



Importance of integrated farming system (IFS) for sustainable agricultural development

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Abstract

Agriculture is the backbone of the rural economy in India, moreover it is mainly labour oriented. In the rural economy, small and marginal land holdings together constituted around 86% of the total land holdings but possessed around 47% of the total operational land. (Agricultural Census-India). The farmers specifically small landholders are unable to get their bare minimum profits because they pay a good amount, for non-physical inputs like seeds, fertilizers, pesticides, labour, energy, etc. Furthermore, the vagaries of monsoon have a negative impact on crop cultivation. Hence, for the betterment of the economic condition of these farmers as well as to maintain the sustainability of agricultural development; IFS can be a better choice for the farmers. In an integrated farming system, farmers are not required to depend only on crop cultivation, it can be integrated with livestock, fish, poultry etc. Hence, an integrated farming system (IFS) in India, is a viable option. The main advantage of an integrated farming system is the same land can be used for crop cultivation as well as for fish, poultry, and livestock, and waste from one component can be used as input for other activities. These will help to reduce the cost of non-physical inputs; additional income is possible and employment can be generated throughout the year. This paper explained the importance and significant features of IFS and its impacts on farm income, soil, and the environment. A descriptive research methodology was applied to complete the research paper. A review of the literature helps to understand that IFS can lead to increase farm income, soil quality, and environmental sustainability.

Keywords: Integrated farming, Income generation, environmental sustainability

Introduction

Agriculture in India faces many challenges, collectively which are sustainability concerns. Sustainable agriculture effectively manages soil, the natural environment, the social and economic condition of the farmers, their employability, and high-quality agricultural production. Agriculture is the backbone of India's rural economy and is mainly labour oriented. In the rural economy, small and marginal land holdings together constituted around 86% of the total land holdings but possessed around 47% of the total operational land. In India, small and marginal land holdings together constituted around 86% of the total land holdings but possessed around 47% of the total operational land. (Government of India 2019) [6]. In many states in India, the number and area of operational land holdings are still declining. In Punjab, marginal land holdings are declining, whereas the small landholdings in Odisha, Goa, Himachal Pradesh, Jharkhand, Karnataka, Tamil Nadu, Up, and West Bengal have declined in 2015-16 than 2010-11. (Government of India-2019) [6]. The increasing population and its pressure on limited land create problems of continuous cultivation on the same land which reduces productivity. As there is limited scope for horizontal expansion of land for crop cultivation, hence, either vertical expansion or multi-component farming is a viable option to maintain the sustainability of agricultural activities.

According to WCED (World Commission and Development Report, "Sustainable agricultural development is a process of change in which the exploitation of resources, the management of the environment, the orientation of technological development and institutional change are all in harmony and enhancing both the current and future potentials to meet human needs and aspirations" (Sustainable Development Report). An integrated farming

system is a possible solution to support the increasing demand for food and stable income of farmers specifically small and marginal farmers. The Ministry of Agriculture and Farmers' Welfare GOI has emphasized an Integrated Farming System while planning for Rainfed area Development as well as doubling farmers' income by 2022.

Methodology

The descriptive method was applied to complete the research paper. Information was collected about integrated farming systems, from different research papers published in reputed journals. The data has been collected from govt. reports. First, the terms 'Integrated farming system' 'income' and 'sustainability' were searched in Google and Google Scholar, and selected articles were referred from there to meet the objectives of the research paper.

Literature Review

According to FAO (1977) [5], in IFS 'there is no waste' and 'waste is only a misplaced resource' which can become a 'valuable material of another product'. Jitsanguan (2001) [10] defined the IFS as an aquaculture system that is integrated with livestock and in which fresh animal waste is used to feed fish. Basically, the concept, of integration usually occurs when the outputs of one enterprise are used as inputs by another within the context of the farming system. Agbonlabor & Aromolaran (2003) [1] defined the IFS as a mixed farming system combining crop and livestock enterprises in a supplementary or complementary manner. Bahire *et al.* (2010) [2] defined the IFS as an integrated mixed farming system as the practice of raising different yet dependent enterprises and when different enterprises are dependent, they are primarily complementary and supplementary to each other. According to Gupta *et al*

(2012) [8], An integrated farming system consists of a range of resource-saving practices that aim to achieve acceptable profits and high and sustained production levels while minimizing the negative effects of intensive farming and preserving the environment. Radhamani *et al* (2003) defined IFS as a holistic farming approach that aims to minimize risks, increase production and profits while increasing the utilization of organic waste and crop residues. According to Thorat *et al* (2015) [15] IFS is defined as a biologically integrated farming system that integrates natural resources and regulatory mechanisms into agricultural activities to achieve increased productivity, to maintain sustainable production, maintain agricultural income, and reduce current sources of environmental pollution.

Integrated Farming System and its importance for sustainable development of Agriculture

The integrated farming system has its own benefits. It has a systematic and holistic approach to agriculture. If the farmers in our country understand the importance of this farming system, then the future of the agriculture sector will be more secure. IFS can create a more sustainable and resilient agricultural sector. The importance of IFS are as follows

1. Economic Viability

IFS can be economically viable for farmers as they can reduce production costs and increase profit by reducing the need for external inputs like fertilizer, pesticides, and insecticides. Farmers can save money on production costs. Moreover, IFS can increase the value of farm products by providing higher quality and more diverse offerings.

2. Social Benefits

This system can create a range of jobs from animal husbandry to crop cultivation, and recreation opportunities, which can generate income for farmers and their families. Hence, IFS can have positive social impacts by providing employment opportunities and supporting rural communities.

3. Environmental Sustainability

IFS minimizes the negative environmental impact while efficiently utilization of natural resources which reduces the waste in the farm and enhances biodiversity to maintain a healthy ecosystem. Furthermore, it helps to protect the soil water, and air which are essential for the long-term viability of agriculture.

4. Maximizing Production & Productivity

IFS is designed to maximize production and productivity, by combining agricultural components like livestock manure which can be used as fertilizer for crops, and in turn, can be used as a feed for livestock. This approach can increase the farmer’s overall productivity.

5. Climate Change Mitigation

IFS helps to mitigate climate change by reducing greenhouse gas emissions, specifically nitrous oxide a potent greenhouse gas, and increasing carbon sequestration by reducing the use of synthetic fertilizers and pesticides.

Significant Features of Integrated Farming System

The main goal for the development of IFS is to achieve integrated economic, social, and environmental effects to maintain its sustainability. To practice, it is necessary to have cooperation not only from farmers but also from economists, scientists’ technicians, and decision-makers. Some important features of IFS (Fig-1) are as follows: i) The main objective is to find out the integrated effects of the whole system not the effects of the individual components. ii) IFS is not an activity for the individual sector, it has emerged as an alternative development model to improve the possibility of small-sized farming operations in relation to larger ones (Rao Praveen V 2018) [13]. iii) It focuses mainly on organic fertilizers and biological pest control. iv) In this farming system, whenever possible by-product of one resource can be used

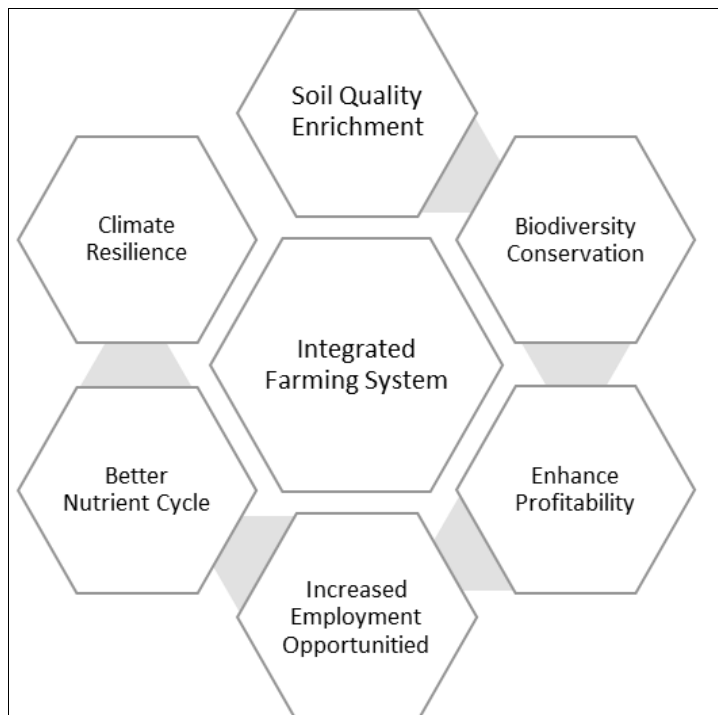


Fig1: Significant Features of Integrated Farming System (IFS)

For other resources. v) It helps the farmers to overcome the risk of mono farming which gets impacted due to climatic variation hence, it supports multiple crop cultivation and animal products, to meet the demand for food and economic needs. vi) Animal waste is the source of the production of biogas and energy. Produced energy from integrated farming systems can be used for household purposes (like cooking) and in rural industries (water pumps, powering mills, etc). Moreover, biogas and cow dung cake can replace the use of charcoal and wood.

Conclusion

The implementation of IFS is very important as it has many advantages. An integrated farming system is an eco-friendly approach that helps to improve soil health, weed, and pest control, increase water use efficiency, and reduce the use of chemical fertilizers and pesticides. But at the same time, it has many challenges too like limited knowledge and skilled labour, limited use of technology and capital, etc. To combat the challenges, support from govt. is very much needed. Support from the govt. should be in the form of training for farmers, better policy implementation, and access to capital so IFS can be implemented properly which will help to encourage to develop the sustainability in the agricultural sector.

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