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Integrated Farming System: An ideal approach for improving Farmer's income

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ABSTRACT

A review study was carried out during 2021-22 and 2022-23 to find out the best approach for sustainable agriculture and improving farmer's income with the conservation of natural resources. Integrated farming system fulfils the multiple objectives of making farmers self-sufficient by ensuring the family members a balance diet, improving the standard of living through maximizing the total net returns and provides more employment, minimizing the risk and uncertainties and keeping harmony with environment. India has the rich diversity of livestock, poultry, crops and horticulture. Utilization of our national resources efficiently is very much important for sustainable development. Thus, this system of farming is very promising for improving overall farm productivity, profitability, generating employment opportunities, conserving natural resources and maintain the sustainability of agroecosystem by effective recycling the farm by-products and efficient utilization of available resources. Integrating Farming System is the unique approach for overall upliftment of rural community and conserving the natural resources and crop diversity. The focus of present government is on improving farmers' income.

KEYWORDS

Integrated Farming System, Sustainable Agriculture, Farming

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Integrated farming system is a combined approach for judicial utilization of farm enterprises such as crop, livestock, aquaculture, poultry, sericulture and agro-forestry to achieve economic and sustained agricultural production without any degradation of natural resources. The principle of IFS model is developed such as wastes generated from one component becomes an input for other system and hence there is efficient recycling of farm and animal wastes in the integrated system (Jayanthi, *et al*., 2002). There is increase in yield per unit area through intensification and diversification of crops. Apart from this IFS helps in controlling insect pests and diseases and weeds through natural cropping system management and there is less use of harmful agro-chemicals for farm production with improving farmer's income. In India, the farmers maintain different enterprises for their complimentary and supplementary nature and for ensuring sustainable livelihood from time immemorial. After the advent of green revolution in late-1960s and economic liberalization in early-1990s, the farmers gradually started focusing on a few enterprises due to several imposing factors including shrinking farm sizes, fluctuating commodity prices, livelihood diversification and shortage of labour during peak agriculture season. It had a severe impact on food and nutritional security of millions of poor farm households.

The anguish of farmers is often expressed in terms of their agitation in one or the other part of the country, unwillingness to continue farming and increasing demands of compensating their economic loss (Ponnusamy and Devi, 2017). Although suggestions are pouring in from experts and leaders of organization for strengthening the income base of farmers, the government cannot implement them entirely due to compulsions from socio-economic and political considerations. However, the Government of India has made various agricultural policies for improving the Farmers' Income.

Principles of Integrated Farming System

The fundamental principle is to boost ecological biodiversity by the following:

- By using the proper cropping techniques, such as intercropping, crop rotation, crop combination, and mixed cropping, there will be less rivalry for scarce natural resources, such as water, food, and space. Additionally, by implementing eco-friendly procedures.
- Using a multi-story layout to make the most of the space that is available and to maximize the interplay between biotic and abiotic elements.
- By incorporating subsystems that allow the various elements to interact favorably, increasing total agricultural production.
- The integrated farming system, which emphasizes intensifying agricultural productivity through resource integration, market linkages, and increased diversification, is also a sustainable agriculture system.

What is an Ideal Integrated Farming System?

An ideal Integrated Farming System should have a low risk for farmers, modest investment requirements, quick returns and be straight forward and repeatable. Five fundamental requirements must be met for an IFS to be considered ideal:

- Economic Viability
- Nutritional Security
- Environmental Sustainability
- Energy Self-sufficiency
- Climatic Adaptation

It ought to produce enough revenue and job opportunities to sustain the farmer's and his family's way of life. Additionally, it should be able to offer a nutritious balanced diet to the entire family using various agricultural products. Furthermore, it should be sustainable, generating less waste through efficient by-product utilization and trash recycling inside the IFS. This would lessen emissions of greenhouse gases (GHG) and groundwater contamination (eg: due to nitrogen leaching from fertilizer application).

Various Types IFS Model in India

IFS Model 1: Agriculture crops + Horticulture crops + Live Stock + Fishery
IFS Model 2: Agriculture crops + Horticulture crops + Live Stock +Poultry + Fishery
IFS Model 3: Agriculture crops + Horticulture crops + Live Stock +Poultry + Fishery + Bee Keeping
IFS Model 4: Agriculture Crops + Vegetables and Spices Crop + Plantation Crops + Fishery + Vermicomposting + Piggery
IFS Model 5: Agriculture + Horticulture+ Silviculture + Pasture
IFS Model 6: Horticulture + Piggery + Fisheries + Plantation Crops
IFS Model 7: Horticulture + Duckery + Fishery + Plantation crops + Vermicomposting + Apiary
IFS Model 8: Agriculture + Horticulture + Poultry + Fishery Fruits crop + Vegetables and Spices Crop + IFS Field crops + Plantation Crops Fishery + Vermicomposting+ Piggery
IFS Model 9: Agriculture + Horticulture + Poultry + Fishery + Azolla + Mushroom
IFS Model 10: Agriculture + Horticulture + Poultry + Fishery + Azolla + Mushroom + Duckry
IFS Model 11: Agriculture + Horticulture + Poultry + Fishery + Mushroom + Duckry + Azolla + Vermicomposting

In an Integrated farming system model, the field crops are grown for food production. Horticultural and vegetable crops can also provide 2-3 times more energy production than cereal crops and hence ensure nutritional security and income sustainability in the same piece of land. The crop residues after harvesting can be used for animal feed for dairy and goat production.

The animal excreta from the animals can also be utilized as organic fertilizer or vermicomposting which in turn improves the soil fertility and thereby, reduces the use of chemical fertilizers. Again, the animal excreta can be dried, composted or liquid composted for the production of biogas and energy for household use (Pushpa, 1996). The rice based integrated farming comprising of rice and fish in the low land area not only improves the fish production but also increases rice yield as fish improve soil fertility by increasing the availability of nitrogen and phosphorous. When the poultry of duck are raised over the ponds, the dropping are utilized by the fishes as nutrients and hence increases their production. Therefore, crop-fish-poultry farming gave the highest net income with an improvement in soil health than single crop farming. By adoption and integration of various components like vegetables and fruit crops, reduce cost of cultivation and provide nutrients to the household. The IFS comprising of crop, dairy, fishery, horticulture and apiary and mushroom culture also provides employment generation and improving farmer's income throughout the year with sustainable agriculture.

Advantages of Integrated Farming System
Increase in Food Supply

On the same plot of land, vegetable or horticulture crops can produce two to three times as many calories as grain crops. Additionally, if beekeeping, mushroom cultivation, silviculture and aquaculture are combined in a multi-tiered system, they can provide more food without reducing the yield of crops that are grown for food grains.

Recycling of Crop Residue

For instance, India produces more than 200 metric tonnes of residue annually. The number of mushrooms produced would increase many times over if just 1% of this was dedicated to mushroom farming. Crop debris can also be used to make good vermin compost, which will help to replenish the soil's fertility. The cost of production is decreased.

Use of Marginal and Waste Land

Wastelands and marginal areas can be productively exploited for crop production, beekeeping, dairying, poultry, fisheries and mushroom growing.

Increased Employment

According to studies on integrated farming systems in India, adopting crop + fish + livestock on arable land can result in three times as many gainful jobs than crop alone. If additional farming ventures like silviculture, beekeeping, and mushroom cultivation are implemented, they can raise the standard of living for farm families by increasing their revenue and offering gainful employment.

Restoration of Soil Fertility and Conservation of the Environment

Soil fertility can be maintained through effective recycling of agricultural waste and crop residue in crop – livestock – poultry - fishery systems. Additionally, it will lessen the need for chemical fertilizers and allow for the maintenance of a cleaner environment.

Enhances Self-Reliance

It can increase farmers' independence and self-sufficiency. The various systems involved generate a significant amount of knowledge and advances.

Participation in Development Process

Poor and landless farmers might receive assistance to make money and take part in the process of development.

Decreased Need for External Inputs

There are fewer external inputs required in the system. Furthermore, it allows for more effective distribution and labour use. Costs are typically decreased, and labour productivity is raised.

Integrated Farming System – Challenges

Although an integrated farming system can increase farmers' income and nutritional security, there are still challenges that must be overcome, including the following:

Non-Affordability

Financial restrictions prevent small and marginal farmers from affording huge cattle, thus we must promote small ruminants like goats and sheep.

Lack of Acceptance

Farmers in non-coastal areas are hesitant to accept fisheries, poultry, and duck rearing due to a lack of role models and religious perceptions.

Not under MSP

The Minimum Support Price (MSP) mechanism does not apply to the mushroom and beekeeping industries. Therefore, there is a need for improved interaction with the hospitality and food manufacturing sectors.

Conclusion

An integrated farming system fulfils the multiple objectives of making farmers self-sufficient by ensuring the family members a balance diet, improving the standard of living through maximizing the total net returns and provide more employment, minimizing the risk and uncertainties and keeping harmony with environment. India has the rich diversity of livestock, poultry, crops and horticulture. Utilization of our national resources efficiently is very much important for sustainable development. Thus, this system of farming is very promising for improving overall farm productivity, profitability, generating employment opportunities, conserving natural resources and maintain the sustainability of agroecosystem by effective recycling the farm by-products and efficient utilization of available resources. Integrating Farming System is the unique approach for overall upliftment of rural community and conserving the natural resources and crop diversity. The focus of present government is on improving farmers' income. The partial budgeting, economic estimation of manure and urine from animal components and factors associated with total income from different enterprise combinations have shown the directions for policy makers, extension functionaries and progressive farmers to prepare strategies for improving farmer's income.

Only livestock component would provide the facilitating inputs to enhance the income of farm families within a short period of five years in a synergistic mode (Meshram, *et al*., 2003 and Rautaray, *et al*., 2005). Therefore, we can say, the adoption of IFS is the right approach in this direction and should be supported through institutional, extension, policy and marketing interventions in a system approach. System mode of production incorporating crop, livestock, fish, horticulture and agro-forestry is a potential option for improving the farmer's income with sustainable agriculture.

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