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A study on buying behaviour of farmers towards pesticides in Siddipet District of Telangana

¹Anupati Srijia, ²Kiran Lakshmikanth Kadam, ²Vaijanatha and ²K Kalyan

¹ MBA scholar, School of Agricultural Sciences, Malla Reddy University, Hyderabad, Telangana, India

²Assistant Professor, School of Agricultural Sciences, Malla Reddy University, Hyderabad, Telangana, India

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Corresponding Author: Anupati Srijia

Abstract

Farmers' decisions when purchasing pesticides are influenced by a combination of economic, social, and informational factors. Key considerations include product effectiveness, price, availability, and brand reputation. In addition, recommendations from pesticide dealers, fellow farmers, and agricultural extension workers play a significant role in shaping buying behaviour. Among these, peer influence is particularly strong, as farmers tend to trust the experiences of others within their community. Awareness of safety standards and regulatory guidelines further affects preferences, with informed farmers showing a greater inclination toward certified and less hazardous products. This study was conducted in Siddipet district of Telangana, selected purposively due to its high gross cropped area. Major pesticide-consuming crops, namely paddy, maize, and cotton, were chosen for analysis. A multi-stage sampling design combining purposive and random techniques was adopted. Three mandals—Chinnakodur, Narayanaraopet, and Thoguta—were selected based on crop acreage. From these mandals, eight villages were identified, and a total of 120 farmers were randomly selected for the survey. Data were analysed using statistical tools such as frequency, percentage, chi-square test, Garrett ranking technique, and Likert scale with the help of SPSS software. The findings highlight that while informal sources like dealers and fellow farmers dominate decision-making, formal advisory services such as agricultural extension officers remain underutilized despite offering scientifically reliable guidance. The study also identifies key challenges faced by farmers, including inadequate knowledge of proper pesticide usage and the high cost of quality products, which often leads to misuse or reliance on cheaper alternatives. These findings emphasize the need for targeted interventions by policymakers and agrochemical companies to promote safe, affordable, and sustainable pesticide use, while strengthening access to reliable information and extension services.

Keywords: Pesticide use, farmer behaviour, buying decisions, social influence, extension services, sustainable agriculture

Introduction

Agriculture supports a large share of India's population, and the increasing demand for food has made pesticides an essential tool for protecting crops from pests and diseases. Farmers do not base their purchasing decisions on a single factor; instead, they consider a combination of economic, agronomic, and social aspects. Key elements such as product effectiveness, availability, cost, and the risk of crop damage play an important role. Farmers also rely on their past experiences, present crop conditions, and expected yields when deciding which pesticide to use. In most cases, the need for pesticides arises when farmers observe pest attacks in their fields or anticipate seasonal outbreaks. Their awareness is further shaped through discussions with fellow farmers, local input dealers, and agricultural extension officers. By comparing current conditions with previous seasons, farmers determine whether pesticide application is necessary and when it should be carried out.

Among the various influences, pesticide dealers and retailers hold a particularly strong position in shaping farmers' choices. They often act as key advisors, suggesting specific products based on crop type and pest issues. Although their recommendations may come from practical experience, they are sometimes influenced by marketing incentives offered by

agrochemical companies. This interaction builds a strong level of trust between farmers and dealers, making their advice a major factor in purchasing decisions, especially in rural areas.

Fellow farmers also contribute significantly to the decision-making process. Their recommendations, based on firsthand experience, are widely trusted and often influence brand preferences, particularly where access to formal sources of information is limited. On the other hand, extension officers and advisory services provide more scientific and reliable guidance, helping farmers make informed decisions. Additionally, company representatives, media advertisements, and field demonstrations play a role in increasing awareness. Together, these different sources create a network of information that shapes farmers' perceptions of pesticide quality, safety, and effectiveness, ultimately influencing their buying behaviour.

Pesticides are vital in agriculture for preventing major crop and livestock losses, estimated at 30-33 percent annually, and for reducing storage damage that can range from 5 to 70 percent. They are especially critical for vulnerable crops like cowpea, which risk complete failure without protection. However, their toxic nature poses serious health risks, particularly for farmers and agricultural workers. Evidence

from contexts such as Nigeria highlights the dangers of improper handling and limited safety measures. This dual reality emphasizes the need to balance the productivity benefits of pesticides with safer practices and stronger awareness initiatives (Augustine Udoh *et al.*, 2011) ^[17].

Agriculture is central to food security, yet shrinking land availability from urbanization and industrial growth has increased pressure to boost yields. Farmers rely heavily on advanced technologies and pesticides to protect crops, but this reliance can degrade soil and pose health risks to workers. Synthetic pesticides remain the dominant method of pest control due to their effectiveness, though they also contribute to problems such as pest resistance, environmental contamination, harm to non-target species, and risks to human health. While alternative pest management approaches exist, they are adopted far less frequently (Ashish Ashok Uikey and Sharvari Patil, 2023) ^[18].

Agriculture is a key pillar of India's economy, contributing 20.2 percent to GDP in 2020-21 and employing nearly 60 percent of the population. Despite being a major pesticide producer, India's usage remains relatively low due to limited farmer awareness, financial challenges, and declining cultivable land. Crop losses remain significant, with 35-45 percent attributed to pests and diseases and about 35 percent to poor storage. These challenges highlight the urgent need for stronger pest management practices and improved storage systems to enhance productivity and ensure food security (Jyoti Kachroo *et al.*, 2023) ^[8].

Pesticide retailers play a central role in modern agriculture by guiding farmers' purchasing decisions, but their recommendations can sometimes encourage excessive use. To safeguard health and the environment, countries such as Tanzania and India regulate pesticide sales through mandatory registration, training, and safety standards. Retailers are expected to employ qualified technical advisors and maintain proper safety equipment, ensuring that farmers receive responsible guidance while minimizing risks (Jaher Ahmed *et al.*, 2024) ^[1].

This study is significant as it helps to understand the key factors that influence farmers' decisions in purchasing pesticides, including price, quality, availability, and recommendations. It provides useful insights into farmers' awareness, preferences, and decision-making behavior. The findings can assist policymakers in designing better awareness and safety programs for pesticide use. It also helps extension services and agrochemical companies improve guidance, products, and support systems. Overall, the study promotes informed decision-making and encourages safe, sustainable, and efficient pesticide use in agriculture.

Objectives

- To understand the farmers usage patterns of pesticides in Siddipet district
- To find the obstacles of farmers have when making pesticides purchases.

Materials and Methods

Sampling design: Multistage purposive cum random sampling design was employed in the present study.

Sampling procedure: Selection of district: Siddipet district of Telangana was purposively selected to study buying behaviour of farmers towards pesticides, as the district

occupies first place in gross area sown in Telangana. Out of the various crops cultivated in the Siddipet district paddy, Maize and cotton crops were selected as the pesticides consumption is high in these crops.

Selection of mandals: The second stage of sampling pertains to the selection of the mandals. All the mandals having maximum acreage of paddy, Maize and cotton were listed out and top three mandals for paddy, Maize and cotton crop each viz., Chinnakodur, Chandlapur and Allipur with highest crop acreage of paddy, Thukkapur, Jakkapur and Mallyal with highest crop acreage of Maize and Thoguta, Narayanaraopet highest crop acreage of cotton were purposively selected for the study.

Selection of villages: The selection of villages formed the third stage of sampling. From the selected mandals, a total of eight villages two from one mandal namely Thoguta, Thukkapur from Thoguta mandal and remaining six villages from two Mandals namely Chinnakodur, Chandlapur and Allipur from Chinnakodur mandal, Narayanaraopet, Mallyal and Jakkapur from Narayanaraopet mandal were selected as they were the highest paddy, maize and cotton growing villages respectively in the selected mandals of Siddipet district.

Selection of farmers: Paddy, Maize and cotton growers of selected villages were listed and 15 farmers from each village were randomly selected for the survey thus making the total sample size to 120.

Collection of data: The data pertaining to the present study were obtained through survey method and enquiries were made with the help of pre-tested schedules. The present study was related to the agricultural year 2025-26.

Primary data: The primary data regarding socio-economic profile of sample farmers, pesticides using in chilli and cotton, awareness towards pesticide usage, source of information regarding pesticides, factors influencing buying behaviour of farmers towards pesticides and constraints faced by the farmers in purchasing process of pesticides were collected using interview schedule.

Tools of analysis: The data collected were subjected to appropriate set of statistical tools to arrive at valid conclusions. Data was statistically analyzed using SPSS program.

Frequencies and percentages

Some of the data were also interpreted in terms of their frequencies and percentages wherever necessary to know the distribution pattern of respondents according to variables.

Frequency: It's simply a count of how many participants or observations fall into each category.

$$\text{Percentage} = \frac{\text{Frequency of category}}{\text{Total frequency (sample size)}} \times 100$$

Likert's scale

A Likert Scale is a popular rating scale used in surveys to measure attitudes, opinions, or perceptions. It captures the degree of agreement or disagreement with a statement. Typically, it consists of 5 or 7 ordered response options ranging from, for example, Strongly Disagree to Strongly Agree.

Formula

$$\text{Mean score} = \frac{\sum (f_i \times v_i)}{N}$$

- f_i = Frequency of respondents choosing the i th response option
- v_i = Value assigned to the i th response (e.g., 1 = Strongly Disagree to 5 = Strongly Agree)
- N = Total number of respondents

Concepts and terms used

Buying behaviour: Consumer buying behaviour is the study of the ways of buying and disposing of goods, services, ideas or experiences by the individuals, groups and organizations in order to satisfy their needs and wants.

Pesticides: Pesticides are the organic or inorganic substances that are meant to control pests like insects, fungal organisms, bacterial organisms, weeds and other organisms which cause damage to the crop.

Brand: A brand is defined as a name, term, design, symbol or any other feature that identifies one seller's good or service as distinct from those of other sellers. The legal term for brand is trade mark.

Agriculture input companies: Private companies who sell agricultural inputs like pesticides, fertilizers, seeds and agricultural equipment's through a distributor or a dealer.

Pesticide dealer: A person who sells pesticides to the farmers on behalf of company.

Pesticide company representative: Professionals who are either agricultural graduates or post graduates who take care of sales, marketing and product development of pesticides.

Kisan call centers: Kisan call centers enable farmers to have direct discussions with the subject matter experts who are able to analyse the problem effectively and provide the solution through phone call.

Product free samples: Free samples of the product are distributed to some of farmers by the private input companies as a part of marketing activity to promote their products.

Professional money lender: Professional money lender is an individual or group that usually lends relatively small amount of money at high rates of interest to farmers.

Results and Discussion

Objective 1: To understand the farmers usage patterns of pesticides in Siddipet district

1. Type of pesticide usage in maize

The data presented in Table 1 indicates the type of pesticide mostly used in maize cultivation by the respondents. Out of 120 respondents, a majority 54.2 percent reported using all types of pesticides, including herbicides, insecticides, and fungicides, indicating an integrated pest and weed management approach in maize cultivation.

Table 1: Type of pesticide mostly used in maize

Type of pesticide	Frequency	Percentage	Cumulative percentage
Herbicide	28	23.3	23.3
Insecticide	19	15.8	39.1
Fungicide	08	6.7	45.8
All of the above	65	54.2	100.0
Total	120	100.0	

Herbicides alone were used by 23.3 percent of the respondents, suggesting that weed management is a significant concern in maize farming. Insecticides were used by 15.8 percent of the farmers, reflecting the prevalence of insect pest problems in maize crops. Only 6.7 percent of respondents reported using fungicides, indicating comparatively lower incidence or awareness of fungal diseases in maize cultivation. Overall, the findings reveal that most maize farmers rely on a combination of pesticides rather than a single category, highlighting the intensity of pest, weed, and disease pressures in maize production.

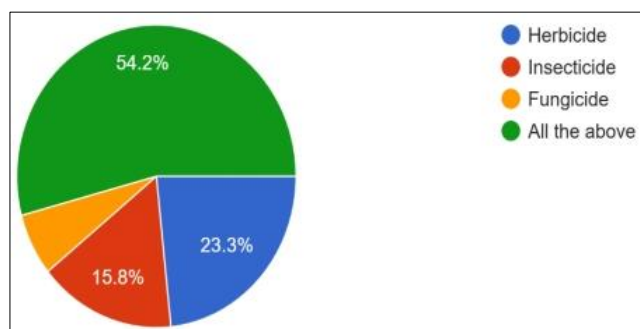


Fig 1: Type of pesticide usage in maize

2. Form of pesticide preferred in maize crop

The results of the SPSS frequency analysis regarding the preferred form of pesticides for maize cultivation are presented in Table 2. Out of the total 120 respondents, a majority 77 respondents 64.2 percent preferred liquid formulation of pesticides. This indicates that liquid formulations are the most commonly used form in maize cultivation.

Table 2: Form of pesticide preferred in maize crop

Form of pesticide	Frequency	Percentage	Cumulative percentage
Liquid formulation	77	64.2	64.2
Powder formulation	21	17.5	81.7
Granular formulation	22	18.3	100.0
No preference	0	0.0	100.0
Total	120	100.0	

Further, 22 respondents around 18.3 percent preferred granular formulation, followed by 21 respondents 17.5 percent who preferred powder formulation. These results suggest that although liquid formulations dominate, a considerable proportion of farmers still use granular and

powder forms depending on the type of pest, method of application, and field conditions. None of the respondents reported no preference, indicating that all farmers have a clear choice regarding the form of pesticide used for maize crop protection. Overall, the findings reveal a strong preference for liquid pesticide formulations among maize farmers, which may be attributed to their ease of application, better coverage, quick action, and compatibility with commonly used spraying equipment.

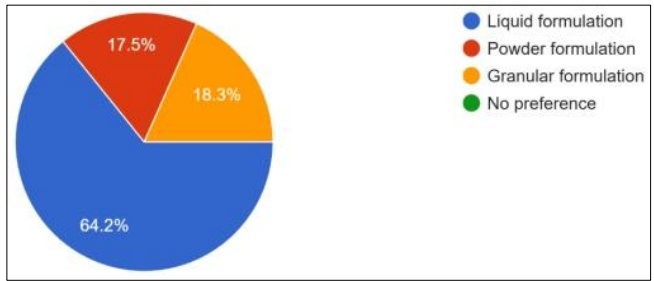


Fig 2: Form of pesticide preferred in maize crop

3. Type of pesticide used in cotton

The results presented in Table 3 indicate the types of pesticides predominantly used by cotton farmers in the study area. Out of the total 120 respondents, 50.0 percent reported using all types of pesticides, including herbicides,

insecticides, and fungicides, suggesting an integrated and intensive pesticide usage pattern in cotton cultivation.

Table 3: Type of pesticide used in cotton cultivation

Type of pesticide	Frequency	Percentage	Cumulative percentage
Herbicides	18	15.0	15.0
Insecticides	32	26.7	41.7
Fungicides	10	8.3	50.0
All of the above	60	50.0	100.0
Total	120	100.0	

Further, 26.7 percent of the respondents primarily used insecticides, highlighting the significance of insect pest pressure in cotton crops. This reflects the continued prevalence of insect-related challenges such as bollworms, sucking pests, and whiteflies, which compel farmers to rely heavily on insecticidal applications. About 15.0 percent of the farmers reported predominant use of herbicides, indicating the importance of weed management practices in cotton production, particularly in labour-scarce conditions. Meanwhile, only 8.3 percent of the respondents relied mainly on fungicides, suggesting comparatively lower incidence or perceived severity of fungal diseases in the region. The cumulative percentage shows that 50 percent of farmers use either herbicides, insecticides, or fungicides individually, while the remaining half employ a combination of all pesticide types, underscoring the complexity of pest management in cotton cultivation.

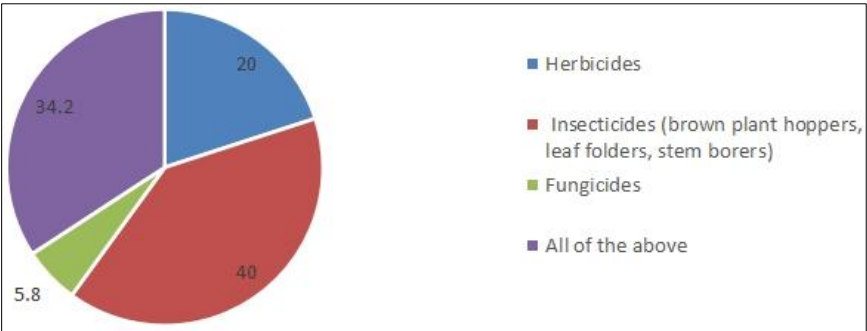


Fig 3: Type of pesticide used in cotton cultivation

4. Reasons for using pesticides in cotton

The data in Table 4 shows the main reasons for using pesticides in cotton cultivation as reported by the respondents. Out of the total 120 respondents, a majority 71

farmers 59.2 percent indicated that pesticides are primarily used to control insect pests such as bollworms and sucking pests. This highlights insect pest infestation as the most serious constraint in cotton production.

Table 4: Reasons for using pesticides in cotton

Reason for using pesticides	Frequency	Percentage	Cumulative percentage
To control insect pests (bollworms, sucking pests)	71	64.2	64.2
To improve crop yields	18	17.5	81.7
To control diseases	16	18.3	100.0
To control weeds	15	0.0	100.0
Total	120	100.0	

Further, 18 respondents around 15.0 percent reported that pesticides are used to improve crop yields, suggesting that farmers perceive pesticide application as an important input for enhancing productivity. Disease control was reported as the main reason by 16 respondents 13.3 percent while weed control was reported by 15 respondents 12.5 percent. The

cumulative percentages indicate that nearly three-fourths of the respondents 74.2 percent use pesticides mainly for pest control and yield improvement purposes. Overall, the findings reveal that insect pest management is the dominant reason for pesticide usage in cotton, followed by yield enhancement, disease control, and weed management.

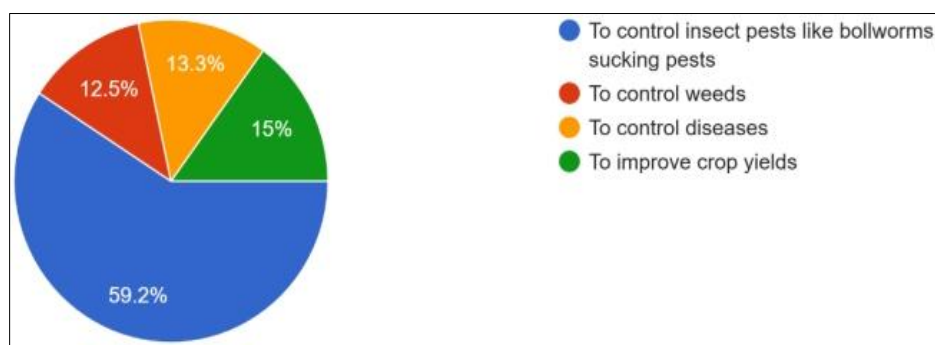


Fig 4: Reasons for using pesticides in cotton

5. Pesticide used in paddy

Table 5 shows the distribution of respondents based on the type of pesticide mostly used in paddy cultivation. Out of 120 respondents, 40.0 percent reported insecticides as the most

commonly used pesticide, indicating that insect pest incidence such as stem borers, leaf folders, and plant hoppers is a major concern in paddy farming.

Table 5: Pesticide used in paddy

Type of pesticide	Frequency	Percentage	Cumulative percentage
Herbicides	24	20.0	20.0
Insecticides (brown plant hoppers, leaf folders, stem borers)	48	40.0	60.0
Fungicides	07	5.8	65.8
All of the above	41	34.2	100.0
Total	120	100.0	

Further, 34.2 percent of the respondents reported using all types of pesticides, including herbicides, insecticides, and fungicides. This reflects a comprehensive pest management approach adopted by a significant proportion of farmers to manage weeds, insect pests, and diseases simultaneously in paddy ecosystems.

About 20.0 percent of the respondents predominantly used herbicides, highlighting the importance of weed control practices in paddy cultivation, especially under labour

scarcity and increasing wage rates. Only 5.8 percent of the respondents relied mainly on fungicides, suggesting comparatively lower severity or incidence of fungal diseases in the study area. The cumulative percentage reveals that nearly 60 percent of farmers depend either on insecticides alone or in combination with other pesticides, emphasizing the dominance of insect pest management in paddy production systems.

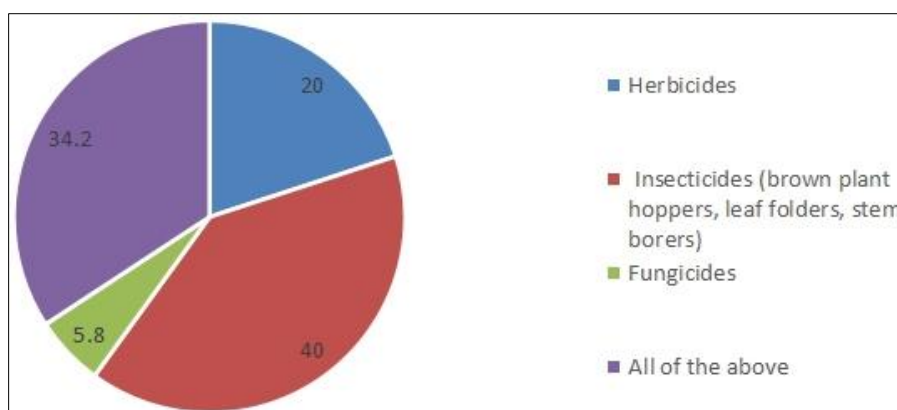


Fig 5: Pesticide used in paddy

6. Application of pesticides in different growth stage of paddy

Table 6 presents the distribution of respondents based on the crop stage at which pesticides are most frequently applied in

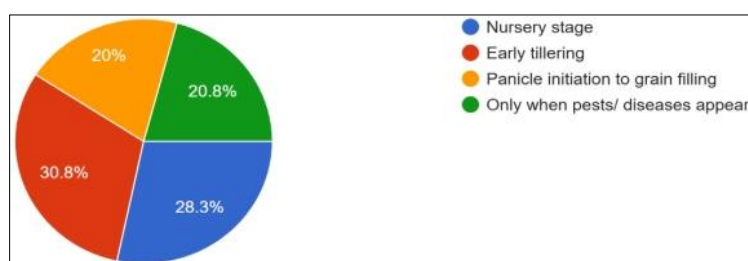
paddy cultivation. Out of the total 120 respondents, 30.8 percent reported applying pesticides during the early tillering stage, indicating that this stage is perceived as the most critical for pest management in paddy.

Table 6: Application of pesticides in different growth stage of paddy

Crop stage	Frequency	Percentage	Cumulative percentage
Nursery stage	34	28.3	28.3
Early tillering	37	30.8	59.1
Panicle initiation to grain filling stage	24	20.0	79.1
Only when pests/disease appear	25	20.8	100.0
Total	120	100.0	

This was followed by 28.3 percent of the respondents who applied pesticides at the nursery stage, suggesting that farmers adopt preventive pesticide applications to protect young seedlings from early pest and disease incidence. Further, 20.8 percent of the respondents reported applying pesticides only when pests or diseases appear, reflecting a relatively smaller proportion of farmers following a need-based or threshold-based approach.

About 20.0 percent of the respondents applied pesticides during the panicle initiation to grain filling stage, indicating the importance of protecting the crop during reproductive and yield-forming stages. The cumulative percentage shows that nearly 59.1 percent of the farmers apply pesticides either at the nursery or early tillering stages, highlighting the dominance of early-stage chemical interventions in paddy cultivation.

**Fig 6:** Application of pesticides in different growth stage of paddy

7. Mode of action to control pests in different crops

The results indicate that stomach action pesticides are the most commonly used mode of action across all three crops, namely paddy, maize, and cotton. In paddy cultivation, 43.3

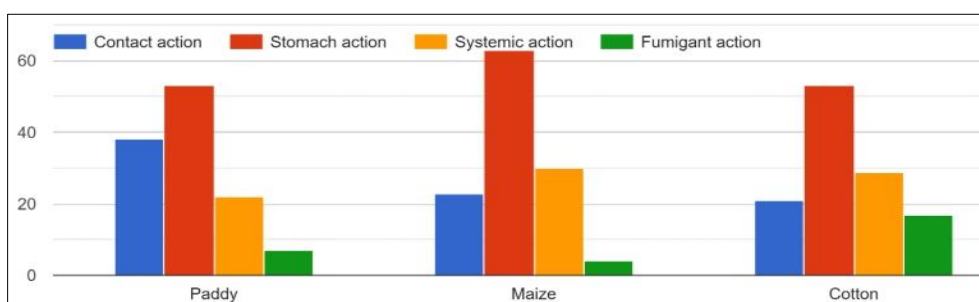
percent of the respondents preferred stomach action pesticides, followed by contact action 31.7 percent, indicating higher effectiveness of ingestion-based control against major insect pests.

Table 7: Mode of action to control pests in different crops

Mode of action	Paddy (Frequency, percentage)	Maize (Frequency, Percentage)	Cotton (Frequency, Percentage)
Contact action	38 (31.7)	24 (20.0)	23 (19.2)
Stomach action	52 (43.3)	60 (50.0)	54 (45.0)
Systemic action	22 (18.3)	31 (25.8)	30 (25.0)
Fumigant action	08 (6.7)	05 (4.2)	13 (10.8)
Total	120 (100.0)	120 (100.0)	120 (100.0)

In maize, the dominance of stomach action pesticides was even more pronounced, with 50.0 percent of the respondents relying on this mode, reflecting severe chewing pest incidence such as stem borers and armyworms. Systemic action ranked second 25.8 percent, suggesting increased adoption of internally translocated pesticides for longer protection. In cotton cultivation, 45.0 percent of the respondents reported using stomach action pesticides,

followed by systemic action 25.0 percent. This pattern highlights the need for effective control of bollworms and sucking pests, where systemic and stomach action chemicals play a crucial role. Across all crops, fumigant action pesticides were the least preferred, accounting for less than 11 percent usage, indicating limited awareness, availability, or suitability of fumigant-based pest control under field conditions

**Fig 7:** Mode of action to control pests in different crops

8. Spraying method in paddy, maize and cotton.

The table 8 depicts the distribution of respondents based on the spraying methods used for pesticide application. Out of 120 respondents, 33.3 percent reported using knapsack sprayers, indicating that manual spraying remains the most commonly adopted method due to its affordability, ease of operation, and suitability for small and marginal holdings.

Table 8: Spraying method in paddy, maize and cotton

Spraying method	Frequency	Percentage	Cumulative percentage
Knapsack sprayer	40	33.3	33.3
Power sprayer	29	24.2	57.5
Drone sprayer	37	30.8	88.3
Tractor sprayer	14	11.7	100.0
Total	120	100.0	

This was closely followed by 30.8 percent of the respondents who used drone sprayers, reflecting a growing adoption of modern and precision-based spraying technologies aimed at reducing labour dependency and improving application efficiency. Further, 24.2 percent of the respondents reported using power sprayers, suggesting moderate mechanization in pesticide application practices. Only 11.7 percent of the respondents used tractor-mounted sprayers, which may be attributed to higher costs, requirement of larger landholdings, and limited accessibility among small farmers.

The cumulative percentage indicates that nearly 88.3 percent of farmers rely on knapsack, power, or drone sprayers, highlighting a strong preference for flexible and cost-effective spraying methods. Overall, the results reveal a transition from traditional manual spraying towards advanced technologies, though conventional methods continue to dominate due to economic and structural constraints.

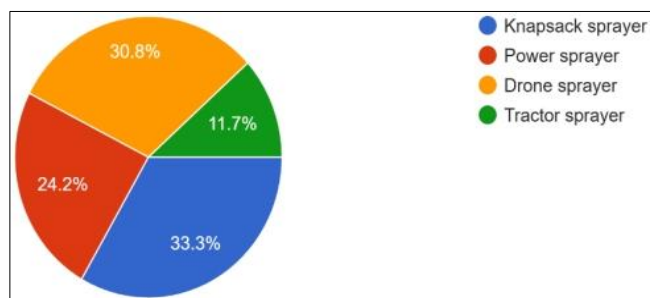


Fig 8: Spraying method in paddy, maize and cotton

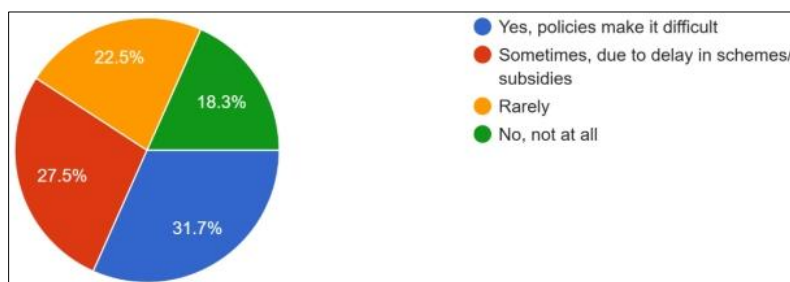


Fig 1: Obstacles faces due to government rules/policies while purchasing pesticides

2. Credit facility (buy now, pay later) affect pesticide purchase

Table 2 shows that the mean score = 2.80. This indicates that

Objective 2: To find the obstacles of farmers have when making pesticides purchases.

Farmers often face several challenges when purchasing pesticides. High prices make it difficult for smallholders to buy enough. Limited availability and distant stores reduce access to the right products. Many farmers lack clear knowledge about which pesticide to use. Concerns about poor-quality or fake products add to the problem.

1. Obstacles faces due to government rules/policies while purchasing pesticides

Table 1 shows with a mean score of 2.72, farmers moderately face obstacles in purchasing pesticides due to government policies. While many report difficulties or delays in schemes and subsidies, some experience these issues rarely or not at all, indicating varying impacts across farmers.

Table 1: Obstacles faces due to government rules/policies while purchasing pesticides

Response	Scale value (vi)	Frequency (fi)	Fi × vi
Yes, policies make it difficult	4	38	152
Sometimes, due to delay in schemes/ subsidies	3	33	99
Rarely	2	27	54
No, not at all	1	22	22
Total		120	327

$$\text{Mean score} = \frac{\sum (fi \times vi)}{N}$$

$$= 327/120$$

$$= 2.72$$

The Fig 1 indicates that 31.7 percent of the respondents stated that government policies make pesticide purchasing difficult, showing that a significant portion of farmers experience direct obstacles due to regulatory rules. Additionally, 27.5 percent of farmers reported that they sometimes face difficulties due to delays in schemes or subsidies, suggesting that administrative delays also affect the purchasing process. Meanwhile, 22.5 percent of respondents indicated that they rarely face such obstacles, which means that government policies do not frequently affect their purchasing decisions. Furthermore, 18.3 percent of farmers reported that they do not face any obstacles at all, indicating that policies may not significantly impact every farmer.

credit facilities have a moderate influence on pesticide purchasing decisions, although many farmers still prefer paying cash.

Table 2: Credit facility (buy now, pay later) affect pesticide purchase

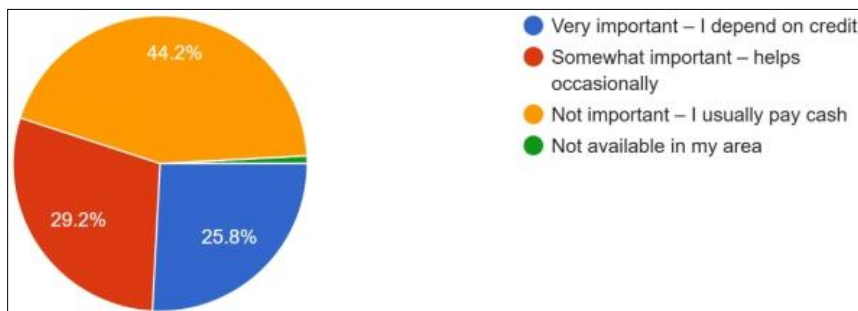
Response	Scale value (vi)	Frequency (fi)	Fi × vi
Very important- I depend on credit	4	31	124
Somewhat important- helps occasionally	3	35	105
Not important- I usually pay cash	2	53	106
Not available in my area	1	1	1
Total		120	336

$$\text{Mean score} = \frac{\sum(fi \times vi)}{N}$$

$$= 336/120$$

$$= 2.80$$

The Fig 2 shows that 44.2 percent of respondents consider credit not important because they usually pay with cash, which is the largest group. 29.2 percent say credit is somewhat important and helps occasionally, while 25.8 percent report that credit is very important and they depend on it. Only a very small percentage indicate that credit is not available in their area. Overall, most respondents prefer cash payments over relying on credit.

**Fig 2:** Credit facility (buy now, pay later) affect pesticide purchase

3. Experience of buying fake or poor-quality pesticides

Table 3 shows that the mean score of 2.81 shows that most respondents have experienced the situation once or twice. This indicates that the experience is common among respondents but does not occur very frequently.

Table 3: Experience of buying fake or poor-quality pesticides

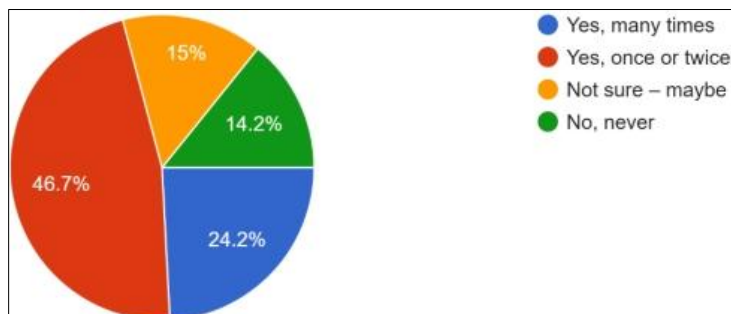
Response	Scale value (vi)	Frequency (fi)	Fi × vi
Yes, many times	4	29	116
Yes, once or twice	3	56	168
Not sure - maybe	2	18	36
No, never	1	17	17
Total		120	337

$$\text{Mean score} = \frac{\sum(fi \times vi)}{N}$$

$$= 337/120$$

$$= 2.81$$

The Fig 3 shows respondents experiences with the situation being asked about. The largest group, 46.7 percent, reported Yes, once or twice, indicating that many people have experienced it but not frequently. 24.2 percent said Yes, many times, suggesting a notable portion has experienced it repeatedly. Meanwhile, 15 percent of respondents are not sure, and 14.2 percent stated No, never. Overall, the results indicate that most respondents have experienced it at least once.

**Fig 3:** Experience of buying fake or poor-quality pesticides

4. Financial problems while purchasing pesticides

The Table 4 shows that the mean score of 2.98 indicates that respondents sometimes experience the issue. This suggests

that the problem occurs occasionally rather than very frequently. Overall, most respondents face the issue from time to time.

Table 4: Financial problems while purchasing pesticides

Response	Scale value (vi)	Frequency (fi)	Fi × vi
Yes, very often	4	32	128
Sometimes	3	61	183
Rarely	2	20	40
No, I can usually afford them	1	7	7
Total		120	358

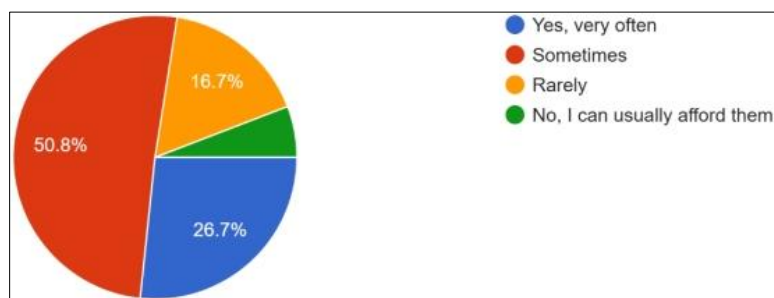
$$\text{Mean score} = \frac{\sum(fi \times vi)}{N}$$

$$= 358/120$$

$$= 2.98$$

The Fig.4.5.4. shows that 50.8 percent of respondents sometimes face the issue, which is the largest group. 26.7

percent experience it very often, while 16.7 percent say it occurs rarely. Only a small percentage reported is that 5.8 percent they can usually afford them. Overall, this indicates that most respondents face the issue occasionally rather than frequently.

**Fig 4:** Financial problems while purchasing pesticides

5. Biggest difficulty or problem faces during purchase of pesticides

Table 5 shows the mean score of 2.92 shows that high cost

and limited availability are the major challenges faced by respondents, while lack of guidance and fear of fake products are comparatively lower concerns.

Table 5: Biggest difficulty or problem faces during purchase of pesticides

Response	Scale value (vi)	Frequency (fi)	Fi × vi
High cost / unaffordable prices	4	50	200
Limited availability in local markets	3	30	90
Lack of proper guidance on what to buy	2	20	40
Fear of getting duplicate / fake products	1	20	20
Total		120	350

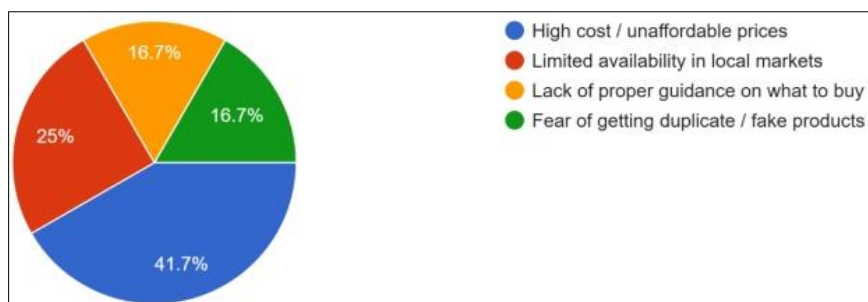
$$\text{Mean score} = \frac{\sum(fi \times vi)}{N}$$

$$= 350/120$$

$$= 2.92$$

The Fig 5 shows that high cost or unaffordable prices 41.7 percent is the biggest challenge faced by respondents. This is

followed by limited availability in local markets 25 percent. Meanwhile, lack of proper guidance on what to buy 16.7 percent and fear of getting duplicate or fake products 16.7 percent are also concerns but affect a smaller proportion of respondents. Overall, price and availability are the main barriers for consumers.

**Fig 5:** Biggest difficulty or problem faces during purchase of pesticides

Conclusion

This study highlights that farmers' pesticide purchasing behaviour is influenced by multiple factors such as effectiveness, price, availability, and recommendations from dealers and fellow farmers. The findings show that most farmers rely on a combination of pesticides and prefer liquid formulations due to ease of use and better results. Insect pest control remains the primary reason for pesticide application, while traditional spraying methods continue to dominate despite the gradual adoption of modern technologies. Farmers face several challenges, including high costs, limited availability, and occasional access to low-quality products, along with moderate policy and credit-related constraints. Overall, the study emphasizes the need for improved awareness, better extension support, and stronger regulatory measures to promote safe, efficient, and sustainable pesticide use in agriculture. For future research future studies can expand the sample size and include multiple regions to provide more comprehensive insights. There is also a need to examine the role of digital platforms, extension services, and policy interventions in influencing farmer behaviour. Research on long-term environmental and health impacts of pesticide use, as well as the adoption of sustainable alternatives like Integrated Pest Management and bio-pesticides, would be valuable. Further studies can also explore strategies to improve farmer awareness, reduce dependence on informal sources, and promote safe and efficient pesticide use.

Future research

Future research can build on this study by covering a wider sample and including farmers from different regions to develop a more complete understanding of pesticide purchasing behaviour. Looking at various agro-climatic zones would help capture how practices, preferences, and challenges differ across locations. It would also be valuable to examine the growing influence of digital tools such as mobile applications and online advisory platforms in shaping farmers' decisions. Understanding whether these sources of information improve awareness and reduce dependence on local dealers or informal advice can provide useful direction for improving outreach efforts. In addition, more attention should be given to the role of extension services and government initiatives in guiding farmers toward safer and more informed pesticide use.

At the same time, future studies should focus on the long-term environmental and health consequences of pesticide usage, particularly their effects on soil, water, and farmer well-being. Exploring sustainable alternatives like Integrated Pest Management (IPM) and bio-pesticides can also offer insights into reducing chemical dependency while maintaining productivity. Researchers can further investigate the barriers that limit the adoption of such practices and evaluate their practical benefits in real farming conditions. Finally, identifying ways to improve farmer awareness, ensure access to reliable and quality inputs, and strengthen supply systems will be essential for promoting safe, efficient, and sustainable pesticide use in agriculture.

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