***Original Research Article***

**ADOPTION POTENTIAL OF INTEGRATED FARMING SYSTEMS: A SOCIO-ECONOMIC STUDY OF FARMERS IN DAUSA DISTRICT OF RAJASTHAN**

**ABSTRACT**

The present study was conducted to assess the socio-economic status, resource availability and knowledge level of farmers regarding the adoption of Integrated Farming Systems (IFS) in Dausa district of Rajasthan. A multistage random sampling technique was employed to select 140 farmers across 14 villages from 7 tehsils. Data were collected on variables such as education, farming experience, landholding, annual income, cropping pattern, risk orientation, irrigation status, livestock possession and knowledge of IFS. The results indicated that a majority of the farmers had moderate education levels, annual income and farming experience, with most falling in the semi-medium landholding category. Over 70 per cent of respondents showed a medium level of risk orientation and income, while about 66 per cent had moderate livestock resources and irrigation access. Importantly, more than half of the farmers demonstrated medium knowledge of IFS, indicating potential readiness for its adoption. The cropping pattern also reflected moderate diversification, which is conducive to integrated approaches. The study concludes that the socio-economic conditions of the farmers in the region are generally favorable for adopting Integrated Farming Systems. With appropriate policy support, awareness programs and infrastructural development, IFS can be an effective strategy to enhance farm income, productivity, and sustainability among small and marginal farmers in semi-arid regions like Dausa.

**Key words:** Integrated farming system, socio-economic status, knowledge level, risk orientation and sustainable agriculture.

**INTRODUCTION**

In India, agriculture plays a vital role in the Indian economy. Farming is the primary source of income for more than 70.00 per cent of rural households (Ahluwalia 2005). In the year 2022-23, the share of Gross Value Added (GVA) of agriculture and allied sector in the economy was 18.30 per cent (Ministry of Statistics & Programme Implementation, 2022-23) and employing more than 60.00 per cent of the workforce (Economic Survey 2021-22). In India 85 per cent of the farmers are marginal or small, operating less than two acres. In fact, 66 percent operates less than one acre each and hence most of these farms are not viable (Akthar and Saba, 2014). Land is one of the most vital resources for the rural poor, who are largely dependent on agriculture for their livelihood. It serves as the primary foundation for economic development and poverty alleviation in rural areas. Therefore, to maximize returns from this limited resource, it is essential to cultivate high-value crops or adopt integrated farming systems. Such approaches not only enhance farm productivity but also contribute significantly to income diversification and the goal of doubling farmers’ income.

The Integrated Farming System (IFS) is a holistic approach that combines multiple agricultural components to enhance productivity, profitability and sustainability for small and marginal farmers (Bhagat *et al.,* 2024). It integrates crops, livestock, fishery and allied activities, enhancing farm productivity, profitability, and employment generation (Bhagat *et al.,* 2024). The IFS provides an opportunity to increase economic yield per unit area and per unit time by stabilizing the intensification of crop and allied enterprises. Therefore, the main focus of our study is to investigate the socio-economic structure of farmers who have adopted integrated farming systems (IFS) and to assess their knowledge and awareness regarding its components.

**MATERIAL AND METHOD**

A multi-stage random sampling technique was adopted in the study. In the first stage, 7 out of 15 tehsils in Dausa district of Rajasthan were selected randomly. In the second stage, 2 villages from each selected tehsil were chosen, accounting 14 villages. Finally, in the third stage, 10 farmers from each village were selected randomly, resulting in a total sample size of 140 farmers in the study area.

**Variables and their measurement**

**Table 1: Variables used in the study and their measurement**

|  |  |  |
| --- | --- | --- |
| **S. No.** | **Variable** | **Measurement** |
| 1 | Education | Scale developed by Pareek (1964) updated by Wani (2019) was used with slight modification |
| 2 | Farming Experience | Number of years spends by the farmer in actual farming |
| 3 | Land Holding | Criteria suggested by Govt. of India was used |
| 4 | Annual Income | Schedule was prepared by the investigator  |
| 5 | Occupation | Scale developed by Pareek (1964) updated by Wani (2019) was used with slight modification |
| 6 | Cropping pattern | Scale developed by Nirban (2004) was used with slight modifications |
| 7 | Risk orientation | Procedure followed by Chandrashekar (2007) was used with slight modifications  |
| 8 | Irrigation status | Procedure followed by Nirban (2004) was used with slight modifications  |
| 9 | Livestock possessions | Schedule was prepared by the investigator |
| 10 | Knowledge about Integrated Farming System | Schedule was prepared by the investigator |

**Education**

This variable was quantified on the basis of scoring system used in the scale developed by Pareek (1974) and Wani (2019) used with slight modifications.

**Table 2: Indicators of education with their score**

|  |  |  |
| --- | --- | --- |
| **S. No.** |  **Categories** | **Score** |
| 1. | Illiterate | 0 |
| 2. | Can read only | 1 |
| 3. | Can read and write | 2 |
| 4. | Primary school | 3 |
| 5. | Middle school | 4 |
| 6. | High school | 5 |
| 7. | Graduate | 6 |
| 8. | Above graduate  | 7 |

**Occupation**

This variable was quantified on the basis of scoring system used in the scale developed by Pareek (1974) and Wani (2019) used with slight modifications.

**Table 3**: **Indicators of occupation with their score**

|  |  |  |
| --- | --- | --- |
| **S.No.** | **Occupation** | **Score** |
| 1. | Labour | 0 |
| 2. | Caste occupation | 1 |
| 3. | Business | 2 |
| 4. | Independent profession | 3 |
| 5. | Cultivation/Agriculture | 4 |
| 6. | Service  | 5 |

**Cropping pattern**

The method followed is from Nirban (2004), and it works like a scoring system:

A farmer gets 1 point for each crop grown in Kharif, Rabi and Summer seasons. So, if a farmer grows crops in all three seasons, they score 3 points. If a farmer grows an annual crop (like wheat or paddy), they get 4 points. If a farmer grows a perennial crop (like mango or guava trees), they get 5 points.

**Table 4: Distribution according to the weightage to farmer**

|  |  |  |
| --- | --- | --- |
| **S. No.** | **Categories** | **Score range** |
| 1 | Poor  | Up to 4 |
| 2 | Fair  | 5 to 8 |
| 3 | Good  | Above 8 |

**Risk orientation**

Risk orientation scale developed by Chandrashekar (2007) was used with suitable modification. The respondents were measured on three-point continuum as agree, undecided and disagree. The scoring was 3, 2 and 1 respectively for 6 statements. The respondents were groups into three categories namely low, medium and high by using mean ± standard deviation.

**Table 5: Statements and weightage given to farmers on risk orientation**

|  |  |  |  |
| --- | --- | --- | --- |
| **S. No.**  | **Statements** | **Category** | **Score** |
|
| **1** | A farmer should grow more crops to reduce risk rather than cultivating one or two crops. | Low | Up to 9 |
| **2** | A farmer should focus more on growing a high-yielding crop instead of many low-yielding crops. |
| **3** | A farmer who is ready to take more risk than others usually perform better. | Medium | 10 to 13 |
| **4** | It is good to take risks in farming when one knows that adopting improved technologies will likely be successful. |
| **5** | It is better not to adopt a new farming practice until most others have used it successfully. | High | Above 13 |
| **6** | Even though a new practice is untested in farming, if it appears useful, it is worth taking the risk to adopt it. |

**Irrigation status**

The irrigation status of respondents was assessed using the method by Nirban (2004), based on three factors: source of irrigation, type of water lifting device and irrigation method. One score was given for each 10 per cent of irrigation use. For lifting devices, 1 score was assigned for 5 HP, 2 for 7 HP and 3 for 9 HP pumps. In irrigation methods, surface irrigation got 1 score, sprinkler 2 and drip 3. The total score from these components indicated the respondent’s irrigation status.

The respondents were then grouped into three categories namely poor, fair and good by using mean ± standard deviation.

**Table 6: Weightage given to farmers on irrigation status**

|  |  |  |
| --- | --- | --- |
| **S. No.** | **Categories** | **Score range** |
| 1 | Poor  | Up to 5 |
| 2 | Fair | 6 to 10 |
| 3 | Good | Above 10 |

**Knowledge about Integrated Farming System**

Knowledge is an important part of human behavior, based on facts and understanding. In this study, knowledge refers to the farmers' understanding of integrated farming system (IFS) practices. To measure this, a set of questions related to IFS was asked. Each correct answer was given a score of one and zero for incorrect answers. The total score of each respondent represented their knowledge level, calculated using a simple formula.

$$Ki=\frac{x1+x2……..+xn}{N}x100$$

Whereas,

Ki = Knowledge index

X1+X2……+Xn = Total number of correct answers *i.e*, Total score

N = Total number of items in the test

For Low = up to 10, Medium = 11 to 16 and Large = Above 16

**List 1 : Research questions and statements**

|  |  |
| --- | --- |
| **S.No.** | **Statements** |
| **1** | IFS include |
| **2** | What is main aim of IFS? |
| **3** | Which is recommended sowing season for groundnut (main crop) in Dausa region? |
| **4** | Main horticultural crops grown by farmers of Dausa region are |
| **5** | Which animal breed used by most of farmers for milking purpose in Dausa region? |
| **6** | Correct method of sowing of field crops is... |
| **7** | Which fertilizer used by farmers as top dressing? |
| **8** | Which organic manure used by most of the farmers in Dausa region? |
| **9** | Recommended seed rate for tomato crop in Dausa region is… |
| **10** | Major pest problem in groundnut is related to… |
| **11** | Major Rabi pulse crop grown in Dausa area is… |
| **12** | Main fodder crop grown in Dausa region is… |
| **13** | What control measures used by farmers to control white grub in groundnut? |
| **14** | Which kind of feed products used by farmers to feed their animals? |
| **15** | Which is the major pest of Mango in Dausa region? |
| **16** | Spacing recommended for main crops is |
| **17** | Is the recommended chemical for seed treatment |
| **18** | Are the contagious diseases of dairy animals? |
| **19** | Is the time to examine animal for pregnancy after insemination. |
| **20** | Is the major disease found in groundnut crop? |

**RESULTS AND DISCUSSION**

**Education**

Education plays a crucial role in the adoption of Integrated Farming Systems by farmers. From the Table 7, it was observed that the majority of farmers had completed middle school (29.29%) and high school (21.42%), together accounting for nearly 50 per cent of the respondents. This indicates a moderate level of literacy and shows that half of the farmers are reasonably educated and more likely to adopt improved farming practices. On the other hand, only 4.29 per cent of farmers were illiterate, representing the lowest educational group. These findings suggest that the general educational background of farmers is supportive of understanding and implementing integrated farming systems effectively.

**Table 7: Distribution of the respondents according to their education (N=140)**

**N=140**

|  |  |  |  |
| --- | --- | --- | --- |
| **S. No.** | **Education** | **Frequency** | **Percentage** |
| **1** | Illiterate | 6 | 4.29 |
| **2** | Can read only | 9 | 6.43 |
| **3** | Can read and write | 13 | 9.29 |
| **4** | Primary school | 19 | 13.57 |
| **5** | Middle school | 41 | 29.29 |
| **6** | High school | 30 | 21.42 |
| **7** | Graduate | 14 | 10 |
| **8** | Above graduate  | 8 | 5.71 |
| **Total** | **140** | **100** |

**Farming Experience**

It was observed from Table 8 that the majority of farmers had 10 to 26 years of farming experience. This indicates that they possess substantial practical knowledge and are likely to adapt more easily to the Integrated Farming System (IFS), as their experience enables them to understand and manage new agricultural practices effectively.

**Table 8: Distribution of the respondents according to their farming experience (N=140)**

**N=140**

|  |  |  |  |
| --- | --- | --- | --- |
| **S. No.** | **Category** | **Frequency** | **Percentage** |
| 1 | Low (Up to 9 years) | 27 | 19.29 |
| 2 | Medium (10 years to 26 years) | 99 | 70.71 |
| 3 | High (Above 26 years) | 14 | 10 |
| **Total** | **140** | **100** |
| **Mean = 17.507 SD = 8.495** |

**Suggested Table 8:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Category** | **Frequency** | **Percentage** | **Mean** | **SD** |
| Low (Up to 9 years) | 27 | 19.29 | **17.507** | **8.495** |
| Medium (10 years to 26 years) | 99 | 70.71 |
| High (Above 26 years) | 14 | 10 |
| Total | **140** | **100** |

**Land Holding**

It reveals that the majority of respondents (37.14%) were semi-medium farmers owning between 2.01 to 4.00 hectares of land. This was followed by small farmers (22.86%), medium farmers (20.71%) and marginal farmers (14.29%). Only a small proportion (5.00%) were large farmers with more than 10 hectares. This indicates that most of the farmers in the study area belong to the small and semi-medium categories, which is important when planning and promoting Integrated Farming System practices suitable for their land size.

**Table 9: Distribution of the respondents according to their land holding (N=140)**

|  |  |  |  |
| --- | --- | --- | --- |
| **S. No.** | **Categories** | **Frequency** | **Percentage** |
| 1 | Marginal farmer (less than 1.00 ha.) | 20 | 14.29 |
| 2 | Small farmer (from 1.01 to 2.00 ha.) | 32 | 22.86 |
| 3 | Semi medium farmer (from 2.01 to 4.00 ha.) | 52 | 37.14 |
| 4 | Medium farmer (from 4.01 to 10.00 ha.) | 29 | 20.71 |
| 5 | Large farmer (more than 10.00 ha.) | 7 | 5.00 |
| **Total** | **140** | **100** |

**Annual Income**

It was observed from Table 10 that 72.86 per cent of the farmers had a medium level of income. This is a positive indicator, as it suggests that the majority of farmers not only have a steady income but also possess the financial capacity to invest in Integrated Farming Systems (IFS). Their desire to enhance income further makes them more likely to adopt improved and diversified farming practices like IFS.

**Table 10: Distribution of the respondents according to their annual income (N=140)**

|  |  |  |  |
| --- | --- | --- | --- |
| **S. No.** | **Annual income** | **Frequency** | **Percentage** |
| 1 | Low (Up to 172000) | 7 | 5 |
| 2 | Medium (173000 to 439000) | 102 | 72.86 |
| 3 | High (Above 439000) | 31 | 22.14 |
| **Total** | **140** | **100** |
| **Mean = 305379 SD = 133444** |

**Occupation**

It was observed from Table 11 that the majority of farmers, i.e., 55.00 per cent, were primarily engaged in agriculture. This is a positive sign for the adoption of Integrated Farming Systems (IFS), as farmers who are already involved full-time in agriculture are more likely to be open to adopting integrated and diversified farming practices to enhance productivity and income.

**Table 11: Distribution of the respondents according to their Occupation (N=140)s**

|  |  |  |  |
| --- | --- | --- | --- |
| **S. No.** | **Occupation** | **Frequency** | **Percentage** |
| 1 | Labour | 0 | 0 |
| 2 | Caste occupation | 1 | 0.71 |
| 3 | Business | 32 | 22.86 |
| 4 | Independent profession | 17 | 12.14 |
| 5 | Cultivation/Agriculture | 77 | 55 |
| 6 | Service | 13 | 9.29 |
| **Total** | **140** | **100** |

**Cropping Pattern**

It was observed from Table 12 that the majority of farmers, i.e., 59.29 per cent, had a fair cropping pattern. This indicates that most of the respondents were practicing moderate crop diversification, which provides a good foundation for adopting Integrated Farming Systems, as it reflects their familiarity with managing multiple crops.

**Table 12: Distribution of the respondents according to their cropping pattern (N=140)**

|  |  |  |  |
| --- | --- | --- | --- |
| **S. No.** | **Cropping pattern** | **Frequency** | **Percentage** |
| **1** | Poor (Up to 4) | 15 | 21.42 |
| **2** | Fair (5 to 8) | 83 | 59.29 |
| **3** | Good (Above 8) | 27 | 19.29 |
| **Total** | **140** | **100** |
| **Mean = 1.978 SD = 0.640** |

**Risk orientation**

The data in the Table 13 shows the distribution of farmers based on their risk orientation. It was observed that the majority of farmers (66.43%) fall under the medium risk orientation category, indicating a balanced approach towards taking risks in agriculture and easily adopt IFS.

**Table 13: Distribution of the respondents according to their risk orientation (N=140)s**

|  |  |  |  |
| --- | --- | --- | --- |
| **S. No.** | **Risk orientation** | **Frequency** | **Percentage** |
| **1** | Low (Up to 9) | 31 | 22.14 |
| **2** | Medium (10 to 13) | 93 | 66.43 |
| **3** | High (Above 13) | 16 | 11.43 |
| **Total** | **140** | **100** |
| **Mean = 11.235 SD = 1.932** |

**Irrigation Status**

The data in Table 14 shows the irrigation status among the farmers in the study area. About 90 per cent of the farmers fall under the fair category, which means that most of them have moderate access to irrigation facilities, including basic water sources, some form of water lifting device, and traditional irrigation methods. This indicates that while irrigation is not highly advanced, the existing infrastructure is sufficient to support the adoption of Integrated Farming Systems with some improvements.

**Table 14: Distribution of the respondents according to their Irrigation status (N=140)**

|  |  |  |  |
| --- | --- | --- | --- |
| **S. No.** | **Irrigation status** | **Frequency** | **Percentage** |
| **1** | Poor (Up to 5) | 30 | 21.42 |
| **2** | Fair (6 to 10) | 90 | 64.29 |
| **3** | Good (Above 10) | 20 | 14.29 |
| **Total** | **140** | **100** |
| **Mean = 1.928 SD = 0.595** |

**Livestock Procession**

It was observed from Table 14 that 67.14 per cent of the farmers fell under the medium category of irrigation status. This is a positive sign for the adoption of Integrated Farming Systems (IFS), as a moderate level of irrigation availability can support diversified farming activities and enhance overall productivity.

**Table 15: Distribution of the respondents according to their livestock possessions (N=140)**

|  |  |  |  |
| --- | --- | --- | --- |
| **S. No.** | **Livestock possessions** | **Frequency** | **Percentage** |
| **1** | Low (Up to 2) | 26 | 18.57 |
| **2** | Medium (3 to 8) | 94 | 67.14 |
| **3** | High (Above 8) | 20 | 14.29 |
| **Total** | **140** | **100** |
| **Mean = 5.378 SD = 2.980** |

**Knowledge Level of Farmers**

It was observed from Table 16 that 55.71 per cent of farmers fell under the medium category, meaning they answered between 11 to 16 questions correctly. This indicates a moderate level of knowledge about Integrated Farming Systems (IFS), suggesting that these farmers are reasonably informed and have the potential to adopt IFS practices effectively.

**Table 16: Distribution of the respondents according to their knowledge level (N=140)**

|  |  |  |  |
| --- | --- | --- | --- |
| **S. No.** | **Knowledge level** | **Frequency** | **Percentage** |
| **1** | Low (Up to 10) | 32 | 22.86 |
| **2** | Medium (11 to 16) | 78 | 55.71 |
| **3** | High (Above 16) | 30 | 21.43 |
| **Total** | **140** | **100** |
| **Mean = 13.007 SD = 2.806** |

**Conclusion:**

The study reveals that the socio-economic profile of farmers in Dausa district, Rajasthan, is favorable for the adoption of Integrated Farming Systems (IFS). A large proportion of farmers possess moderate levels of education, income, farming experience, and land holdings, all of which are key factors influencing the adoption of improved and diversified farming practices. Additionally, most farmers showed a medium level of knowledge and risk orientation, indicating their openness to new agricultural approaches.

Overall, the findings suggest that farmers in the region are well-positioned to adopt IFS. With appropriate policy interventions, targeted training programs, and improvements in infrastructure and irrigation facilities, Integrated Farming Systems can serve as a viable strategy to boost farm productivity, enhance sustainability, and improve the livelihoods of small and marginal farmers in the area.

**REFERENCES**

Ahluwalia, M.S. Reducing Poverty and Hunger in India: The Role of Agriculture. Available online: http: //planningcommission.nic.in/aboutus/speech/spemsa/msa046.pdf (accessed on 15 June 2016).

Akhtar, S. M., & Saba, P. (2014). Small, marginal and women farmers in Uttar Pradesh: Land rights and credit flows. *International Journal of Research in Social Sciences*, *4*(3), 396-419.

Bhagat, R., Walia, S. S., Sharma, K., Singh, R., Singh, G., & Hossain, A. (2024). The integrated farming system is an environmentally friendly and cost‐effective approach to the sustainability of agri‐food systems in the modern era of the changing climate: A comprehensive review. *Food and Energy Security*, *13*(1), e534.

Government of India. (2022). *Economic Survey 2021–22*. Ministry of Finance, Department of Economic Affairs.

Ministry of Statistics and Programme Implementation. (2023). *Annual report 2022–23*. Government of India.

Nirban, A. A. *Department Of Agricultural Extension Education* (Doctoral Dissertation, University Of Agricultural Sciences, Dharwad).

Wani, R. T. (2019). Socioeconomic status scales-modified Kuppuswamy and Udai Pareekh's scale updated for 2019. *Journal of family medicine and primary care*, *8*(6), 1846-1849.