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Adoption of different adaptation strategies by farmers during the COVID-19 pandemic: A socio-economic analysis in Haryana, India

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Abstract

The investigation was carried out on the socio-economic condition of farmers during COVID-19 in Haryana state. In this study, an attempt has been made to understand the adoption level of different strategies of farmers in rural areas with respect to their socioeconomic profile that enables them to adapt, as well as the socio-economic determinants of farm households that influence adaptation decisions and adoption strategy choices. For this purpose, a macro-level assessment of 80 farmers was conducted, selected from Hisar and Bhiwani districts, covering four blocks from each district and two villages from each block, selected randomly. The data were analysed through descriptive statistics with suitable parameters to make the findings more comprehensive. The study found that key socio-economic variables including farmers' age (55.00%), education (26.25%), landholding (27.50%) and family type (nuclear: 71.25%) were identified as significant determinants of technology adoption among the respondents. This study will help identify the critical household profiles that may be integrated into future policy formulation and implementation to support successful agricultural adaptation.

Keywords: Adoption, farmers, macro-level, livelihood, productivity

Introduction

Agriculture constitutes an important part of the Indian economy and, at present, India is among the top two farm producers in the world. Two-thirds of India's population directly or indirectly depends on agriculture and allied activities for their livelihood. Current climate change exposes farmers in developing countries to greater uncertainty in their livelihoods. Such threats will increase unpredictable weather conditions and destabilise agricultural production and crop prices in markets, threatening smallholders who rely on agriculture as their primary means of livelihood (IPCC, 2022) ^[5]. In this regard, an adoption strategy is a plan for achieving a sound result for better implementation from whatever system was previously in use (Anonymous, 2024) ^[1].

The finding that poor farmers adopt crop diversification for robust food security in response to drought/flood events and large increases in food prices for purchase is well documented. In contrast, progressive farmers adopt crop diversification to stabilise market income in response to large increases in input prices and large declines in crop prices for sale (Fujimoto and Suzuki, 2001) ^[3]. The acceptance of new technology usually passes through four different stages: consciousness, profitability, appraisal and finally acceptance. The potential effect of a new technology depends on whether farmers adopt it and, if they do,

whether the adoption is to the degree that can lead to measurable results within a certain period of time. These results are often reflected in increases in productivity, food quality and sustainability (Jara-Rojas *et al.*, 2020) ^[6].

Farmers often face difficulty in decision-making regarding the adoption of new agricultural innovations, mainly because of inadequate information or awareness about new technologies along with their implementation. For this reason, farmers need to be more aware of their economic status, the benefit-cost ratios of different crops and the adoption of appropriate innovations that govern the decision-making patterns of farmers in their perception towards new technology (Naveen Kumar, 2022) ^[9]. A recent study evaluated the adoption of technologies among different crop growers in Mau District, aiming to assess the extent of IPM integration and identify the factors influencing adoption (Singh, 2025) ^[12]. Several researchers have considered that adoption is the best possible option for combating the negative impacts on farmers and for increasing production levels (Hassan *et al.*, 2023) ^[4].

It has been noted that adoption intensity varies from one crop region to another, suggesting that training should be conducted in a region-specific manner for effective adoption. A study from Vietnam examined factors such as extension agents and peer learning, which influenced adoption at different stages (Ashrit and Joshi, 2024) ^[2]. It

has been demonstrated that the adoption of sustainable and diverse farm enterprises increases farmers' income. Furthermore, informal information contact was found to influence the adoption of sustainable agricultural practices (Thangjam, 2024) ^[13].

Methodology

The study was conducted in two districts of Haryana state, namely Hisar and Bhiwani, comprising four blocks from each district and two villages from each block, selected

randomly. The villages Dhanshu and Talvandi Rana from Hisar-I block, Bass and Badala from Hansi-I block, Bawani Khara and Bads from Bawani Khara block and Sagwan and Baganwala from Tosham block were selected randomly. Subsequently, ten farmers from each selected village were also selected randomly. Thus, a total sample of eighty farmers was selected using a random sampling technique.

Results and Discussion

Table 1: Distribution of personal profile of farmers (n=80)

S. No.	Variable(s)	Category	Frequency	Percentage
1	Age	Young (up to 30 years)	23	28.75
		Middle (31 to 50 years)	44	55.00
		Old (51 years and above)	13	16.25
2	Education	Primary	06	07.50
		Middle	15	18.75
		Matriculation	14	17.50
		Higher Secondary	17	21.25
		Graduate	21	26.25
		Post Graduate	07	08.75
3	Landholding	Less than 2.5 acres	11	13.75
		Above 2.5 and up to 5 acres	19	23.75
		Above 5 and up to 10 acres	20	25.00
		Above 10 to 15 acres	22	27.50
		Above 15 acres	08	10.00
4	Family Type	Nuclear	57	71.25
		Joint	23	28.75
5	Family Size	Small (up to 4 members)	22	27.50
		Medium (5 to 6 members)	42	52.50
		Large (more than 7 members)	16	20.00

Source: Field survey data

The data presented in Table 1 indicate that more than half of the respondents (55.00%) belonged to the middle age (31-50 years) group, followed by the young (up to 30 years) age group at 28.75 per cent. The remaining 16.25 per cent belonged to the old (51 years and above) age group. The data further reveal that 26.25 per cent of the respondents were graduates, followed by 21.25 per cent with higher secondary education, 18.75 per cent with middle school education, 17.50 per cent with matriculation, 08.75 per cent with postgraduate education and 07.50 per cent with only primary education, respectively. The study of Roy *et al.* (2024) ^[10] has shown that the level of socio-economic status and, in some cases, a lack of leisure time were identified as factors that may affect farmers' access to various mass media sources.

The data in Table 1 further depict that 27.50 per cent of the respondents hold land in the category of above 10 to 15 acres, followed by above 5 and up to 10 acres (25.00%), above 2.5 and up to 5 acres (23.75%), less than 2.5 acres (13.75%) and above 15 acres (10.00%), respectively. The data also portray that 71.25 per cent of respondents were living in nuclear families while 28.75 per cent were living in joint families. It is further depicted from Table 1 that 52.50 per cent of the respondents belonged to the medium (5-6 members) family size group, followed by 27.50 per cent from the small (up to 4 members) family group, while 20.00 per cent belonged to the large (more than 7 members) family size group.

Table 2: Irrigation facilities available with farmers (n=80)

S. No.	Source of Irrigation	Frequency	Percentage
1	Submersible pump / Tube well	43	53.75
2	Canal	18	22.50
3	Both (Canal + Tube well / Submersible pump)	57	71.25
4	Un-irrigated	23	28.75

* Multiple responses; Source: Field survey data

It was depicted from Table 2 that the majority of the respondents (71.25%) used both sources of irrigation (Canal + Submersible pump/Tube well), followed by Submersible pump/Tube well alone (53.75%), un-irrigated (28.75%) and canal alone (22.50%), respectively.

Table 3: Crop rotation followed by farmers (n=80)

Sr. No.	Crop Rotation	Frequency	Percentage
1	Cotton-Wheat	50	62.50
2	Bajra/Jawar/Guar-Wheat	16	20.00
3	Bajra/Jawar/Guar-Fallow	10	12.50
4	Fallow-Wheat	12	15.00
5	Bajra/Fallow-Mustard	06	07.50
6	Bajra/Fallow-Pulses	08	10.00

* Multiple responses; Source: Field survey data

The data presented in Table 3 show that 62.50 per cent of respondents were following the Cotton-Wheat crop rotation, followed by 20.00 per cent, 15.00 per cent, 12.50 per cent,

10.00 per cent and 07.50 per cent following Bajra/Jawar/Guar-Wheat, Fallow-Wheat, Bajra/Jawar/Guar-

Fallow, Bajra/Fallow-Pulses and Bajra/Fallow-Mustard rotations, respectively.

Table 4: Mass media exposure (virtual mode) of farmers (n=80)

S. No.	Particular	Used n (%)	Extent of Utilization			Total Score	Weighted Mean Score	Ranks
			Daily	Often	Sometime			
1	Online Solution	56 (70.00)	23 (69)	22 (44)	11 (11)	124	2.21	I
2	Television	64 (80.00)	16 (48)	27 (54)	21 (21)	123	1.92	II
3	e-Farm Magazine	18 (22.50)	00 (00)	10 (20)	08 (08)	028	1.55	V
4	e-Newspaper	22 (27.50)	05 (15)	07 (14)	06 (06)	035	1.59	IV
5	Radio	20 (25.00)	00 (00)	12 (24)	08 (08)	032	1.60	III
6	e-Kisan Sewa Kendra	08 (10.00)	00 (00)	04 (08)	04 (04)	012	1.50	VI

Source: Field survey data

It was depicted from Table 4 that Online Solution ranked first with a weighted mean score of 2.21, followed by Television and Radio ranked second and third with weighted mean scores of 1.92 and 1.60, respectively, as mass media tools. It was also reported from Table 4 that farmers used e-Newspaper (27.50%) followed by e-Farm Magazine (22.50%) and e-Kisan Sewa Kendra (10.00%) to obtain information, though not on a regular or daily basis (often and sometimes as required), ranking fourth, fifth and sixth, respectively. However, the variables of social media contact and extension contact are more likely to influence the adoption of different media as used in this study (Thangjam, 2024) ^[13].

Table 5: Social media used by farmers for getting information during COVID-19 (n=80)

S. No.	Social Media / ICT Tool	Frequency	Percentage
1	WhatsApp	66	82.50
2	Facebook	57	71.25
3	YouTube	45	56.25
4	Video Calling	37	46.25
5	Any Others (Twitter, Instagram, etc.)	17	21.25

* Multiple responses; Source: Field survey data

The data from Table 5 reveal that 82.50 per cent of respondents obtained information through WhatsApp, followed by Facebook (71.25%), YouTube (56.25%), Video Calling (46.25%) and any other platforms such as Twitter and Telegram (21.25%), respectively. Madhu Shekar *et al.* (2023) ^[8] declared that respondents perceived social media as a tool that can easily disseminate different technological innovations occurring in the farming sector within a short time.

Conclusion

The study concluded that the majority of the respondents (55.00%) belonged to the middle age group (31-50 years), followed by the young age group (28.75%) in respect to the adoption level of new practices. It was also observed that the majority of respondents were highly enthusiastic about adopting new technology, having become aware of its necessity for enhancing productivity and overcoming the hurdles they faced. Furthermore, the maximum proportion

of respondents (26.25%) were graduates, followed by higher secondary (21.25%), while 18.75 per cent were found to be at the middle school level of education. In the case of landholding, 27.50 per cent of respondents possessed land falling in the category of above 10 to 15 acres, followed by 25.00 per cent in the category of above 5 and up to 10 acres. The research also asserted that the majority of farmers (71.25%) used both irrigation sources, i.e., canal and tube well/submersible pump, owing to their easy availability. The study also revealed that the majority of farmers (62.50%) followed the Cotton-Wheat crop rotation, followed by 20.00 per cent adopting the Bajra/Jawar/Wheat rotation. The data further revealed that 70.00 per cent of farmers used mass media on a daily basis, securing a weighted mean score of 2.21 and ranking first, indicating that they are well acquainted with current social media platforms for obtaining need-based information. Furthermore, 80.00 per cent of respondents used Television owing to its availability, while 27.50 per cent of farmers utilised e-Newspaper. Social media used by farmers for obtaining information during the pandemic included WhatsApp (82.50%) and Facebook (71.25%). It is reported that farmers used smartphones for obtaining agricultural information, news, online chatting and for entertainment purposes. The results also support the findings of Khou and Suresh (2018) ^[7] and Singh *et al.* (2021) ^[11], who stated that YouTube was the most popular social media platform among all age groups of farmers, followed by Facebook and WhatsApp, while a small group of educated young farmers preferred Instagram and Twitter.

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