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Perceived constraints in adopting integrated pest management: Insights from soybean growers

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Abstract

The research investigates the psychological underpinnings, constraints, and suggestions influencing the adoption of Integrated Pest Management (IPM) practices among soybean growers. The psychological profiles of respondents reveal diverse attitudes, scientific orientations, innovativeness, and knowledge levels. Notably, attitude, innovativeness, and knowledge exhibit significant positive correlations with IPM adoption, emphasizing their pivotal roles. Constraints faced by soybean growers, with improper knowledge about pheromone traps ranking highest. This underscores the need for targeted education on IPM tools and techniques. Suggestions, with a prominent emphasis on disease resistant soybean varieties and increased technical knowledge. The multifaceted insights provide a foundation for tailored interventions, educational initiatives, and policy recommendations to bolster the adoption of sustainable IPM practices in soybean cultivation, fostering agricultural resilience and sustainability.

Keywords: Psychological profile, constraints, IPM, and soybean growers

Introduction

Integrated Pest Management (IPM) stands as a sustainable approach to pest control that integrates various strategies to minimize environmental impact and economic costs. While the benefits of IPM are well-documented, the extent of its adoption among soybean growers is influenced by a myriad of factors. This research delves into the perceived constraints faced by soybean growers in embracing IPM practices, aiming to provide nuanced insights into the challenges that hinder the widespread adoption of sustainable pest management strategies.

Soybean cultivation, a crucial component of global agriculture, is often confronted with pest-related challenges that impact yield and quality. IPM offers a holistic approach, incorporating cultural, mechanical, biological, and chemical control measures. Despite its effectiveness, the adoption of IPM practices among soybean growers varies, and understanding the underlying constraints is vital for targeted interventions.

The objective of this research is to identify and analyze the constraints perceived by soybean growers regarding the adoption of IPM practices. By exploring the psychological, economic, and contextual factors that act as barriers, this study aims to contribute valuable insights for policymakers, extension services, and agricultural practitioners. The findings will not only enhance our understanding of the challenges faced by soybean growers but will also inform the development of strategies to overcome these constraints, fostering a more sustainable and resilient soybean cultivation landscape. The research combines qualitative and quantitative methods, engaging directly with soybean growers to capture their experiences, perceptions, and recommendations. Through this investigation, we seek to bridge the gap between IPM knowledge and on-field implementation, ultimately promoting the integration of environmentally friendly and economically viable pest management practices in soybean agriculture.

Materials and Methods

In the Bhopal district, characterized by two subdivisions, the Berasia block was deliberately selected for its prominence in soybean cultivation, coupled with the researcher's familiarity with the area and local intricacies. Within the Berasia block, which comprises a total of 304 villages, a random selection process identified six villages—Damila, Chanpura, Dolatpura, Hamid Khedi, Gorla, and Netapura—for inclusion in the study. To ensure a representative sample, a systematic approach involved the random selection of 20% of soybean growers from

each of the chosen villages. This meticulous sampling strategy culminated in the inclusion of 120 farmers in the research study. The rationale behind this methodology is to provide a diverse and comprehensive understanding of the psychological profile with the association of their adoption patterns of integrated pest management practices in soybean cultivation, thus enhancing the robustness and applicability of the research findings.

Results and Discussion

Psychological profile

Table 1 presents a detailed distribution of respondents based on their psychological profiles, encompassing attitudes towards Integrated Pest Management (IPM), scientific orientation, innovativeness, and the level of knowledge.

Attitude towards IPM

The distribution indicates a balanced representation, with 25.00% holding an "Unfavorable" attitude, 49.17% maintaining a "Moderate" stance, and 25.83% expressing a "Favorable" attitude. This diversity in attitudes provides a nuanced understanding of the psychological landscape among soybean growers, emphasizing the need for tailored interventions to address varying perceptions of IPM.

Scientific Orientation

Respondents exhibit varied levels of scientific orientation, with 28.33% categorized as "Low," 49.17% as "Medium," and 22.50% as "High." The prevalence of a significant proportion in the "Medium" category suggests a baseline scientific orientation among soybean growers, offering potential leverage points for educational initiatives to enhance scientific understanding.

Innovativeness

The distribution of innovativeness reveals a balanced landscape, with 21.67% classified as "Low," 50.00% as "Medium," and 28.33% as "High." This diversity underscores the scope for targeted interventions to bolster innovativeness, fostering a more dynamic approach among soybean growers towards the adoption of innovative pest management practices.

Level of Knowledge

The level of knowledge among respondents is well-distributed, with 17.50% falling into the "Low" category, 70.00% in the "Medium" range, and 12.50% in the "High" category. This distribution provides a baseline understanding of the knowledge landscape, emphasizing the potential for educational interventions to bridge gaps and elevate the overall knowledge base related to IPM practices.

Table 1: Distribution of the respondents according to their psychological profile

S. No.	Categories	No. of respondents	Percentage
1.	Attitude towards IPM		
	Unfavorable	30	25.00
	Moderate	59	49.17
	Favorable	31	25.83
	Total	120	100.00
2.	Scientific orientation		
	Low (up to 6 scores)	34	28.33
	Medium(7-15 scores)	59	49.17
	High (16 and above scores)	27	22.50
	Total	120	100.00
3.	Innovativeness		
	Low Innovativeness	26	21.67
	Medium Innovativeness	60	50.00
	High Innovativeness	34	28.33
	Total	120	100.00
4.	Level of knowledge		
	Low (up to 15 scores)	21	17.50
	Medium (16-19 scores)	84	70.00
	High (22 and above scores)	15	12.50
	Total	120	100.00

Correlation analysis of psychological profile with the adoption of recommended IPM practices of soybean

Table 2 presents a correlation analysis investigating the relationship between psychological profiles of soybean growers and their adoption of recommended Integrated Pest Management (IPM) practices. The results reveal that attitudes significantly correlate with adoption ($r = 0.1987, p < 0.05$), indicating that a positive attitude towards IPM is associated with a higher likelihood of adoption. Innovativeness also shows a significant positive correlation ($r = 0.1850, p < 0.05$), suggesting that more innovative farmers are more inclined to adopt IPM practices. Notably, the level of knowledge

demonstrates a strong positive correlation ($r = 0.2415, p < 0.01$), emphasizing the pivotal role of knowledge in influencing the adoption of IPM practices. However, scientific orientation exhibits a non-significant correlation (NS), suggesting that the scientific inclination of growers may not significantly impact their adoption behavior. These findings underscore the importance of psychological factors, particularly attitudes and knowledge, in shaping the adoption of sustainable agricultural practices, providing valuable insights for targeted interventions and educational programs aimed at enhancing IPM adoption among soybean growers.

Table 2: Correlation analysis of psychological profiles of respondents with the adoption of recommended IPM practices of soybean

1.	Attitude	0.1987*
2.	Scientific orientation	0.0027 ^{NS}
3.	Innovativeness	0.1850*
4.	Level of knowledge	0.2415**

NS= Non significant, *Significant at 5% level, **Significant at 1% level

Constraints perceived by soyabean growers in adoption of integrated pest management practices

Table 3 elucidates the perceived constraints faced by soybean growers in the adoption of integrated pest management (IPM) practices, providing valuable insights into the challenges that may hinder the widespread implementation of sustainable pest management strategies. A notable constraint, as indicated by the highest frequency and ranking (98.33%, I), is the improper knowledge about pheromone traps. This underscores a critical need for targeted educational initiatives to enhance growers' understanding of these IPM tools. Similarly, insufficient knowledge about light traps (75.00%, III) and technical aspects related to bio-agents and bio-insecticides (85.00%, II) emerges as significant barriers, emphasizing the importance of educational interventions in these domains. Lack of knowledge about seed treatment (62.50%, V) and inadequate supply of seed for resistant varieties (57.69%, VI) also feature prominently, signaling the necessity for comprehensive training programs on seed-related aspects. Non-availability of bio-insecticides (63.33%, IV) poses a noteworthy challenge, suggesting the need for improved accessibility to these alternatives. The constraints related to chemical inputs, including insufficient knowledge (49.16%, VIII) and inadequate supply (25.00%, IX), highlight areas where educational and logistical support can contribute to overcoming barriers. Issues such as non-availability of chemical fertilizers (50.00%, VII), non-availability of labor (37.50%, XI), and insufficient funds for agricultural inputs (48.83%, X) further underscore multifaceted challenges that necessitate a holistic approach to promote the effective

adoption of IPM practices among soybean growers.

Suggestions obtained from the soyabean growers to overcome the problems faced by them during the adoption of recommended IPM practices of soyabean

Table 4 presents valuable insights into the suggestions offered by soybean growers to address challenges encountered during the adoption of recommended Integrated Pest Management (IPM) practices. The most prominent suggestion, with a significant frequency of 75.00%, is the demand for pest and disease-resistant soybean varieties. This underscores the growers' emphasis on preventive measures through resilient crop varieties. Technical knowledge enhancement in various aspects of soybean IPM practices, such as seed treatment methods, pest and disease identification, and the correct use of fungicides and fertilizers, ranked second with 50.00%. The call for increased awareness about pesticide usage and its impact on crops (36.67%) highlights a need for educational initiatives. The demand for accessible pesticides (70.00%) and availability of labor during hoeing (58.83%) signifies practical concerns that influence pest management. Furthermore, suggestions related to training programs at the village level, local availability of plant protection equipment, provision of good quality seeds, and storage facilities shed light on multifaceted considerations in optimizing soybean IPM practices. This comprehensive array of suggestions reflects the growers' nuanced perspectives and provides a foundation for tailored interventions and policy recommendations to enhance the efficacy and adoption of recommended IPM practices in soybean cultivation.

Table 3: Constraints perceived by soyabean growers in adoption of integrated pest management practices

S. No.	Constraints	Adoption		
		Frequency	percent	Rank
1	Lack of knowledge about seed treatment	75	62.50	V
2	Insufficient supply of seed of resistant variety	69	57.69	Vi
3	Non availability of chemical fertilizer	60	50.00	Vii
4	Improper knowledge about pheromone trap	118	98.33	I
5	Improper knowledge about light trap	90	75.00	Iii
6	Improper technical knowledge about bio-agent and bio-insecticide	102	85.00	Ii
7	Non-availability of bio-insecticide	76	63.33	Iv
8	Complete insufficient knowledge about chemical insecticide	59	49.16	Viii
9	Inadequate supply of chemical insecticide	30	25.00	Ix
10	Non availability of labours	45	37.50	Xi
11	Insufficient funds to purchase useful agricultural inputs	49	48.83	X

Table 4: Suggestions obtained from the soyabean growers to overcome the problems faced by them during the adoption of recommended IPM practices of soyabean

S. No.	Suggestions	Frequency	Percent	Rank
01	Pest and disease resistant of soyabean should be available	90	75.00	I
02	Technical Knowledge Should be increased in various aspects of soyabean IPM practices i.e. methods of seed treatment, identification of pests and diseases, use of proper doses of fungicide and fertilizers	60	50.00	V
03	Increased awareness regarding use of pesticides and its effect on crop	44	36.67	IX
04	Pesticides should be provided	85	70.00	II
05	Market facilities should be provided	30	25.00	X
06	Availability of labour at the time of Hoeing	70	58.83	III
07	Training Programmes Should be organized on Plant protection measures at village level	54	45.00	VII
08	Availability of Plant protection equipments locally at critical time	50	41.67	VIII
09	Good quality seed should be provided	58	48.33	VI
10	Storage facility should be provided	65	54.17	IV

Conclusion

In conclusion, the comprehensive analysis of soybean growers' psychological profiles, constraints perceived, and suggestions offered for the adoption of Integrated Pest Management (IPM) practices provides valuable insights into the multifaceted dynamics influencing sustainable agriculture. The psychological profile assessment revealed diverse attitudes, scientific orientation, innovativeness, and knowledge levels among growers, emphasizing the need for tailored interventions considering this heterogeneity. The correlation analysis highlighted the significance of positive attitudes, innovativeness, and knowledge in influencing the adoption of IPM practices, underlining the pivotal role of psychological factors in shaping sustainable agricultural behaviors. Perceived constraints illuminated critical challenges, such as inadequate knowledge about pheromone traps, light traps, and bio-agents, signaling the necessity for targeted educational initiatives to overcome knowledge gaps. Additionally, logistical issues related to the supply and availability of inputs, including resistant seed varieties, bio-insecticides, and chemical fertilizers, emerged as barriers demanding holistic approaches. The growers' suggestions underscored their priorities, with a strong emphasis on disease-resistant varieties, increased technical knowledge, and accessible pesticides, providing actionable insights for policy development and educational interventions. This research contributes to the ongoing discourse on sustainable agriculture by elucidating the intricate interplay of psychological, knowledge-based, and logistical factors in the adoption of IPM practices. Tailoring interventions based on these findings can enhance the effectiveness of strategies aimed at promoting sustainable practices among soybean growers, thereby contributing to the broader goal of fostering environmentally friendly and economically viable agricultural systems.

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