasing profitability per rupee investment.

3. Sustainability:- Huge quantity of inorganic fertilizers, pesticides, herbicides are required to meet the food requirement of increasing population @ 2.2 % every year. Abundant use of such material causes soil degradation and pollution. The productivity of soil gets drastically reduced in due course of time. IFS provides an opportunity to sustain production through organic supplementation and effective utilization of byproduct of linked components.

4. Balanced food:- IFS link varied nature of enterprises to provide nutritious food viz., vitamins, proteins, carbohydrates, fat, minerals etc. from the same area. This solves the malnutrition problem of poor peoples.

5. Environmental Safety:- Abundant use of inorganic fertilizers, pesticides, herbicides make the soil, water and environment polluted. Similarly, residues of some crops, waste material also pollute the environment after decomposition. However in IFS waste material, byproducts of one composite are effectively recycled using for other component and by-product of that component as organic manure to enrich the soil. Use of bioagent or crop protection also minimizes the pesticides.

6. Recycling of waste:- By-product of the crop husbandary can be effectively recycled for preparation of compost. Some of the by-product can be used as feed. This reduces the cost of production of one enterprise at the cost of other. Thus net income of farm is increased.

7. Saving energy:- Energy crises can be served to same extent by utilizing organic waste to generate biogas which can be used for cooking, lighting etc.

8. Adoption of new technology:- Big farmers are fully aware with the new technologies because of using improved varieties, package of practices. But small and marginal farmers are not able to adopt for want of money. In IFS linking of cropping with dairy, mushroom, sericulture, floriculture there is a flow of money throughout the year.

9. Money round the year:- In conventional farming income is expected once at the end of cropping season. However, IFS provides flow of money round the year by way of disposing eggs, milk, edible mushroom, honey, cocoons of silkworm etc.

10. Availability of fodder, fuel and timber:- IFS utilizes every part of land. Growing of fodder trees on border will not only provide fodder but also enrich the soil by fixing atmospheric nitrogen. In multicropped cropping includes of fodder component like cowpea as second or third tier also meet the fodder crises. The current production of fuel wood is about 20 million ton which needs to be increased to eighteen folds.

11. Employment round the year:- Crop-livestock integration increase labour requirement through the year, other activities like mushroom cultivation, sericulture, apiculture also needs labor. Hence IFS provides employment to family members as well as outside labour throughout the year.

12. Agro-industries:- Linking of various components in IFS, the production definitely increased to commercial level. Surplus production leads to development of agro based side industry.

13. Increase input efficiency:- IFS provides better scope to use available inputs more efficiently. This leads to increase benefit: cost ratio.

14. Standard of living:- IFS leads to produce milk, eggs, fruits, honey, edible mushroom and generate bioenergy for farmers family and commercial purpose. There is regular flow of money at frequent interval through out the year.

15. Avoid degradation of forest:- There is a vast gap between demand and production of fuel wood and timber. Users encroaches/destroy the forest area to bridge the gap. Forest lands get degraded and eroded due to denudation of forest. IFS linked with Afforestation and provide safety against degradation of lands, besides supplementation of fuel, timber and fodder.

➤ **Types of Allied Enterprises:-**

1. Dairy Farming
2. Sheep and Goat farming
3. Poultry farming
4. Duck farming
5. Turkey rearing

6. Piggery
7. Rabbit farming
8. Bee keeping
9. Pigeon rearing
10. Aquaculture
11. Sericulture
12. Mushroom cultivation

- **Bio-gas plant:-** Is a complex biogas process. The cellulose materials are broken down to methane and carbon-di-oxide by different groups of micro-organisms.

✓ **Types of Bio-gas plant:-**

1. Float dome type:- KVIC Vertical and Horizontal Pragati, Ganesh Model

2. Fixed dome type:- Janata, Deen Bandhu Model

▪ **Selection of site:-**

- i. The site should be close to kitchen or the place of use to reduce the cost of gas distribution system.
- ii. Similarly, it should be nearer to the cattle shed to reduce the cost of transportation of dung.
- iii. Land should be levelled and slightly above the ground level to avoid in flow or runoff of water.
- iv. There should be clear sunshine on the plant during most part of the day.
- v. Gas production is higher in summer followed by rainy season and winter.
- vi. Gas production is maximum at 30-35°C however decreased below 10°C.

▪ **Size of Bio-gas Plant:-**

- i. The size of the bio-gas is decided by the no. of family members and availability of cattle.
- ii. 1m³ capacity plant requires 2-3 animals and 25 kg of dung.
- iii. This is sufficient for 4-6 family members.
- iv. It is better to have a plant of 2 m³ to fulfill the requirement of 6-10 members.

- **Bio-Gas Slurry:-** Slurry is obtained after the production of bio-gas. It is enriched manure.

➤ **Enterprise Integration:-**

- Livestock is the best complementary enterprise with cropping.
- Installation of a bio-gas plant in crop-livestock system will make use of the wastes besides providing manure and gas for cooking and lighting.
- In wetland there is a better scope for fishery, duck and buffalo rearing. Utilizing rice straw, mushroom production can be started.
- Under irrigated condition sericulture, poultry, piggery with arable crop is better.
- In rainfed farming, sheep and goat, sericulture, agroforestry etc.
- In the integrated system, enterprises with complementary relationship should be selected to avoid competition.

➤ **Interrelationship among different enterprises:-**

- a. Crop-Livestock interaction:-** Crop-livestock interaction takes place in two main systems. First interaction is without full integration defined as segregated system. Farmers own animals and herders might grow crops.
- b. Aquaculture-Crop integration/interaction:-** A large quantity of silt and manure is added to the fish pond every year on an average 25 kg pond silt produce 1kg of green fodder. Rice is found to be increased by 10% due to synergistic effect of fish on rice. Weeds and insects also controlled by fish.
- c. Aquaculture-Bio-gas-Livestock Integration/Interaction:-** Cattles in aquaculture utilizes the fodder produced through application of silt to the crop. Fish in pond feed on the zoo-planktons and phytoplankton, bacteria etc. Ducks acts as a Bio-aerators as they aerate the pond through their legs. Bio-gas plant generate the gas used for cooking and lighting.

