Challenges Faced by Farmers in Integrated Farming Systems: Personal and Social Constraints

Abstract

India's agricultural sector is dominated by small and marginal farmers with less than two hectares of land, making it difficult to achieve livelihood security and sustainability through single-enterprise farming. With the average size of landholdings shrinking to 1.08 hectares, there is a growing need to adopt Integrated Farming Systems (IFS), which integrate crop and livestock production to enhance sustainability, productivity, and profitability through resource recycling. This study aimed to examine the personal and social constraints faced by farmers practicing IFS in Haryana, India. Conducted as a cross-sectional study over one year in four districts representing the Eastern and Western agro-climatic zones of Haryana, a total of 120 IFS farmers were selected through purposive and random sampling. Data were gathered through structured interviews based on a well-validated questionnaire, with constraints categorized into personal and social dimensions and analyzed using frequency distributions and weighted mean scores (WMS). The results showed that the most severe personal constraint in the Western zone was the lack of knowledge about the balanced use of pesticides and fertilizers (WMS = 2.2), while the Eastern zone's primary personal constraint was a lack of knowledge about different IFS components (WMS = 2.51). In terms of social constraints, Western zone farmers identified a lack of leisure time for family as the most significant issue (WMS = 2.48), while Eastern zone farmers cited inadequate family support as their main constraint (WMS = 2.5). These findings highlight the need for targeted interventions, including knowledge dissemination on IFS components and balanced input usage, as well as improved social support systems to boost the adoption and effectiveness of IFS. The study’s outcomes align with previous research on agricultural challenges and offer actionable recommendations for enhancing IFS practices in Haryana.

Keywords: Integrated Farming Systems (IFS), Personal Constraints, Social Constraints, Agricultural Practices, Resource Recycling, Livelihood Security, Sustainability, Farming Integration

Introduction

India, predominantly an agricultural country, continues to face significant challenges related to food security and sustainable farming, particularly for small and marginal farmers who constitute about 86% of the agricultural workforce. These farmers, managing less than two hectares of land, are often trapped in low productivity cycles, leading to income insecurity and unsustainable farming practices [1]. According to the 2021 Agricultural Census, the average size of landholdings in India has dwindled to 1.08 hectares, which severely limits opportunities for horizontal expansion of agricultural land [2]. In high-productivity regions like Haryana and Punjab, shrinking land sizes and over-reliance on resource-intensive farming systems have exacerbated issues such as soil degradation, water scarcity, and economic instability for farmers [3].

Nationally, India's food security is under pressure from multiple factors, including climate change, depleting natural resources, and population growth. The Green Revolution, while boosting food production in the past, has resulted in the depletion of water tables, loss of biodiversity, and the degradation of soil health [4]. The need for more resilient, diversified, and sustainable farming approaches is critical to meet the food and nutritional needs of the country.

Integrated Farming Systems (IFS) have gained attention as a viable solution for improving the livelihoods of small and marginal farmers. IFS involves the integration of different agricultural activities such as crop production, livestock rearing, fish farming, and agroforestry into a synergistic farming model. This approach maximizes resource efficiency by recycling farm by-products and reducing external input costs, leading to enhanced productivity and profitability [5]. Research shows that IFS can improve food and nutritional security while reducing the ecological footprint of farming activities [6]. For example, livestock manure is used as fertilizer for crops, while crop residues serve as feed for livestock, creating a sustainable, closed-loop system [7].

Despite the proven benefits of IFS, its adoption remains limited, particularly in states like Haryana and Punjab. Several barriers hinder the effective implementation of IFS, with personal and social constraints being significant factors. Personal challenges include a lack of technical knowledge regarding the integration of IFS components, limited access to resources, and insufficient training on modern farming techniques [8]. Social constraints, such as lack of community support, resistance to change, and limited access to institutional support like credit and extension services, further impede the widespread adoption of IFS [3].

This study seeks to address these gaps by focusing on the personal and social constraints faced by farmers engaged in IFS in Haryana. Previous research has primarily concentrated on the economic and environmental benefits of IFS, with limited attention paid to the socio-personal challenges that farmers encounter during implementation [5]. Furthermore, little is known about how these constraints vary across different agro-climatic zones within Haryana, a critical factor for designing targeted interventions that support farmers in transitioning to more sustainable farming practices.

The objective of this study is to investigate the personal and social constraints that limit the adoption of IFS and to offer actionable insights for policymakers and extension services. By identifying these constraints, the study aims to contribute to the development of targeted interventions that can enhance the effectiveness and scalability of IFS, ultimately improving food security, sustainability, and the livelihoods of small and marginal farmers in Haryana and beyond.

Research Gap

While previous studies have explored the technical and economic aspects of Integrated Farming Systems, there is a noticeable gap in understanding the socio-personal constraints that limit its adoption, particularly in the context of Haryana and Punjab. Additionally, little research has been conducted on how these constraints differ across agro-climatic zones. This study aims to fill these gaps by investigating the personal and social barriers to adopting IFS and providing

recommendations to enhance its implementation and effectiveness, thereby supporting sustainable agricultural development.

Methodology

The study was conducted across two agro-climatic zones of Haryana, namely the Eastern and Western zones. A total of four districts were selected for the research: Hisar and Bhiwani from the Western zone, and Kaithal and Jind from the Eastern zone. These districts were chosen randomly from the respective zones to ensure unbiased representation. Haryana has several districts in each zone, and the random selection method aimed to provide a fair and comprehensive representation of the farming practices across these zones.

District and Village Selection

Within each selected district, three villages were purposively chosen based on the presence of farmers actively engaged in Integrated Farming Systems (IFS). The selected villages from Hisar district were Harikot, Mangali, and Kaimri; from Bhiwani district, BwaniKheda, Prem Nagar, and Kungad; from Kaithal district, Peyoda, Songal, and KheriSheru; and from Jind district, KaerKheri, Ahirka, and Julna. The selection of these villages was based on the researcher's knowledge and consultation with local agricultural authorities to ensure that the sample included areas with a significant number of IFS practitioners.

Respondent Selection

From each village, 10 respondents practicing IFS were selected purposively, making up 30 respondents per district. The total sample size for the study was 120 respondents. The purposive sampling method was employed to ensure that the study focused on farmers who were directly involved in IFS, as their experiences would provide relevant insights into the personal and social constraints they encountered.

Research Instrument

A well-structured interview schedule was designed as the primary data collection tool. The schedule was developed based on a comprehensive review of literature and expert consultations to ensure content validity. The instrument was pre-tested with a small sample of IFS farmers outside the selected study areas to assess its clarity, relevance, and comprehensiveness. Necessary adjustments were made to the interview schedule based on the pre-test feedback to improve the accuracy and reliability of the instrument.

Validity And Reliability

To ensure the validity of the instrument, both content and face validity were established. Content validity was achieved by reviewing the instrument with subject matter experts and aligning the questions with the objectives of the study. Face validity was confirmed through a pre-test, ensuring that respondents clearly understood the questions, and that the questions measured the intended concepts. Reliability was assessed by calculating Cronbach’s alpha for

the interview schedule, with a value of 0.78 indicating acceptable internal consistency for the constructs measured.

Data Collection

The data were collected personally by the researcher through face-to-face interviews. This approach allowed the researcher to clarify any ambiguities and ensure that the respondents fully understood each question. The personal nature of the interviews also helped in establishing rapport with the farmers, enhancing the reliability of the responses.

Data Analysis

The collected data were analyzed using descriptive statistics, including frequency distributions and percentage calculations, to summarize the respondents' demographic characteristics and the identified constraints. To quantify the severity of personal and social constraints, weighted mean scores were calculated. Each constraint was rated by the respondents on a Likert-type scale, and the scores were weighted according to their relative importance. The formula used for calculating the weighted mean score was:

$$\text{Weighted Mean Score} = \frac{\sum (f \times w)}{N}$$

Where:

f = frequency of responses for each scale point

w = weight assigned to each scale point

N = total number of respondents

This method allowed for the identification of the most pressing constraints based on the farmers' perceptions. The use of weighted mean scores provided a clearer understanding of the relative importance of different constraints faced by IFS farmers, facilitating targeted recommendations.

Results and Discussion

Challenges Faced by Farmers in Integrated Farming Systems: Personal and Social Constraints

The study identified and analyzed constraints faced by respondents involved in Integrated Farming Systems (IFS) across five key dimensions: personal and social constraints. These constraints were evaluated using percentage distributions and weighted mean scores (WMS). The weighted mean scores provided a quantifiable measure of the severity of each constraint, facilitating a comparative assessment among small, medium, and large groups of IFS practitioners.

Personal Constraints Faced by Respondents in Integrated Farming Systems

Personal constraints are identified as factors that hinder the effective translation of knowledge and motivation into practical actions and successful outcomes. These constraints encompass various aspects that impact farmers' ability to engage in and benefit from Integrated Farming Systems (IFS). The study highlights five specific personal components that influence farmers' activities and their implementation of IFS practices.

Table 1 indicates that, among respondents in the Western zone, the most severe personal constraint was the lack of knowledge regarding the balanced use of pesticides and fertilizers, which ranked highest with a weighted mean score (WMS) of 2.20. This was followed by a lack of knowledge about different IFS components (WMS = 2.05, rank II) and a lack of time (WMS = 2.03, rank III). In the Eastern zone, the most significant personal constraint was identified as a lack of knowledge about different IFS components, with a WMS of 2.51, placing it at rank I. This was followed by a lack of knowledge about the application of balanced use of pesticides and fertilizers (WMS = 2.43, rank II) and a lack of time (WMS = 2.18, rank III).

These findings are consistent with the research conducted by Tiwari et al. [9], who noted that farmers in crop production face constraints related to limited investment capacity, inadequate training, lack of credit facilities, and high input costs. The study highlighted that these barriers hinder effective agricultural practices, aligning with the present findings on personal constraints related to knowledge and time. Similar constraints are observed in livestock and vegetable production. Tiwari et al. [9] identified issues such as unavailability of green fodder, improved breeds, and scientific knowledge in livestock enterprises. These challenges resonate with the current study's findings on the lack of knowledge about IFS components, which significantly impacts farmers' ability to implement integrated practices effectively. In vegetable production, the research highlighted the lack of training and technical know-how, which is consistent with the present study's identification of knowledge deficits as a major constraint. Additionally, Singh and Burark [10] found that inadequate knowledge and training facilities were significant barriers in crop production, corroborating the current study's results. For poultry farming, Singh et al. [11] reported constraints such as insufficient knowledge, poor breeds, and inadequate veterinary services. These issues align with the current study's findings on the lack of knowledge as a critical personal constraint, affecting overall farming efficiency. The similar results are in line with the findings of Ponnusamy and Devi [12]; Nikam et al. [13]; Pandey et al. [14]; Rahman et al. [15]; Meshram et al. [16]; and Kumar et al. [17].

Overall, the constraints identified in this study reflect broader challenges reported in the literature, emphasizing the need for targeted interventions to address knowledge gaps and time management issues to improve the adoption and effectiveness of Integrated Farming Systems.

Table 1: Personal Constraints Faced by Respondents in Integrated Farming Systems

N=120

Sr. No.	Constraints	Western Zone F (%)/N=60			W.M.S	Rank	Eastern Zone F (%)/N=60			W.M.S	Rank
		Severe	Somewhat Severe	Not so Severe			Severe	Somewhat Severe	Not so Severe		
1.	**Personal constraints**										

I	Lack of knowledge about different IFS component	18 (30.0)	27 (45.0)	15 (25.0)	**2.05**	**II**	41 (68.3)	9 (15.0)	10 (16.7)	**2.51**	**I**
II	Lack of knowledge about application of balanced use of pesticide and fertilizer	23 (38.3)	26 (43.3)	11 (18.4)	**2.2**	**I**	31 (51.7)	24 (40.0)	5 (8.3)	**2.43**	**II**
III	Lack of confidence to start new enterprise	8 (13.3)	31 (51.7)	21 (35.0)	**1.78**	**IV**	13 (21.7)	26 (43.3)	21 (35.0)	**1.86**	**IV**
IV	Lack of time	24 (40.0)	14 (23.3)	22 (36.7)	**2.03**	**III**	19 (31.7)	33 (50.0)	8 (13.3)	**2.18**	**III**

Figures in parentheses indicate percentages. W.M.S. = Weighted Mean Score.

SOCIAL CONSTRAINTS FACED BY RESPONDENTS IN INTEGRATED FARMING SYSTEMS

Social constraints have been recognized as factors that impede the effective transfer of knowledge into practical behaviors and outcomes, primarily due to limitations in social support. Four specific social components significantly influence farmers' activities and their implementation of agricultural practices.

Table 2 shows that social constraints significantly affect farmers' activities in both the Western and Eastern zones. In the Western zone, the primary social constraint was the lack of leisure time for family, with a weighted mean score (WMS) of 2.48. This was followed by insufficient support from family members (WMS = 1.98) and a lack of time for social gatherings (WMS = 1.93). Similarly, in the Eastern zone, the most severe constraint was identified as a lack of family support (WMS = 2.50), followed by a lack of leisure time for family (WMS = 2.25) and inadequate time for social gatherings (WMS = 2.08).

The results of this study align with findings from several previous research efforts. Singh and Burark [10] highlighted the social constraints, such as limited family support and time management issues, significantly impact farmers' ability to adopt and benefit from new agricultural practices. Similarly, Ponnusamy and Devi [12] found that inadequate support from family members and difficulties in balancing family responsibilities with farming duties were substantial barriers to effective agricultural management. Nikam et al. [13] further emphasized that social constraints, including limited time for social interactions and family activities, negatively affect farmers' mental well-being and productivity. Pandey et al. [14] and Rahman et al. [15] also identified that constraints related to family support and personal time management are critical factors influencing farmers' overall performance and satisfaction. Meshram et al. [16] and Tiwari et al. [9] supported these findings by demonstrating that social constraints, particularly those related to family dynamics and support, play a crucial role in the effective implementation of farming practices. Kumar et al. [17] and Singh et al. [11] corroborated these results, noting that issues such as a lack of leisure time for family and insufficient support from family members are significant barriers.

Overall, the current study’s findings on social constraints reflect broader issues identified in the literature, underscoring the need for strategies that enhance family support and improve time management to alleviate these constraints. Addressing these social factors can help farmers better balance their agricultural and personal lives, potentially leading to improved outcomes in farming practices.

Table 2: Social Constraints Faced by Respondents in Integrated Farming Systems

N=120

Sr. No.	Constraints	Western Zone F (%)/N=60			W.M.S	Rank	Eastern Zone F (%)/N=60			W.M.S	Rank
		Severe	Somewhat Severe	Not so Severe			Severe	Somewhat Severe	Not so Severe		
2.	**Social Constraints**										
i.	Lack of support from family members	12 (20.0)	35 (58.3)	13 (21.7)	**1.98**	**II**	33 (55.0)	24 (40.0)	3 (5.0)	**2.5**	**I**
ii.	Interference of fellow Farmers	7 (11.6)	37 (61.7)	16 (26.7)	**1.85**	**IV**	5 (8.3)	34 (56.7)	21 (35.0)	**1.73**	**IV**
iii.	Lack of time for social Gathering	8 (13.3)	40 (66.7)	12 (20.0)	**1.93**	**III**	14 (23.3)	37 (61.7)	9 (15.0)	**2.08**	**III**
iv.	Lack of leisure time for family	37 (61.7)	15 (25.0)	8 (13.3)	**2.48**	**I**	23 (38.3)	29 (48.3)	8 (13.4)	**2.25**	**II**

Figures in parentheses indicate percentages. W.M.S. = Weighted Mean Score.

Conclusion

The study provides valuable insights into the personal and social constraints faced by farmers engaged in Integrated Farming Systems (IFS) in Haryana, India. The analysis reveals that personal constraints, such as limited knowledge about IFS components and the balanced use of pesticides and fertilizers, along with time management issues, significantly impact the effectiveness of IFS. The study also highlights the social constraints, including insufficient family support and a lack of leisure time for family activities, play a crucial role in influencing farmers' ability to adopt and benefit from integrated farming practices.

In the Western zone, personal constraints related to knowledge gaps in pesticide and fertilizer application were identified as the most severe, while social constraints primarily revolved around limited leisure time for family. Conversely, in the Eastern zone, a lack of knowledge about IFS components and inadequate family support were the most pressing issues. These findings underscore the need for targeted interventions to address both personal and social barriers.

The study's results are consistent with previous research, which has highlighted similar constraints in agricultural practices. This alignment emphasizes the broader relevance of these challenges and the importance of developing comprehensive strategies to support farmers. Addressing the identified constraints through enhanced training programs, better resource management, and improved social support structures can facilitate the effective implementation of IFS, ultimately contributing to greater agricultural sustainability and productivity.

Overall, the study underscores the necessity for tailored support mechanisms that address both the personal and social dimensions of farming. By focusing on bridging knowledge gaps, improving time management, and enhancing family support, policymakers and agricultural extension services can better assist farmers in overcoming these challenges and achieving successful integrated farming outcomes.

Authors' Contributions

Khushbu designed the study, performed the statistical analysis, wrote the protocol, and drafted the initial manuscript. Kanta Sabharwal provided advisory support and guidance throughout the study. Jyoti managed the literature searches. All authors read and approved the final manuscript.

Consent

Informed consent was obtained from all individual participants included in the study. Participants were provided with detailed information about the study's purpose, procedures, and potential risks before consenting to participate. Their participation was voluntary, and they were assured of confidentiality and the right to withdraw from the study at any time without consequence. The study was conducted in accordance with ethical guidelines and received approval from the relevant institutional review board.

Disclaimer (Artificial intelligence)

Authors hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of manuscripts.

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