

KNOWLEDGE OF PADDY GROWERS ABOUT PLANT PROTECTION PRACTICES

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ABSTRACT

The present study examines the knowledge of plant protection practices among paddy growers in the Valsad district of Gujarat. This research also investigates the socio-economic profile and relationship between their knowledge of plant protection practices. Ex-post-facto research design was employed for this investigation. A total of 150 respondents from three talukas within the Valsad district were randomly selected for this study. Data were collected personally using an interview schedule covering independent dependent variables. The findings revealed that most respondents were middle-aged, with primary-level education, medium landholding size, and moderate annual income. They showed medium levels of risk orientation, mass media exposure, and decision-making ability, alongside moderate levels of innovativeness, economic motivation, and scientific orientation. A significant majority had at least one organizational membership. The respondents exhibited moderate knowledge of plant protection practices. Education, landholding, income, risk orientation, social participation, management orientation, economic motivation, scientific orientation, and mass media exposure had positive and highly significant relationships with knowledge of plant protection practices. This study is valuable for policymakers, extension workers, and agricultural scientists aiming to enhance paddy production in India through the promotion of efficient plant protection practices, thereby contributing to food security and rural development.

Keywords: paddy crop, knowledge, plant protection practices

INTRODUCTION

Paddy, a staple cereal for over half the global population, is essential for food security, particularly in Asia, where it serves as a major food source and agricultural focus. While India has the highest area under paddy cultivation, yields lag behind countries like China and Japan due to soil fertility issues, water scarcity, climate variability, and pest infestations. These challenges emphasize the need for effective plant protection to prevent losses and boost productivity. Plant protection, encompassing pest, disease, and weed management, is crucial for optimizing yields and promoting sustainable agriculture (Mondal *et al.*, 2017). India's paddy production spans diverse climates, each with unique pest challenges. Pests and diseases cause up to 33% of crop losses, making Integrated Pest Management (IPM) — combining biological control, cultural practices, and selective pesticide use — vital for sustainable pest control (Mondal *et al.*, 2017). Adoption of such practices, however, varies due to factors like education, training access, and local support. Farmers knowledgeable in plant protection tend to adopt eco-friendly methods, benefiting crop yield and environmental

health. Many Indian farmers still rely on traditional pest control, and awareness of sustainable practices remains uneven. Knowledge gaps lead to pesticide overuse, increasing environmental risks (Mondal *et al.*, 2017; Vegad *et al.*, 2021). This study examines paddy growers' knowledge and attitudes regarding IPM, aiming to identify areas for education and training to enhance sustainable practices and productivity (Anonymous, 2021). As agriculture shifts toward sustainable, climate-resilient practices, bridging knowledge gaps among farmers is essential for achieving these goals. Keeping this in view present study was undertaken with following specific objectives:

OBJECTIVES

- (1) To study the profile and knowledge level of paddy growers about plant protection practices of paddy crops; and
- (2) To ascertain the relationship between the profile of paddy growers and their knowledge about plant protection practices of paddy crop.

METHODOLOGY

This study was conducted in Valsad district, Gujarat, aiming to assess paddy growers' knowledge of plant protection practices and the factors influencing it. An ex-post-facto research design was employed with a sample of 150 paddy growers selected through multistage random sampling. First, three talukas viz; Valsad, Vapi, and Dharampur were chosen randomly from Valsad district's six talukas. Then, five villages per taluka were selected via lottery: Muli, Hariya, Dived, Chanvai, and Dungri from Valsad; Chhiri, Rata, Kaval, Morai, and Pandor from Vapi; and Bilpudi, Bamti, Luheri, Gadi, and Khoba from Dharampur. In each village, 10 paddy growers were randomly chosen, totalling 150 respondents. In this study, the knowledge and independent variables viz; age, education, landholding, income, risk orientation, social participation, media exposure, scientific orientation, management and decision-making abilities, innovativeness, economic motivation, and fatalism examined using the appropriate scales. Data were collected personally using a structured interview schedule covering both The study also analyzed the relationship between growers' knowledge of plant protection (dependent variable) and the profiles (independent variables) to understand their influence on knowledge levels.

RESULTS AND DISCUSSION

Profile of respondents

Farmers' profiles viz; age, education, land holding, annual income, risk orientation, social participation, management orientation, decision-making ability, economic motivation, mass media exposure, scientific orientation, innovativeness and fatalism were studied as independent variables during the investigation. Appropriate interpretation with discussion and reliable conclusions were made on the base of the results. The data regarding the results of the personal profile of respondents are presented in Table 1.

Table 1: Distribution of the respondents according to their profile (n=150)

Sr. No.	Categories	(f)	(%)
1	Age		
(1)	Young age (Up to 35 years)	27	18.00
(2)	Middle age (Between 36 to 60 years)	78	52.00
(3)	Old age (Above 60 years)	45	30.00
2	Education		
(1)	Illiterate	05	03.33
(2)	Functionally literate (no education)	17	11.34

Sr. No.	Categories	(f)	(%)
(3)	Primary school (1 st to 8 th class)	46	30.67
(4)	Middle school (9 th to 10 th class)	26	17.33
(5)	High school (11 th and 12 th class)	36	24.00
(6)	College/Postgraduate	20	13.33
3	Landholding		
(1)	Marginal (Up to 2.5 acres)	20	13.33
(2)	Small (2.5 to 5.00 acres)	36	24.00
(3)	Medium (5.00 to 10.00 acres)	70	46.67
(4)	Large (Above 10.00 acres)	24	16.00
4	Annual income (Mean = 1.84, SD = 0.62)		
(1)	Low (Up to 1.22 score)	43	28.66
(2)	Medium (1.22 to 2.46 score)	88	58.67
(3)	High (Above 2.46 score)	19	12.67
5	Risk orientation (Mean = 17.83, SD = 2.34)		
(1)	Low (Up to 15.49 score)	28	18.67
(2)	Medium (15.49 to 20.18 score)	99	66.00
(3)	High (Above 20.18 score)	23	15.33
6	Social participation (Mean = 1.04, SD = 0.97)		
(1)	No membership in any organization	43	28.67
(2)	Membership in one organization	56	37.33
(3)	Membership in more than one organization	40	26.67
(4)	Holding a position in the organization	11	07.33
7	Mass media exposure (Mean = 9.09, SD = 1.71)		
(1)	Low (Up to 7.37 score)	31	20.67
(2)	Medium (7.37 to 10.80 score)	93	62.00
(3)	High (Above 10.80 score)	26	17.33
8	Scientific orientation (Mean = 19.64, SD = 2.27)		
(1)	Low (Up to 17.37 score)	34	22.67
(2)	Medium (17.37 to 21.9 score)	75	50.00
(3)	High (Above 21.9 score)	41	27.33
9	Management orientation (Mean = 33.09, SD = 3.57)		
(1)	Low (Up to 29.52 score)	18	12.00
(2)	Medium (29.52 to 36.65 score)	111	74.00
(3)	High (Above 36.65 score)	21	14.00
10	Decision making ability (Mean = 14.61, SD = 2.23)		
(1)	Low (Up to 12.37 score)	32	21.33
(2)	Medium (12.37 to 16.84 score)	80	53.34
(3)	High (Above 16.84 score)	38	25.33
11	Innovativeness (Mean = 1.95, SD = 0.74)		
(1)	Low (Up to 1.22 score)	38	25.33
(2)	Medium (1.22 to 2.69 score)	78	52.00

Sr. No.	Categories	(f)	(%)
(3)	High (Above 2.69 score)	34	22.67
12	Economic motivation (Mean = 20.06, SD = 2.02)		
(1)	Low (Up to 18.04 score)	30	20.00
(2)	Medium (18.04 to 22.08 score)	103	68.67
(3)	High (Above 22.08 score)	17	11.33
13	Fatalism (Mean = 6.44, SD = 1.53)		
(1)	Low (Up to 4.91 score)	16	10.66
(2)	Medium (4.91 to 7.97 score)	94	62.67
(3)	High (Above 7.97 score)	40	26.67

The respondents' age was recorded in completed years and grouped into young, middle-aged, and old. As shown in Table 1(1), over half (52%) of respondents were middle-aged, 30% old, and 18% young. This is because in rural India where elder members, especially in the father's absence, hold authority. Additionally, many young, educated individuals prefer non-agricultural urban jobs. Similar trends were reported by Sardhara *et al.* (2020) and Khuvung *et al.* (2022). Education level, measured by scale developed by Pandya (2010), is summarized in Table 1(2) indicates that Nearly one third (30.67%) respondents had primary education, 24% high school, 17.33% middle school, 13.33% college or postgraduate, 11.34% were functionally literate, and 3.33% illiterate. Limited education is likely due to economic hardship and restricted access education facilities, and educated youth often migrate to cities, reducing their agricultural engagement. These findings align with Sardhara *et al.* (2020) and Kichu & Jahanara (2022).

Data pertaining landholding assessed with scale of Pandya (2010) with slight modification, are given in Table 1(3). It is evident that 46.67% had medium holdings, 24% small, 16% large, and 13.33% marginal. These patterns reflect land fragmentation and family divisions, consistent with Kichu and Jahanara (2022). Annual income of respondents was, measured by scale used by Pandya (2010) and based on data they were categorized into low, medium, or high earners. Table 1(4) shows that 58.67% respondents had medium-income, 28.67% low, and 12.67% high. This results might be due to the small landholding sizes of the respondents. The results match with the findings by Kichu and Jahanara (2022). Risk orientation was measured using Supe's (1969) scale and on the bases data respondents were categorized into low, medium, and high. Table 1(5) shows that 66% had medium risk orientation, 18.67% low, and 15.33% high. This might result from modest finances, education, landholding, and social participation, as also observed by Pandey and Tiwari (2022).

Data of social participation, assessed by using Pandya's (2010) scale given in Table 1(6), indicates that 37.33% respondents belonged to one organization, 28.67% had no participation, 26.67% were in multiple, and 7.33% held leadership roles. Such participation likely stems from village-level institutions such as panchayats and primary cooperatives societies. Finding of Pandey and Tiwari (2022) also supports this finding. The variable mass media exposure was assessed by Nirban's (2004) scale and based on results respondents were categorized into low, moderate, and high as given in Table 1(7). About 62% had moderate exposure, 38% low, and 20.67% high. This is due to the growing presence of TV, newspapers, and internet-enabled phones in villages, although literacy and age remain barriers. Similar trends were noted by Sardhara *et al.* (2020).

Scientific orientation of respondents was calculated using Supe's (1969) scale and based on they were grouped into low medium and high. Data given in Table 1(8) revealed that 50% had medium orientation, 27.33% high, and 22.67% low. Medium orientation may be influenced by tribal beliefs that hinder full adoption of scientific approaches. These findings align with Khuvung *et al.* (2022). Data of management orientation, measured by Samantha's (1977) scale, presented in Table 1(9) indicated that 74% had medium, 14% high, and 12% low levels. This likely relates to their farming experience and decision-making ability. Nagesh *et al.* (2011) also reported similar results.

Data regarding decision-making ability which was measured by scale of Nandapulkar (1981), given in Table 1(10), explains that 53.34% had medium, 25.33% high, and 21.33% low levels influenced by their education and landholding, similar to Rathod (2020). Innovativeness of respondents was evaluated with Singh's (1977) scale and results are presented in Table 1(11), shows that 52% had medium levels, 25.33% low, and 22.67% high. Moderate levels are likely due to average education and media access. Khuvung *et al.* (2022) also supports this finding.

Economic motivation was measured by using Supe's (1969) scale and data presented in Table 1(12), explains that 68.67% respondents had medium motivation, 20% low, and 11.33% high. This suggests that agriculture is seen as a viable livelihood. Similar findings were reported by Pandey and Tiwari (2022). Fatalism, assessed with Rathod's (2020) scale and presented in Table 1(13) shows that 62.67% had medium, 26.67% high, and 10.66% low fatalism. These views likely stem from tribal belief systems, as supported by Rathod (2020).

interpreting relevant information, which in turn elevates their knowledge. As far size of landholding concerned, study found that landholding size had a positive influence on knowledge levels. This might be that if the landholding increases the annual income of the farmers also increases (Das and Ganeshkumar 2018), subsequently, achievement motivation and interest in agriculture also increase (Bhattacharjee *et al.*, 2021), which might lead them to seek more information about plant protection practices, eventually knowledge increases.

Annual income was also positively associated with knowledge, as financially better-off farmers likely utilize mass media more and participate in extension activities, further enriching their understanding of plant protection. This finding is aligned with studies by Kichu and Jahanara (2022). Another critical factor was risk orientation—farmers with a higher tolerance for risk showed greater knowledge about plant protection, likely because they proactively seek information to manage uncertainty in farming. The same applies to social participation, which was positively correlated with knowledge, as social interactions expose farmers to new ideas and practices through information exchange. In terms of management orientation, those with higher tendencies toward efficient management had more knowledge, likely due to their proactive approach to acquiring data about farming technologies, market dynamics, weather, and resources. Similarly, farmers with better decision-making ability were more knowledgeable, probably because effective decision-making requires well-informed judgments based on a solid understanding of agricultural contexts. As far as economic motivation concerned, it was also played a significant role in enhancing knowledge because highly motivated farmers actively pursue information and innovations that could increase their profits, thereby increasing their knowledge about plant protection.

Mass media exposure was another influential factor, where greater engagement with media translated into higher knowledge due to the media's role in disseminating information and enhancing awareness. Also, scientific orientation positively correlated with knowledge levels, as scientifically inclined farmers tend to value empirically proven practices and stay updated with research-based recommendations. These farmers, often curious and innovation-driven, are more likely to adopt new technologies, thereby expanding their knowledge base. This findings was in conformity with Chauhan and Patel, (2021). A correlation study of Innovativeness shows that Innovativeness had a significant impact on knowledge about plant protection practices. This is because innovative farmers, due to their active involvement in research-extension networks, mass media, and their general information-seeking behavior,

demonstrated greater knowledge.

Interestingly, the study also found that fatalistic beliefs had minimal influence on knowledge. Despite many respondents belonging to tribal communities with traditional beliefs attributing events to divine forces, long-standing exposure to agricultural innovations and extension activities helped bridge this gap. Continuous outreach has empowered even the most traditionally inclined farmers with substantial knowledge of plant protection practices, minimizing the role of fatalism. These insights, collectively, underscore the multifaceted influences—ranging from demographics and economics to psychological traits and social behavior—on the knowledge levels of paddy farmers regarding plant protection, offering vital implications for future agricultural extension and education strategies. This findings was in line of the finding of Rathod *et al.* (2021); Nath *et al.* (2024); Bora *et al.* (2023); Patel *et al.* (2023); Bhat *et al.* (2022); Bora *et al.* (2022)

CONCLUSION

The study concluded that most respondents were middle-aged, had a primary education, medium landholdings, and medium annual income. They exhibited moderate levels of risk orientation, media exposure, scientific and management orientation, decision-making ability, innovativeness, and economic motivation, with most holding membership in one organization. Respondents generally had medium knowledge of plant protection practices for paddy. Key factors such as education, landholdings, income, social participation, management orientation, and scientific orientation positively influenced their knowledge of plant protection at a high significance level. Age was negatively correlated, while fatalism showed no significant relationship with knowledge. The findings emphasize that the State Department of Agriculture, universities, and NGOs should collaborate on targeted extension programs to enhance paddy growers' knowledge of plant protection practices. Future research should further explore how paddy growers' profiles influence their knowledge and adoption of these practices.

IMPLICATIONS

The results of this investigation agree to both theoretical and applied implications for all stakeholders who are involved research and extension activities. Following implications can be made in light of findings of the present study.

- (1) The findings of the study indicated that the majority of respondents had a medium level of knowledge about plant protection practices of paddy crop. Hence it is imperative that State Department of Agriculture,

University of Agricultural Sciences and other NGOs should make integrated and concerted extension efforts to provide required knowledge about plant protection practices to paddy growers.

- (2) Research related to the relationship of profile of paddy growers and dependent variables should be considered while planning and implementation of the knowledge enhancing programmes for paddy growers in the South Gujarat.

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CONFLICT OF INTEREST

All authors express no conflict of interest in any part of the research.

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