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IFS (Integrated Farming System): Utilization of by-Products and Wastes to Attain Self-Sustainability

R. A. Aruna

Agriculture College and Research Institute,
Vazhavachanur, Tiruvannamalai
raaruna2000@gmail.com

Abstract

Industrialization of agriculture during the Green Revolution increased the production but it has created problems like pollution and climate change. So, for the future we need a resilient and sustainable food system. We can achieve that by working along with nature and not against it. There will not be any waste in any natural ecosystem. Waste is a concept that belongs only to artificial ecosystems. In IFS, the waste of one enterprise becomes the input of another enterprise, making it a self-sustainable farming system.

Keywords: agriculture, waste, self-sustainability



1. Introduction

Population is ever increasing, but land is limited. So, there is no scope for horizontal expansion of land for agriculture. Moreover, Industrialization of agriculture has created problems like pollution and climate change. Self-sufficiency and sustainability are now gaining importance more than ever. Self-sustained development is the goal of many countries. Utilizing wastes is an important strategy to attain that. So, there is a need for a farming system that is self-sustainable. Integrated Farming System can be the solution.

2. Need for IFS

Many farmers plant only one crop in the same place year after year. Planting the same crop in the same place each year sucks nutrients from the earth and leaves soil weak and unable to support healthy plant growth, which in turn forces farmers to use chemical fertilizers to encourage plant growth and yield. These fertilizers, in turn, disrupt the natural makeup of the soil and contribute further to pollution. Monocropping also creates the spread of pests and diseases, which must be treated with yet more chemicals. The effects of monocropping on the environment are severe when pesticides and fertilizers make their way into ground water or become airborne.

3. Utilizing wastes

In IFS, the waste of one enterprise becomes the input of another for making better use of resources. Waste material/by products of crops and animals are recycled and used as inputs for other components of integrated farming system. So, this will help overcome the problems of small resource poor farmers, development of a more holistic, and interacting approach.

3.1. Crop component

Crops that suit the given agro-climatic conditions and the socioeconomic status of the farmer can be grown and the by-products can be used as inputs in other enterprises, sometimes in the same enterprise too.

3.1.1. Multi-layer farming

Multi-layer farming can be a way of recycling the wastes within the crop component itself. Multi-layer farming is also called multi-storied cropping and multi-tire farming. Growing plants of different height in the same field at the same time is termed as Multi-layer cropping. It is one type of intercropping. It is generally practiced in orchards and plantation crops for maximum use of solar energy even under high planting density.

This Multi-layer cropping technique allows the farmers to get a good result of harvest and more earning on the same piece of land by making optimum available sources. Multi-tier cropping has been mentioned in Kutrala Kuravanji, a form of Tamil poetry written with Kutralanathar as the Hero. Kutralanathar is Lord Shiva present in the temple at Kutralam.

Module 1

We visited Purvabhumi, the ‘adisil vanam’ (edible food forest), which spread across 107 acres at Mudukulam village of Gandarvakottai taluk in Pudukottai district of Tamil Nadu, during our Study tour.

“I foresaw a problem for Agri business in the weather pattern, which paved the way to work with nature. After consulting experts, I tried different schools of scientific methods. The results were good but failed on economics. I realised that the only way out was ecological farming,” recalls Mr. Senthilnathan, an entrepreneur, who now manages the farm.

By stopping the use of fertilisers and bringing down the labour cost by focusing on essentials, the cost of production came down. Every rupee that was spent afterwards was only towards planting seedlings, which is an investment rather than expenditure.

Simulating the features of a natural eco-system is the key. The farm has a variety of timber, fruits, vegetables, spices, sugarcane, coffee and cocoa.

A zero-cost principle adopted in the farm meant that coconuts would be collected after they fall from the tree and not plucked. A solar dryer is used to convert coconut into copra and oil is extracted. “Everything, except the oil, goes back to the soil. Ultimately, I want only profit, not revenue,” says Mr. Senthilnathan. It adopts multi-tier cropping to enhance the soil quality and profit. “We do not allow sunlight to fall on the ground. The trees and plants harvest sunlight, converting energy into money,” says Ammapettai Venkatachalam, an expert in organic farming.

More details about the food forest can be had from Purvabhumi, Mudukulam, Gandarvakottai Taluk, Pudukottai District 622203. Phone: 94425 70075 (P. Sunderraj, Farm Manager).

Credits: The Hindu

3.1.2. Utilizing crop wastes

A crop by-product is derived along with the production or harvesting of a main crop.

Crop by-products can be used as feed, as litter, as a base for mushroom cultivation, as manure (incorporate /compost /pelleting), mulching, etc. While using it as a manure, Incorporation of crop waste as mulch is one way. Second way is going for composting. Compost can be done near the farm and can be used as manure. Large farmers can go for pelleting of organic wastes.

3.2. Animal component

India has a huge population of cattle. As a tradition every household possesses 1–2 cows/buffaloes or 3–4 goats. We get Milk, Curd, Ghee, Panchagavya Mix, Distilled Cow urine and cow dung. Dung of these animals are generally used as fuel by making dung cakes.

If these materials are recycled within the farm a sizable amount of money spent on chemical fertilizers can be saved.

When this cow dung is used to make bio gas it can be used as a fuel. Also, we will get bio digested slurry as a by-product in this process, which is an excellent organic manure and soil conditioner.

3.3. Integrated fish cum poultry farming

Apart from eggs and chicken, poultry also yields manure, which is a high fertilizer value manure in aquaculture. The poultry droppings from the poultry farms can be collected, stored in suitable places and is applied in the ponds at regular instalments. The other way is constructing the poultry housing structure partially covering the fish tank and directly recycling the dropping for fish culture, which will create a synergistic effect.

3.4. Fish-pig farming

Housing units of pigs can be constructed on the pond embankment in such a way that the wastes are directly drained into the pond. Pig dung acts as excellent pond fertilizer and raises the biological productivity of the pond and consequently increases fish production. Pond water is used for cleaning the pigsties and for bathing the pigs.

3.5. Sericulture

Pond mud or humus is the main nutrient source for mulberry cultivation. After fish harvest in winter each year, the pond mud is removed to form the “base soil” (base manure) of mulberry plants.

Silkworm excreta is used as feed for fish. Pond mud or humus is the main nutrient source for mulberry cultivation. After fish harvest in winter each year, the pond mud is removed to form the “base soil” (base manure) of mulberry plants.

4. Result

By mimicking the natural ecosystem, we can create a sustainable farming system in which each and every component will interact with one another in a synergistic way and wastes are being fed back as input. By doing so, we can get increased profit apart from nourishing the nature. As, $\text{profit} = \text{revenue} - \text{cost}$, reducing the costs by using wastes and by-products as inputs, will increase the profit.

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