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Factors influencing insecticide purchase and associated challenges faced by chilli farmers in Rajkot district

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Abstract

The present study was undertaken to examine the factors influencing the insecticide purchasing. The study was conducted to examine the factors affecting insecticide purchase decisions of chilli farmers and the major challenges faced by them in Rajkot district of Gujarat. An ex-post facto research design was used for the study. A total of 200 chilli farmers were selected through multistage random sampling from four talukas, namely Gondal, Jam Kandorna, Dhoraji, and Upleta. Primary data were collected through personal interviews using a structured schedule, while secondary information was gathered from published sources. The findings indicated that farmers mostly relied on their past experience while purchasing insecticides (Mean = 4.00). Local retailers (Mean = 3.78) and opinions of progressive farmers (Mean = 3.67) also played an important role in purchase decisions. Advertisement and promotional activities had comparatively less influence (Mean = 3.24). Major constraints reported by farmers were inadequate knowledge about specific insecticides, fear of spurious products, and high product cost. The study highlights the need for better extension support, farmer awareness programmes, and improved quality assurance in agrochemical supply systems.

Keywords: Chilli farmers, insecticide purchase, buying behaviour, constraints, Rajkot district

1. Introduction

Insecticide application is a crucial aspect of chilli cultivation, as the crop is highly susceptible to a variety of pests and diseases that can significantly reduce yield and profitability. In India, where chilli is a major spice crop, effective pest management is central to securing farm income and ensuring food safety. Farmers' decisions regarding the purchase and use of insecticides are influenced by multiple socio-economic, psychological, and institutional factors (Kumari & Singh, 2020) ^[4]. These decisions are shaped not only by the efficacy and price of insecticides, but also by factors such as brand image, past experience, peer recommendations, and the advice of local retailers (Deshmukh & Patil, 2020) ^[2]. In the Rajkot district of Gujarat, chilli cultivation plays a vital role in the agrarian economy. However, farmers in this region often face challenges related to product availability, credit access, and limited awareness of integrated pest management (IPM) techniques. Previous studies suggest that the influence of progressive farmers and local input dealers, as well as promotional efforts by companies, significantly affect the buying patterns of farmers (Chatterjee & Ghosh, 2018; Meena, Singh, & Kumari, 2020) ^[1,5]. Moreover, constraints such as high costs, lack of technical knowledge, and improper usage due to inadequate training remain major barriers to optimal insecticide use (Rao, Reddy, & Prasad, 2019) ^[7]. Understanding both the determinants of insecticide purchasing and the constraints faced by farmers can provide critical insights for policymakers, agri-input firms, and extension agencies. It enables the development of region-specific strategies to encourage responsible pesticide use, improve farmer awareness, and promote sustainable pest management practices (Sharma & Mehta, 2018) ^[8]. The present study explores these dimensions by examining the factors influencing insecticide purchase and the challenges experienced by

by chilli farmers in the Rajkot district of Gujarat. The objectives are as follows

- To identify the factors influencing the chilli farmers while buying the insecticides
- To identify the constraints as perceived by chilli farmers towards insecticides

Research Methodology

Participants: The study was conducted in the Rajkot district of Gujarat, which consists of 14 talukas. A multi-stage sampling method was employed to select the participants. In the first stage, four talukas—Gondal, Jam Kadorana, Dhoraji, and Upleta were randomly chosen. In the second stage, five villages were randomly selected from each of these talukas. In the third stage, ten chilli-growing farmers were purposively selected from each village, resulting in a total sample size of 200 farmers. The unit of analysis for the study was the individual chilli farmer.

Measures

A structured interview schedule was developed to collect data in alignment with the study's objectives. The instrument included questions focused on the socio-economic background of chilli farmers, their buying behaviour, the factors influencing their purchase decisions, and the constraints they encountered in using insecticides. Primary data were collected directly from farmers through personal interviews, while secondary

data were sourced from government reports, academic journals, research articles, and relevant company websites to complement and support the analysis.

Procedure

The study adopted a descriptive research design, suitable for examining present conditions and identifying relationships where experimental control is not feasible. An ex post facto approach was followed, wherein the variables were observed in their natural context without manipulation. The multi-stage sampling method involved three phases: selection of four talukas at random from the Rajkot district; selection of five villages from each chosen taluka; and purposive selection of ten chilli farmers from each village. Data collection was carried out through in-person interviews with the farmers in their respective locations.

Statistical Analysis

A combination of statistical tools was applied to analyze the collected data and derive meaningful insights. Percentage analysis was used to describe socio-economic traits and behavioural patterns. Tabular and graphical methods were employed to systematically present data. Ranking and Likert scale techniques were utilized to measure farmer attitudes and preferences regarding insecticide usage. Additionally, the cumulative score method was used to assess the significance of various influencing factors and constraints experienced by the farmers in their purchasing decisions.

Table 1: Factors Influencing the Chilli Farmers While Buying Insecticides

Parameter	Very High(5)	High (4)	Moderate (3)	Low (2)	Very Low(1)	CS*	Mean**	Rank
Progressive Farmers' Opinions	62	70	26	24	18	734	3.67	III
Past Experience with Insecticides	82	59	35	24	00	799	4.00	I
Local Retailer's Influence	76	56	25	34	09	756	3.78	II
Competitive Price	62	65	27	25	21	722	3.61	IV
Credit Facility	53	42	44	34	25	658	3.29	VII
Brand Image	59	37	42	36	26	667	3.34	VI
Advertisement and Promotional Activities	49	42	45	36	28	648	3.24	VIII
Timely Availability of Product	57	42	37	42	22	670	3.35	V

Very High: 5; High: 4; Moderate: 3; Low: 2; Very Low: 1

*Cumulative Score (CS) = $\sum$ (Maximum Scale $\times$ No. of Farmers)

**Mean = Cumulative Score (CS) / Total No. of Farmers (200)

Table 1 presents the ranked factors that influence chilli farmers' buying behaviour towards insecticides in the Rajkot district of Gujarat. The factors were measured on a 5-point Likert scale, and the cumulative scores and mean scores were used for ranking. Past Experience with Insecticides had Mean = 4.00 and Rank I. Farmers placed the highest importance on their previous experiences with insecticide performance. This suggests a strong reliance on outcomes from past use—whether a product was effective or caused damage. Similar findings were reported by Deshmukh and Patil (2020)^[2], who observed that cotton growers in Maharashtra also depended heavily on personal experience when selecting agro-inputs. Local Retailer's Influence had Mean = 3.78 and Rank II. Local input dealers significantly impacted purchase decisions. Farmers often trust these retailers due to repeated interactions and proximity. Meena, Singh, and Kumari (2020)^[5] reported that in Rajasthan, agro-input dealers were among the most influential information sources for farmers due to

personalized service and immediate availability. Progressive Farmers' Opinions had Mean = 3.67 and Rank III. Advice from progressive or lead farmers within the community was highly regarded. This reflects the role of peer influence and informal social networks in the adoption of farm inputs, as discussed by Chatterjee and Ghosh (2018)^[1], who emphasized the importance of farmer-to-farmer communication in Eastern India. Competitive Price (Mean = 3.61, Rank IV). While price competitiveness was important, it ranked below experiential and social factors. This aligns with the view that farmers prioritize effectiveness and reliability over cost. According to Patel and Sharma (2020), although price was a factor in rural Gujarat, trust and product performance outweighed mere cost considerations. Timely Availability had Mean = 3.35 and Rank V. Access to products during critical crop stages mattered, but it was not the foremost concern. Similar results were noted by Rao, Reddy, and Prasad (2019)^[7] in Andhra Pradesh, where farmers emphasized that delays in pesticide availability

often led to crop losses. Brand Image had Mean = 3.34 and Rank VI. A product's reputation or brand image was moderately influential. Farmers preferred brands with consistent performance, a trend also observed in Kumari and Singh's (2020) ^[4] study on insecticide use among vegetable growers in Bihar. Credit Facility had Mean = 3.29, Rank VII. Although access to credit influenced purchases, it ranked relatively lower. This may suggest either better financial standing among the sample or higher priority given to performance over payment flexibility. Kumar and Singh

(2021) ^[3] noted that vegetable growers in Haryana also viewed credit as secondary to product trustworthiness. Advertisement and Promotion had Mean = 3.24 and Rank VIII. Promotional efforts such as advertising had the least influence. This indicates that traditional promotional tools are less persuasive than field-level interactions and experiences. This finding is consistent with Sharma and Mehta (2018) ^[8], who found limited impact of advertising on pesticide use decisions across Indian farming communities.

Table 2: Constraints as perceived by Chilli farmers towards insecticides

Parameters n = 200	Frequency		Rank
	Yes	No	
High cost of Insecticides	139	61	III
Non-availability at the required time	120	80	VII
Lack of knowledge about newly released agrochemicals	158	42	II
Not satisfied with the results of the insecticide	125	75	V
Lack of knowledge about a particular insecticide	166	34	I
Fear of spurious product	158	42	II
Lack of information on effectiveness	131	69	IV
Difficulty in understanding labels and instructions	123	77	VI

Table 2 highlights key constraints faced by chilli farmers in Rajkot district when purchasing or using insecticides. These constraints can hinder proper pest management, leading to yield loss and higher costs. Lack of Knowledge about a Particular Insecticide was ranked I as a majority (166 out of 200) of respondents reported limited understanding of specific insecticides, suggesting a major gap in product-specific awareness. This aligns with Sharma and Mehta (2018) ^[8], who emphasized that poor awareness and technical knowledge significantly affect safe pesticide use across Indian farms. Lack of Knowledge about Newly Released Agrochemicals ranked II as farmers also struggle to keep up with newly introduced products, likely due to weak extension outreach and limited literacy. Deshmukh and Patil (2020) ^[2] found that most smallholders depend on local dealers rather than scientific sources, leaving them uninformed about the latest agrochemical innovations. Fear of Spurious Products ranked II as tied with the above, fear of counterfeit or adulterated insecticides was also high. This indicates a trust deficit in the agri-input supply chain. Rao *et al.* (2019) ^[7] reported that fake pesticides were a major concern in Andhra Pradesh, leading to farmer losses and mistrust in retail networks.

Lack of Information on Effectiveness ranked IV as a considerable number of farmers lacked sufficient data or field-level experience regarding product performance. This reflects the need for demonstration trials and experiential learning. According to Kumari and Singh (2020) ^[4], pesticide use confidence increased when farmers had access to comparative performance data. Not Satisfied with Results ranked V as about 125 farmers expressed dissatisfaction with the performance of insecticides. This could as result from poor-quality products, pest resistance, or incorrect application. Chatterjee and Ghosh (2018) ^[1] noted that dissatisfaction is closely tied to limited diagnostic support and weak follow-up services. Difficulty in Understanding Labels and Instructions ranked VI as many respondents faced challenges in understanding dosage or safety instructions due to complex language or poor literacy. Meena *et al.* (2020) observed that label literacy was low among rural farmers, and that visual-based instruction

or vernacular labeling was more effective. Non-Availability at Required Time ranked VII as timely access to insecticides remains a problem for 120 respondents. Delays can result in missed spraying windows and significant crop damage. This constraint was similarly emphasized by Kumar and Singh (2021) ^[3] in their study on vegetable growers, where supply chain inefficiencies often disrupted pest control schedules. High Cost of Insecticides ranked III as 139 farmers viewed cost as a key barrier. Farmers in resource-constrained conditions often compromise on quantity or quality. Patel and Sharma (2020) ^[6] also concluded that affordability strongly influenced purchasing patterns in Gujarat's tribal and marginal farming communities.

Suggestions

- **Promote Quality Assurance and Transparency:** Companies should build trust among farmers by ensuring product authenticity, clear labeling, and traceability features like QR codes to combat counterfeit products.
- **Strengthen Dealer and Retailer Training:** Retailers are key influencers; companies should invest in training programs for agro-dealers to provide correct and ethical product advice to farmers.
- **Focus on Farmer Education and Demonstrations:** Conduct on-field demos, trial plots, and awareness campaigns on the effectiveness of biopesticides and Integrated Pest Management (IPM) practices.
- **Enhance Digital Outreach and App Usage:** Develop and promote user-friendly mobile apps or WhatsApp services to provide pest alerts, product recommendations, and dosage guidance in local languages.
- **Improve Supply Chain and Availability:** Ensure timely and widespread product availability, especially during peak crop seasons, across remote villages.
- **Flexible Payment Options:** Collaborate with fintech platforms to offer affordable credit schemes or installment-based purchases to reduce cash

burdens on small and marginal farmers.

Conclusion

The present study aimed to identify factors influencing insecticide purchase and associated challenges faced by chilli farmers in Rajkot District using a structured research design and responses from 200 chilli farmers across four talukas, the study offers critical insights into the decision-making behaviour of these agricultural stakeholders. The findings revealed that past experience with insecticides emerged as the most influential factor (Mean = 4.00), followed by the local retailer's influence and progressive farmers' opinions. These results confirm that chilli farmers largely depend on experiential knowledge and localized networks rather than formal promotional methods or branding. This pattern aligns with similar research by Deshmukh and Patil (2020) ^[2], Meena *et al.* (2020) ^[5], and Chatterjee and Ghosh (2018) ^[1], all of whom emphasized the strong role of personal experience and peer or dealer influence in agricultural input decisions. On the other hand, constraints such as a lack of knowledge about specific insecticides, fear of spurious products, and the high cost of chemicals were reported as the most significant barriers. These findings corroborate prior studies by Sharma and Mehta (2018) ^[8], Rao *et al.* (2019) ^[7], and Patel and Sharma (2020), indicating that gaps in technical knowledge, trust, and affordability remain pressing issues for farmers in India. The study underscores the need for improved extension services, trustworthy input supply systems, and customized training for dealers and farmers alike. Addressing these factors is crucial for empowering farmers to make informed and safe pest management decisions that enhance productivity while minimizing risk.

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