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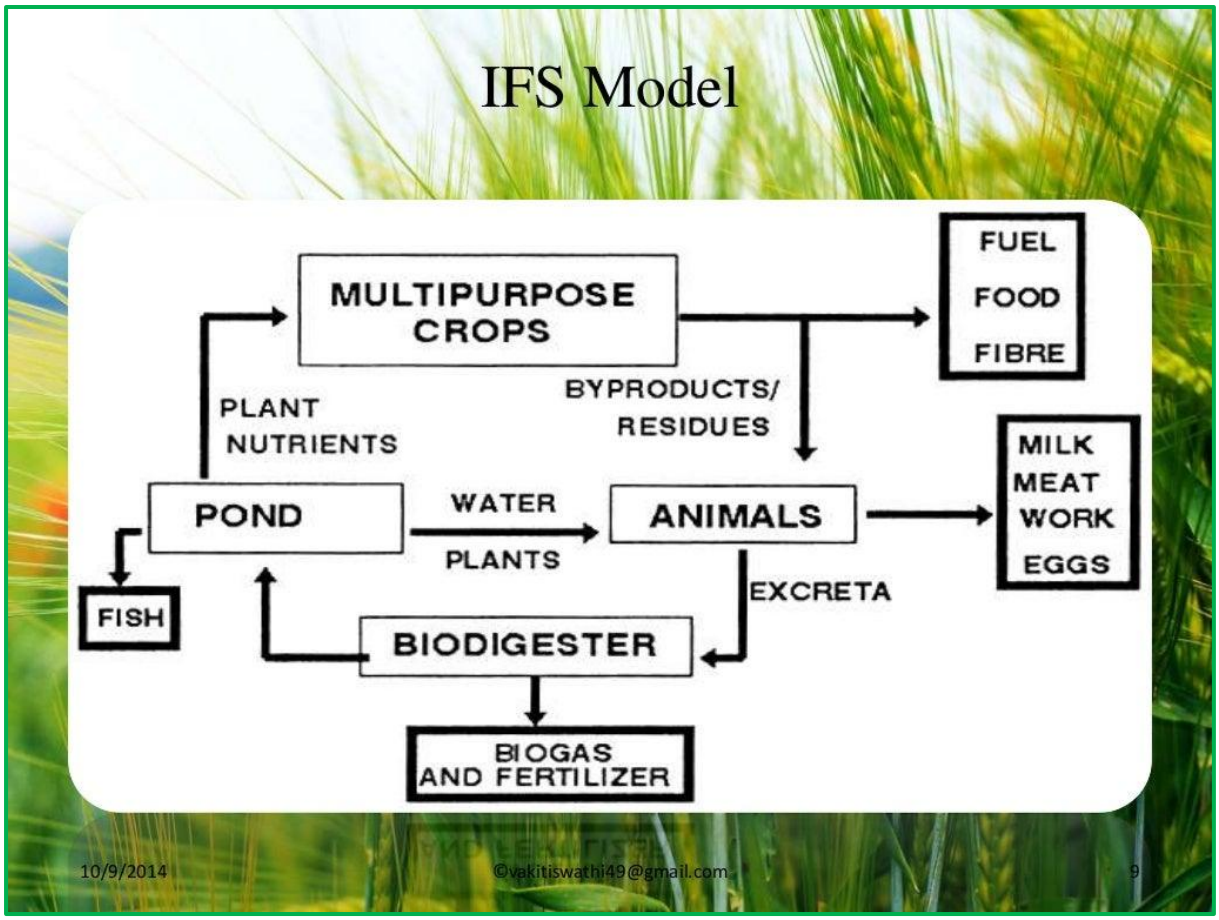
Integrated Farming System-A Way Look Forward

(*Naveen Meena, Jayasree Midde, Udiyata Kumari and Uttam Kumar)
Department of Soil Science and Agricultural Chemistry, Sam Higginbottom University of Technology and Sciences, Allahabad, U.P.
*Corresponding Author's email: naveenmeena1999828@gmail.com

The Economic Survey of India reports that between 1990 and 2007, the growth rate of food grain output slowed to 1.2 percent, which is less than the 1.9 percent population growth. Our country's population is anticipated to reach 1370 million by 2030 and 1600 million by 2050. We must produce 289 and 349 mt of food grains throughout the corresponding periods in order to meet the demand for the future. According to the country's current situation, land under cultivation may continue to decline, and by 2030, more than 20% of the country's existing cultivable area would be used for non-agricultural purposes (Gill et al., 2005). The task is made more difficult in India by the declining average farm size and the financial restrictions on further investment in agriculture because 80 percent of farm families fall into the small and marginal farmer groups. Productivity improvement may be a crucial option for ensuring nutrition and food security for a large population. This entails implementing cutting-edge agronomic methods and technologies that will increase the productivity of traditional agricultural systems. During the 20th century, agronomic practises like the permissive use of inorganic fertilisers and pesticides significantly increased productivity, but unfavourable environmental degradation and rising operating costs in agriculture raised questions about the viability and sustainability of these practises (IAASTD, 2009 and FAO, 2010).

Farmers currently focus primarily on crop production, which comes with a significant level of uncertainty regarding their income and employment. The Indian government has pledged to double farmers' income by 2022. The Honourable Prime Minister of India, who is challenging the status of all engaged parties, set a goal of doubling farmers' real income by 2022. Increasing output and productivity in agriculture alone won't guarantee that farmers' incomes will double (Srinivasan, 2017). Members of NITI Aayog, ICAR, and scientists collaborated to convene a meeting to discuss the idea of doubling farmers' income in an effort to overcome challenges and define a strategy for rural poverty in India. To devise a plan for addressing the PM's issue, representatives from the Department of Agriculture, the GOI, national research institutions, central/state agricultural colleges, the private sector, international research centres, and NGOs met (Wani and Singh 2017) . However, specialists are working to find the best solutions and approaches for accomplishing this admirable goal. One alternative is to assess if the traditional integrated farming system (IFS) can increase farm households' incomes within a reasonable time frame. The Integrated Farming System (IFS) mixes animal and crop agricultural systems, where the animals consume agricultural byproducts and their bodies are used to cultivate the soil and produce manure that is used as fertiliser and fuel (Jayanthi et al., 2000). A group of connected agro-economic activities that interact in a specific agricultural context is known as an integrated farming system (IFS). The primary goals are to reduce risks and boost profitability. Reusing resources allows for the self-supply of 90–95% of nutritional needs, which lowers cultivation costs while boosting

employment and profit margins. Integrated farming systems (IFS) is an environmentally beneficial method that makes better use of farm resources by turning waste from one sector into input for another. IFS is a mixed farming system made up of at least two distinct but logically connected elements of a crop and livestock enterprise (Okigbo, 1995 and Gupta et al., 2020). Agro-economic activities that are interconnected and take place in a specific agrarian context are called farming systems. Although there is coexistence between the crop and other businesses, the fundamental goal of diversified farming is to reduce risks. Through the efficient use (recycling) of wastes and crop residues, integrated farming systems ensure a sensible combination of one or more ingredients and cropping, producing a complimentary effect. IFS is seen as a means of supplemental income for the farming community (Agbonlabor *et al.*, 2003).



Importance of Integrated Farming System

The goal of integrated farming is to reduce waste produced by the many agricultural subsystems. To increase productivity and reduce the cost of producing the various subsystems' outputs, wastes or byproducts from each subsystem are used as inputs in other subsystems. (Edwards et al. 1988, Gill *et al.* 2009). IFS appears to be a viable option given India's evolving agrarian situation. The need for a comprehensive approach to agricultural use is driven by the country's changing climatic conditions, a lack of agricultural inputs, and land fragmentation. Through crop intensification, crop diversification, and the integration of related businesses, integrated agricultural systems offer the chance to raise the economic yield per unit area per unit time. Recycling waste materials as inputs or resources in agricultural production, diversification with different crops and businesses bringing in stability, meeting the diversified needs of the farm family offer of an insurance against crop/market risk, and overall soil sustainability have proven advantages over the

monocropped situation (Manjunath and Singh 2012). IFS is an effort to balance, in the words of "FARRE," food production, profitability, safety, animal welfare, social responsibility, and environmental care in order to harmonise agricultural practises with the ideals of sustainable development (Singh and Rai 2006). Overall, an integrated farming system achieves the multiple goals of making farmers self-sufficient by guaranteeing the family members a balanced diet, raising the standard of living by maximising total net returns and creating more employment, reducing risk and uncertainties, and maintaining environmental harmony (Mali et al. 2014).

Benefits or Advantages of Integrated Farming System

1. **Productivity:** IFS provides an opportunity to increase economic yield per unit area per unit time by virtue of intensification of crop and allied enterprises.
2. **Profitability:** Use waste material of one component at the least cost. Thus reduction of cost of production and form the linkage of utilization of waste material, elimination of middleman interference in most input used. Working out net profit B/ C ratio is increased.
3. **Potentiality or Sustainability:** Organic supplementation through effective utilization of by-products of linked component is done thus providing an opportunity to sustain the potentiality of production base for much longer periods.
4. **Balanced Food:** We link components of varied nature enabling to produce different sources of nutrition.
5. **Environmental Safety:** In IFS waste materials are effectively recycled by linking appropriate components, thus minimize environment pollution.
6. **Recycling:** Effective recycling of waste material in IFS.
7. **Income Rounds the year:** Provides flow of money to the farmer round the year through integration of Crop, poultry, dairy and fishery etc.

Goals of IFS

The goals of integrated farming systems (IFS) are to:

- To ensure a consistent and predictable income and to restore or improve the productivity of the system
- To manage natural agricultural systems naturally, use fewer chemicals, and reduce the buildup of pests and illnesses in order to attain agro-ecological balance (in-organic fertilisers and pesticides).
- To provide environmentally sustainable and economically viable technology that encompasses rational utilization of available resources of the region.
- To conserve natural resource base, protect the environment and enhance prosperity for a longer period of time.

Advantages of IFS

- It improves space utilization and increase productivity per unit area.
- It provides diversified products.
- Improves soil fertility and soil physical structure from appropriate crop rotation and using cover crop and organic compost.
- Reduce weeds, insect pests and diseases from appropriate crop rotation.
- Utilization of crop residues and livestock wastes.
- Less reliance to outside inputs – fertilizers, agrochemicals, feeds, energy etc
- Increase profits by reducing production costs. Poor farmers can use fertilizer from livestock operations, especially when rising petroleum prices make chemical fertilizers unaffordable.

- Higher net returns to land and labour resources of the farming family. It provides diversified income sources, guaranteeing a buffer against trade, price and climate fluctuations (Kumar *et al*. 2015).

Case Study

2019 saw the completion of a study by Shukla and Tripathi that examined the economic and employment outcomes of crop-based farming on farmer farms and at the KVK centre. Then, using a 2.5-acre plot at KVK Chitrakoot, they contrasted these findings with integrated farming based on fisheries. The average gross revenue from farmer's fields was Rs 82,228 with a B:C ratio of 2.60, while the crop-based gross income was Rs 107,264 with a B:C ratio of 2.16. Gross income from fishery-based farming was Rs. 458,659, with a B:C ratio of 2.95. Both at KVK and in the farmers' own fields, the fishery-based farming system was significantly more profitable than the crop-based farming system. The integrated farming system based on fisheries gives rural residents greater employment options. 512 people found work in the production of fish, mushrooms, fruits, and vegetables, as well as in the harvesting and marketing of other goods. Along with this form of fishery-based integrated farming, some 100 rural residents received seasonal employment. At KVK, crop-based farming generated 197 man-days of employment, and farmers' fields generated 172-195 man-days of employment annually. In terms of net income, crop-based farming at KVK Farm generated around Rs. 236,983 more, while farmer's fields generated about Rs. 242,843 more.

The effect of an integrated farming system on farm income was researched by Yadav et al. in 2019. In their research area, the majority of farmers only occasionally integrated their farming enterprises. Nevertheless, all combinations of integrated farming systems were more profitable than traditional farming methods. The continuation of the integration of crops, livestock, and fish enhanced the farmers' net income. Farmers that wish to increase their revenue and get out of poverty will focus on adding more businesses to their farms, such as crops, cattle, fisheries, apiculture, and even biogas.

Conclusion

All around the world, integrated farming systems (IFSs) are renowned for their profitability and sustainability. The broad use of IFSs by small and marginal farmers should be taken into consideration. They need to understand why operating single-product farms makes it difficult for them to meet their fundamental needs for food and other necessities. Farm income is gradually falling due to smaller land holdings and ongoing non-integrated agriculture. Integrating several aspects of agriculture, such as crops, dairy, fishery, poultry, mushrooms, horticulture, sericulture, etc. into a single farm unit is crucial for maintaining farm income. IFS is a comprehensive methodology that takes into account interactions between the various IFS components and the environment. IFS is also a special waste recycling system since nothing is lost and the waste or byproduct of one system is used as the input for other systems. Labor-intensive operations on an IFS farm, such as dairy, poultry, fruits, vegetables, sericulture, mushrooms, etc., can boost employment (man-days), particularly for family labour. Additionally, spending on outside inputs will go down. IFS is therefore both commercially and environmentally viable. However, there are a number of implementation-level issues this system is dealing with. The main ones are a high initial cost, a lack of marketing, financing availability issues, and a lack of storage and processing facilities. Infrastructure for markets is required. The nationalised banks must streamline their loan applications and connect with IFS farmers in an effort to assist them. It is necessary to give fertiliser, irrigation incentives, and IFS model demonstrations in order to improve IFSs. To enhance and sustain integrated farming systems, a variety of organisations could offer manufacturing, storage, distribution, and transportation activities.

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