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Development of Integrated farming system model: A Case study of a farmer of Jhajjar District of Haryana

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Abstract— *In India, increasing population coupled with decreasing land holding which results in declining productivity challenged the livelihood of small and marginal farmers. The concept of integrated farming system which integrated various agricultural components and enterprises at farm level helps to have sustainable agriculture production system. Considering the efficacy of integrated farming system, present study was carried out at a farm comprising of bee keeping + horticultural crops + cereal crops,regarding farm income in Malikpur village of district Jhajjar, Haryana during 2021-22. Due to adoption of system net income has increased by 116 percent, indicating that integrated farming system could address the issues of productivity, sustainability and income generation effectively.*

Keywords— ***Integrated Farming System, Productivity, Profitability, Sustainability***

I. INTRODUCTION

Agriculture plays a pivotal role in the Indian economy, contributing to 18.6% of India's Gross Value Added (GVA) and employing 54.6% of the total workforce in agricultural and allied activities. However, Indian agriculture is under significant strain, primarily due to the diminishing trend in average land holdings per individual. The mounting population pressure has resulted in smaller land holdings, with approximately 80% of farming households categorized as small and marginal farmers. This situation intensifies the challenges associated with ensuring food security and livelihoods for these vulnerable groups. Approximately 75% of farmers are affiliated with rural communities in developing economies, where their livelihoods are intricately tied to agriculture and related activities. This reliance on agriculture underscores the significance of Integrated Farming Systems (IFS) for the economic well-being and sustenance of small and marginal farmers (Behera *et al.,* 2018) underscore the pivotal role played by IFS in elevating the economic status and livelihoods of these farmers. It is crucial to acknowledge that a single agricultural endeavor is unlikely to provide sustained income and consistent employment throughout the year for small and marginal farmers, necessitating their adoption of integrated farming systems to achieve these objectives (Nath *et. at.*, 2020).

Integrated farming system involves integrating multiple agricultural components such as crops, livestock, poultry, fishery, bee keeping and agroforestry in a synergistic manner.Among all these components, bee-keeping plays a vital role in agricultural diversification as it offers income and employment opportunities. With the aim of fostering sustainable beekeeping practices in India, the Indian government earmarked a budget of 500 crore rupees for the National Beekeeping and Honey Mission (NBHM) spanning from the fiscal year 2020-21 to 2022-23. Additionally, the government has laid out plans to orchestrate a sequence of nationwide initiatives to promote the concept of a "sweet revolution." This initiative stems from the recognition of beekeeping as an essential component of an integrated farming system (Horo and Singh, 2023).

It was observed that the beekeeping and crops were co-dependent on each other as the cultivated crops were

helping the bees in collecting nectar and bees were augmenting the productivity through pollination of to field and horticultural crops thereby enhancing farm profitability (Chauhan *et al.*, 2017). Considering the above facts, a case study which pertains to Mr. Vinay, farmers of district Jhajjar of state Haryana who has adopted the technique of Integrated farming system (IFS) comprising of bee keeping + horticultural crops + cereal crops was undertaken.

II. MATERIALS AND METHODS

Jhajjar is a district of Haryana state spreading over an area of around 1834 sq km with population density of 523/sq km. Mr. Vinay who is a farmer by profession is also a resident of village Malikpur, Jhajjar, Haryana. The total cultivable land available with him is around 3 acre. After completing his B.Tech education he joined his father's business which was started with 27 boxes. Initially, he cultured bee on his farm only and the productivity was very low as compared to the standards. After sometime, he came in contact and participated in various activities of Krishi Vigyan Kendra, Jhajjar. He worked hard to serve people with best quality of honey.

IFS model comprising of honey bee, fish farming, goat rearing, horticultural crops, cereals crop and many more components was demonstrated as KVK Farm, Jhajjar. He adopted the IFS technology and this case study was carried out to evaluate the farm income of Mr. Vinay.

III. RESULT AND DISCUSSION

Beekeeping is compatible with a variety of multi-crop-based cropping systems that ensure the continuous availability of nectar and pollen resources essential for the well-being of bee colonies. Presently Mr. Vinay owned 1200 colonies of honeybees besides this he also owned honey processing plant in his village and gets an annual net income of Rs. 11,11,050. The net income increased by 116 percent by adopting improved agricultural practices and integrated farming system. The implementation of an Integrated Farming System (IFS) offers a sustainable avenue for year-round gainful employment and the assurance of a higher income, consequently leading to an improved standard of living. Detailed information regarding the income generated from various components is provided in Table 1. Integrated farming system increased the farm income by following ways:

1. Diversification: It minimizes the production constraints which are responsible for yield gaps. Diversification can increase income through adoption of farming system approaches.
2. Productivity: Integration of enterprises leads to increased productivity per unit area, reduced risk and finally sustainability.
3. Employment generation: By adopting bee-keeping in IFS model we not only improve the social-economic condition as well as we can generate the employment and other career opportunities for the youth.
4. Profitability and sustainability: The system provides the opportunity to increase the profit and their social-earning which contributes towards sustainable development.
5. Nutritional security: Various components of integrated farming system enable the nutritional security by increasing the productivity of crops from the same piece of land.

Table1: Income from different component

Sr. No.	Component	Enterprise	Area (in acre)	B:C ratio	Gross Income	Net income
1	Bee keeping	Honey and its by-products	1200 colonies	3.69	1350000	985000
2	Field Crops	Paddy+ Wheat	2 acre	2.25	135550	75550
3	Horticultural Crops	Guava Orchard+ Snap melon + Cauliflower	1 acre	2.19	92700	50500

Current scenario

Beekeeping is a profitable venture under IFS and it could result in added returns through production of honey and its by-product as well as increasing the productivity of field and horticultural crops. Mr. Vinay currently sustains his livelihood through an integrated farming system encompassing various varieties of high-quality honey, such as ajwain honey, mustard honey, jamun honey, eucalyptus honey, kikar honey, neem honey, and numerous others.Along with honey production he also supply pollens, honey gel and wax. He is owner of his own brand named Bee Hut. Many a time KVK, Jhajjar has motivated and

helped him to participate in different district and state level exhibitions for development of his skills and promoting his produce. He was awarded and felicitated many time,

Shahad Ratan Award at 3rd Agri Leadership summit, 2018 by Chief Minister of Haryana

Felicitation conferred by KVK, Jhajjar

Progressive Farmer Award, Haryana Krishi Vikas Mela, 2023 by Chief Minister of Haryana

Success of Mr. Vinay affects the nearby farmers effectively and motivates others to adapt the integrated farming system.

IV. CONCLUSION

Never the less, agriculture remains of utmost priority for economic reasons, as it still accounts for a substantial part of GDP and employment. Despite major contribution of agriculture in Indian GDP, the income of majority of farmers did not grow much and remained low in rural areas. For such farmers integrated farming system will prove a milestone as it is low cost technology and allows farmer to undertake the double benefit from the same area of work. IFS not only encourages ecological awareness but also helps in the promotion of rural and small scale industry which would eventually help in increasing the income of farmers by supplementing in agriculture.

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