P-ISSN: 2618-0723
E-ISSN: 2618-0731

NAAS Rating (2026): 5.04
www.extensionjournal.com

International Journal of Agriculture Extension and Social Development

Volume 9; Issue 1; January 2026; Page No. 152-158

Received: 11-10-2025
Accepted: 16-11-2025

Indexed Journal
Peer Reviewed Journal

Farmers' buying behaviour and dealers' perception about the use of pesticides and fertilizers in Selected Districts of North Gujarat

[1]Sagar Joshi and [2]Dhruv Patil

[1]MBA- ABM, IABMI, AAU, Anand, Gujarat, India

[2]MBA- ABM, IABMI, AAU, Anand, Gujarat, India

DOI: https://www.doi.org/10.33545/26180723.2026.v9.i1c.2901

Corresponding Author: Dhruv Patil

Abstract

The Indian agrochemicals market demonstrated significant expansion, achieving a value of nearly USD 6.51 billion in 2023, and is anticipated to grow at a Compound Annual Growth Rate (CAGR) of 8.5 per cent from 2024 to 2032, nearing USD 13.61 billion by 2032. Regarding global pesticide exports, India ranked 2nd with a value of 5.5 billion US$. Additionally, the consumption of chemical pesticides in India exhibited a gradual incline from 2018-19 to 2021-22, rising from 59,670 metric tons (MT) to 63,284 MT. The consumption of fertilizers in India also displayed an upward trajectory from 2017-18 to 2020-21, rising steadily from 515 LMT to 629 LMT. This study comprehensively examines the purchasing behaviour of farmers regarding pesticides and fertilizers, alongside dealers' perspectives in stocking and selling these agricultural inputs. Key findings indicated a predominant reliance on agri-input stores for purchases, with effectiveness and retailer suggestions significantly influencing buying decisions. While concerns regarding health hazards and high prices were paramount, online purchasing remains limited due to quality assurance and a lack of digital literacy. Dealers face challenges including competition and credit demands, underscoring the complex dynamics within the agricultural input market.

Keywords: Agrochemicals, pesticides, fertilizers, farmers buying behaviour, dealers perception, online purchase, problems

Introduction

Agriculture plays a crucial role in India, serving as the backbone of the economy and providing livelihoods for over half of the country's population. The agricultural sector also supports numerous related industries, including food processing, textiles, and trade. In 2021-22, the net sown area covered a large area of 1,410 lakh hectares, accompanied by a gross cropped area of 2,191 lakh hectares, showcasing the country's immense scale of agricultural activities (MoSPI, 2023). The production of staple crops, diverse food items, and animal products caters to the nutritional needs of the people. India is the world's largest producer of milk, pulses, and jute, and ranks as the second largest producer of rice, wheat, sugarcane, groundnut, vegetables, fruit, and cotton. It is also one of the leading producers of spices, fish, poultry, livestock, and plantation crops (FAO, 2024).

Uncontrolled pests significantly diminish both the quantity and quality of food production Pests pose a significant threat to crop yields, resulting in substantial losses. Plant pests and diseases alone are responsible for decreasing global crop yields by an estimated 20 to 40 per cent annually. These losses worsen food insecurity, a problem compounded by growing population numbers and climate-related challenges (FAO, 2024). Food crops face competition from various challenges, including 30,000 species of weeds, 3,000 species of nematodes, and 10,000 species of plant-eating insects. (Carerating, 2024) [1].

In the pre-planning era, agriculture in India relied heavily on organic manures. However, the fact that these manures did not sufficiently boost agricultural production posed a challenge. Nonetheless, the growing demand for food required the adoption of more effective cultivation methods utilizing superior inputs in agricultural operations. This need, coupled with technological advancements, led to the introduction of agro-chemicals in agriculture. (Hena, 2004) [8].

Agrochemicals are chemical compounds typically used to manage pests and diseases and to provide essential nutrients to the soil. The application of agrochemicals, including growth regulators, pesticides, and fertilizers, has enhanced crop yield and growth, thereby contributing to the stability of agricultural production. (Singh *et al.*,2020) [10].

The Indian agrochemicals market attained nearly USD 6.51 billion in 2023. It is projected to expand at a Compound Annual Growth Rate (CAGR) of 8.5% from 2024 to 2032, reaching close to USD 13.61 billion by 2032. (Expert Market Research, 2024) [5].

In the fiscal year 2021-22, the pesticide sector exhibited robust performance with a Compound Annual Growth Rate (CAGR) of 8.9 per cent signifying the industry's capacity for meeting demand and its sustained growth, underscoring its vital role in agricultural practices. (Department of Chemicals and Petrochemicals, 2022) [2].

In 2022, China led pesticide exports with US$11.1 billion (22.4% of total). India followed with $5.5 billion (11.2%), and the United States with $5.4 billion (10.9%). France

exported $4.1 billion (8.2%), and Germany $3.9 billion (7.9%). These top five countries dominated global pesticide exports in terms of dollar value. (World's Top Expert, 2024) [11].

The consumption of chemical pesticides in India witnessed a gradual increase over the years from 2018-19 to 2021-22. In 2018-19, the pesticide consumption stood at 59,670 metric tons (MT), which rose to 63,284 MT in 2021-22. This consistent upward trend in pesticide consumption reflects the continued reliance on chemical pest management solutions in the agricultural sector within India. (Directorate of Plant Protection, Quarantine & Storage, 2024) [4].

In 2022, India experienced trade deficit in fertilizers, amounting to -$17.1 billion. Brazil topped the list with a deficit of -$24.5 billion, followed by the United States of America at -$4.8 billion. France and Australia also had significant deficits, recording -$3.8 billion and -$3.5 billion respectively. India's deficit underscores a substantial reliance on fertilizer imports and highlights a significant aspect of its trade dynamics in the global fertilizer market. (World's Top Expert, 2024) [12].

The fertilizer consumption in India exhibited an upward trend from 2017-18 to 2020-21, rising steadily from 515 LMT to 629 LMT. However, in 2021-22, consumption dipped slightly to 579 LMT. Overall, fluctuating but generally increasing fertilizer usage was observed over the specified period. (Department of Fertilizers, 2022) [3].

Objectives

1. To study the farmers' buying behaviour about the use of pesticides and fertilizers
2. To study dealers' perception about the use of pesticides and fertilizers

Research Methodology

The research employed both primary and secondary data sources. Primary data were gathered directly from respondents through a structured schedule. The secondary data were collected from existing literature, government publications, and reputable web sources.

The study utilized a descriptive research design to systematically describe the characteristics of the sampled population. A probability sampling method was employed, specifically utilizing a multistage sampling technique to ensure representativeness. The sample included 180 farmers (with 60 from each of the selected districts: Banaskantha, Sabarkantha, and Aravalli) and 60 dealers (20 from each district). A semi-structured schedule served as the research instrument, allowing for both quantitative and qualitative data collection. Analytical tools such as frequencies, percentages, weighted average mean, and Garrett's ranking technique were utilized to process and analyze the collected data

Results and Discussion

Socio-economic profile of farmers

Socio-economic parameters such as age, education level, farming type, land holding, and annual income were considered. The socio-economic profile of farmers is recorded in Table 1.

Table 1: Socio-economic profile of farmers (n=180)

Sr. No.	Socio-economic parameter	Frequency	Percentage
1	**Age (Years)**		
A	Below 25	1	1
B	25 to 40	60	33
C	41 to 60	95	53
D	Above 60	24	13
2	**Education level**		
A	Illiterate	13	7
B	Below or equivalent to SSC	105	59
C	Below or equivalent to HSC	42	23
D	Equivalent or above Graduation	20	11
3	**Farming type**		
A	Farming	8	4
B	Farming + Animal Husbandry	172	96
4	**Land holding**		
A	Less than 1 Ha	16	9
B	1 to 2 Ha	55	31
C	2.1 to 4 Ha	81	45
D	Above 4 Ha	28	15
5	**Annual income**		
A	Less than 1 Lakh	17	10
B	1 to 3 Lakh	67	37
C	3 to 5 Lakh	63	55
D	Above 5 Lakh	33	18

The socio-economic profile of farmers surveyed revealed that the majority of farmers (53%) fell within the age group of 41 to 60 years, with the highest education level being Below or equivalent to SSC (59%). Most farmers (96%) were engaged in farming + animal husbandry, and the largest landholding (45%) category was between 2.1 to 4 Ha. Regarding annual income, the highest proportion (37%) reported earnings between 1 to 3 Lakh annually.

Farmers' buying behaviour about the use of pesticides and fertilizers

Source of Purchase for Pesticides

Table 2: Source of purchase for pesticide

Sr. No.	Source of purchase	Frequency	Percentage
1	Agri-input stores	180	100
2	Online platform	19	11

The source of purchase for pesticides was asked to respondents, with the option to provide multiple responses. Among 180 participants, all indicated that they obtained pesticides from agricultural input dealers. Additionally, 19 (11%) farmers reported using online platforms alongside agricultural input stores for their pesticide purchases.

Frequency of Purchase for Pesticides

Table 3: Frequency of purchase for pesticides

Sr. No.	Frequency of Purchase	Frequency	Percentage
1	2-3 times a year	33	18
2	More than 3 times a year	147	82
Total		180	100

The frequency of purchase for pesticides among respondents was categorized into two groups, i.e., 2-3 times a year and

more than 3 times a year. The respondents, comprising 82 per cent of the total, reported purchasing pesticides more than 3 times a year. Additionally, 18 per cent of respondents reported purchasing pesticides 2-3 times a year.

Average Cost of Pesticide per Hectare of Land

Table 4: Average cost of pesticide per hectare of land

Season	Major crops	Cost (in ₹)
Kharif	Ground nut, Castor, Cotton	4439
Rabi	Potato, Cumin, Wheat, Mustard	4970
Summer	Pearl millet, Sesamum, Sorghum	285

The average cost of pesticide per hectare of land varies across different seasons. For the Kharif season, the average cost was ₹ 4439. During the Rabi season, it increases to ₹ 4970 per hectare. However, in the Summer season, the average cost is notably lower, at ₹ 285 per hectare due to farmers either not cultivating crops during this period or cultivating crops such as pearl millet that require fewer pesticides, resulting in reduced pesticide usage.

Influencers for the Purchase Decision of Pesticides

Table 5: Influencers for the purchase decision of pesticides

Sr. No.	Influencers	Frequency	Percentage
1	Agri-Input Retailers	154	86
2	Self-decision	73	41
3	Other farmers	23	13

The influencers for the purchase decision of pesticides were asked of the respondents, with the option to provide multiple responses. Among them, 154 (86%) farmers acknowledged agri-input retailers as significant influencers, 73 (41%) indicated making decisions by themselves, and 23 (13%) mentioned being influenced by fellow farmers when purchasing pesticides.

Promotional Activities Influencing the Purchase Decision of Pesticides

Table 6: Promotional activities influencing the purchase decision of pesticides

Sr. No.	Promotional activities	Frequency	Percentage
1	Tv advertisement	67	37
2	Wall painting	37	29
3	Leaflets	151	84
4	Social media	44	24

The promotional activities influencing the purchase decision of pesticides were asked of the respondents, with the option to provide multiple responses. It was found that leaflets had the greatest impact, with 151(84%) respondents indicating they influenced their decisions. Following this, TV advertisements were mentioned by 67 (37%) respondents as influential. Additionally, wall paintings were said by 52 (29%) respondents, while social media had an impact on the decisions of 44 (24%) respondents.

Extension Activities Influencing the Purchase Decision of Pesticides

Table 7: Extension activities influencing the purchase decision of pesticides

Sr. No.	Extension activities	Frequency	Percentage
1	**Group meeting**	**167**	**93**
2	Farm visit	54	30
3	On-farm demonstrations	136	76
4	Agricultural fairs	30	17

The Extension activities influencing the purchase decision of pesticides were asked of the respondents, with the option to provide multiple responses. It was found that group meetings had the most impact, with 167 (93%) respondents attributing their decisions to this activity. Following closely behind, on-farm demonstrations influenced the decisions of 136 (76%) respondents. Moreover, farm visits were mentioned by 54 (30%) respondents, while agricultural fairs played a role in the decisions of 30 (17%) respondents.

Factors Influencing Purchase of Pesticide

Garrett's ranking technique was used to find out the most significant factors that influence the respondent's purchase of pesticides.

Table 8: Factors influencing purchase of pesticide

Particulars	Average Garette Score	Rank
Effectiveness	74.98	1
Retailer's suggestion	65.42	2
Brand reputation	55.47	3
Price	51.08	4
Easy availability	41.28	5
Packaging size	39.71	6
Residue level on produce	22.44	7

The first rank was of effectiveness with an average Garrett score of 74.98, indicating that buyers prioritize the pesticide's ability to deliver desired results in pest control. Following closely behind is the influence of retailer suggestions, with an average score of 65.42, suggesting that recommendations from sellers play a significant role in purchasing decisions. Brand reputation emerges as the third most influential factor, getting an average score of 55.47, highlighting the importance of trusted brands for gaining consumer confidence. Price, although notable, ranks fourth with an average score of 51.08, indicating that while cost plays a role, it is not the sole determining factor. Easy availability and packaging size occupy the fifth and sixth positions, respectively. Lastly, the residue level on produce, with an average score of 22.44, ranks lowest among the factors considered, suggesting that while consumers are concerned about the environmental impact, it holds less role in their purchasing decisions compared to other factors.

Problems & Concerns while Purchasing Pesticides

The weighted average mean (WAM) technique was utilized to assess the problems and concerns faced by farmers when purchasing pesticides.

Table 9: Problems & concerns while purchasing pesticides

Particulars	WAM	Rank
Health hazard	4.31	1
High price	4.23	2
Resistance development	4.09	3
Less knowledge	3.32	4
Different Names	2.91	5
Packaging size	2.58	6
Lack of credit availability	2.08	7

The first rank was of health hazard with a WAM score of 4.31, indicating that farmers consider potential health risks associated with pesticide use as their foremost concern. High prices closely follow with a score of 4.23, suggesting that the cost of pesticides significantly impacts farmers' purchasing decisions. Resistance development ranks third with a score of 4.09, highlighting concerns about the effectiveness of pesticides over time. Less knowledge about pesticide usage and different names for the same product are also notable concerns, scoring 3.32 and 2.91, respectively. Packaging size and lack of credit availability occupy the sixth and seventh positions. Lastly, the unavailability of preferred brands ranks eighth, with a score of 2.01, suggesting the availability of different brands in the localities.

Fertilizers Used by the Respondents

Table 10: Fertilizers used by the respondents

Sr. No.	Fertilizers	Frequency	Percentage
1	Urea	180	100
2	DAP	180	100
3	SSP	149	83
4	NPK	131	73
5	Ammonium Sulphate	126	70
6	MOP	102	57
7	Nano Urea	54	30
8	APS	12	7

The different fertilizers used were asked of the respondents, with the option to provide multiple responses. The results revealed widespread use of urea and DAP, with all 180 respondents indicating their usage. Additionally, 149 (83%) respondents reported using SSP, while 131 (73%) mentioned NPK. Furthermore, Ammonium Sulphate was utilized by 126 (70%) respondents, followed by MOP with 102 (57%) respondents. Nano Urea was reported by 54 (30%) respondents, and APS was the least used, mentioned by 12 (7%) respondents.

Purpose for Use of Fertilizers

Table 11: Purpose for use of fertilizers

Sr. No.	Purpose for use	Frequency	Percentage
1	Increasing crop yield	180	100
2	Enhancing crop quality	127	71
3	Addressing specific nutrient deficiencies	124	69

The purpose for using fertilizers was asked to respondents, with the option to provide multiple responses. The results indicated that the primary purpose of fertilizer application was to increase crop yield, as mentioned by 180 respondents. Additionally, 127 (71%) respondents mentioned enhancing crop quality as a goal, while 124 (69%) respondents reported using fertilizers to address specific nutrient deficiencies in their crops.

Method for Deciding the Quantity of Fertilizer

Table 12: Method for deciding the quantity of fertilizer

Sr. No.	Method	Frequency	Percentage
1	Crop type & stage	159	88
2	Previous year yield data	124	69

The method for deciding the quantity of fertilizers was asked of the respondents, with the option to provide multiple responses. The results indicated that the most common method was considering crop type and stage, chosen by 159 (88%) respondents. Additionally, 124 (69%) respondents reported relying on the previous year's yield data to determine fertilizer quantity.

Sources of Purchase for Fertilizer

Table 13: Sources of purchase for fertilizer

Sr. No.	Sources of purchase	Frequency	Percentage
1	Agri-input stores	174	97
2	Depot	77	43

The sources of purchase for fertilizer were asked of the respondents, with the option to provide multiple responses. The findings revealed that the majority of respondents, 174 (97%) in total, relied on agri-input stores for their fertilizer procurement. Additionally, 77 (43%) respondents reported purchasing fertilizers from depots.

Average Cost of Fertilizers per Hectare of Land

Table 14: Average cost of fertilizers per hectare of land

Season	Major crops	Cost (in ₹)
Kharif	Ground nut, Castor, Cotton	6501
Rabi	Potato, Cumin, Wheat, Mustard	8983
Summer	Pearl millet, Sesamum, Sorghum	1125

The average cost of fertilizers per hectare of land varies across different seasons. For the Kharif season, the average cost is ₹ 6501. During the Rabi season, it increases notably to ₹ 8983 per hectare. However, in the Summer season, the average cost is lower, at ₹ 1125 per hectare. These figures reflect the seasonal fluctuations in fertilizer expenses, influenced by factors such as crop selection, nutrient requirements, and agricultural practices during each season.

Influencers for the Purchase Decision of Fertilizers

Table 15: Influencers for the purchase decision of fertilizers

Sr. No.	Influencers	Frequency	Percentage
1	Self-decision	180	100
2	Other farmers	20	11

The influencers for the purchase decision of fertilizer were asked to respondents, with the option to provide multiple

responses. The results showed that all 180 respondents made their pesticide purchase decisions independently. Additionally, 20 (11%) respondents mentioned other farmers as influencers in their pesticide purchase decisions.

Promotional Activities Influencing the Purchase Decision of Fertilizers

Table 16: Promotional activities influencing the purchase decision of fertilizers

Sr. No.	Promotional activities	Frequency	Percentage
1	TV advertisement	95	53
2	Offers	17	9
3	Leaflets	120	67
4	Wall painting	44	24

The promotional activities influencing the purchase decision of fertilizers were asked to the respondents, with the option to provide multiple responses. The findings revealed that leaflets had the most notable impact, with 120 (67%) respondents mentioning them as influential. Following leaflets, TV advertisements influenced the decisions of 95 (53%) respondents, while wall paintings were mentioned by 44 (24%) respondents. Offers influenced the decisions of 17 (9%) respondents regarding fertilizer purchases.

Extension Activities Influencing the Purchase Decision of Fertilizers

Table 17: Extension activities influencing the purchase decision of fertilizers

Sr. No.	Extension activities	Frequency	Percentage
1	Group meeting	142	79
2	Farm visit	74	41
3	On-farm demonstration	13	18
4	Agricultural fairs	32	7

The extension activities influencing the purchase decision of fertilizers were asked to the respondents, with the option to provide multiple responses. The findings showed that group meetings had the most notable impact, with 142 (79%) respondents indicating their influence. Following group meetings, farm visits influenced the decisions of 74 (41%) respondents, while agricultural fairs were mentioned by 32 (18%) respondents. On-farm demonstrations influenced the decisions of 13 (7%) respondents regarding fertilizer purchases.

Factors Influencing the Purchase of Fertilizers

Garrett's ranking technique was used to find out the most significant factors that influence the respondents' purchase of fertilizers.

Table 18: Factors Influencing the Purchase of Fertilizers

Particulars	Average garette score	Rank
Brand reputation	72.02	1
Effectiveness	65.14	2
Easy availability	45.77	3
Nutrient composition	42.47	4
Price	42.22	5
Packaging size	32.39	6

Brand reputation emerged as the most notable factor, with an average Garrett score of 72.02, indicating that consumers prioritize trusted brands when making fertilizer purchasing decisions. Following closely behind is effectiveness, with a score of 65.14, highlighting the importance of the fertilizer's ability to deliver desired results. Easy availability ranks third, scoring 45.77, suggesting that convenient access to fertilizers influences consumer choices. Nutrient composition and price occupy the fourth and fifth positions, respectively, with scores of 42.47 and 42.22. Packaging size, with a score of 32.39, was at last position indicating that while packaging plays a role, it is not as crucial as other factors.

Problems & Concerns while Purchasing Fertilizers

The weighted average mean (WAM) technique was utilized to assess the problems and concerns faced by farmers when purchasing fertilizers.

Table 19: Problems & Concerns while Purchasing Fertilizers

Particulars	WAM	Rank
Soil deterioration	4.42	1
High price	3.97	2
Lack of credit availability	3.93	3
Packaging size	2.53	4
Preferred brand is not available	2.45	5
Less knowledge	2.32	6

The first rank was of soil deterioration with a WAM score of 4.42, indicating that farmers consider soil deterioration associated with fertilizer use as their foremost concern. High prices closely follow with a score of 3.97, suggesting that the cost of fertilizers was a big problem faced by the farmers. Lack of credit availability ranks third with a score of 3.93, highlighting financial constraints faced by farmers in accessing fertilizers because of cash transaction necessary for the purchase of fertilizers. Packaging size and the unavailability of preferred brands occupy the fourth and fifth positions, respectively, with scores of 2.53 and 2.45, indicating practical considerations and brand loyalty. Lastly, less knowledge about fertilizers ranks sixth, with a score of 2.32.

Online Purchase of Pesticides or Fertilizers

Table 20: Online purchase of pesticides or fertilizers

Sr. No.	Particulars	Frequency	Percentage
1	Yes	19	11
2	No	161	89
Total		180	100

Respondents were asked if they had ever purchased pesticides or fertilizers online, with the option to provide multiple responses. The results showed that 11% of respondents indicated they had made online purchases, while 89% reported they had never made online purchases. This data highlights the limited adoption of online purchasing among respondents for these products. The majority of respondents still prefer traditional purchasing methods.

Online Platform Used for the Online Purchase

Table 21: Online platform used for the online purchase

Sr. No.	Particulars	Frequency	Percentage
1	Mobile application	6	32
2	Website	3	16
3	Calling	10	53
Total		19	100

Among the 19 respondents who reported making online purchases, they specified the platforms they used. 53% mentioned making purchases by calling, 31% used mobile applications, and 16% used websites. This data shows a preference for calling and mobile applications over websites.

Reason for Online Purchase

Table 22: Reason for online purchase

Sr. No.	Particulars	Frequency	Percentage
1	Convenience	13	68
2	Testing	6	32
Total		19	100

The 19 respondents were asked about their reason for purchasing through online platforms. Among them, 68 per cent of respondents mentioned convenience as the primary motivator for their online purchases. The remaining 32 per cent of respondents indicated that they used online platforms to test the service.

Challenges or Concerns Regarding Online Purchase

Table 23: Challenges or concerns regarding online purchase

Sr. No.	Particulars	Frequency	Percentage
1	Quality assurance	153	85
2	Lack of digital literacy	72	40
3	Delivery reliability	69	38
4	Fear of fraud	33	18

The challenges or concerns regarding online purchases were asked of the respondents, with the option to provide multiple responses. Quality assurance was the primary concern, with 153 respondents expressing worries about product quality. Additionally, 72 respondents cited a lack of digital literacy as a challenge, while 69 respondents were concerned about delivery reliability. Fear of fraud was mentioned by 33 respondents as another notable challenge in online purchases.

Dealers' perception about the use of pesticides and fertilizers

Socio-economic profile of dealers

Socio-economic parameters such as age, education level, farming type, land holding, and annual income were considered. The socio-economic profile of farmers is recorded in Table 24.

Table 24: Socio-economic profile of dealers

Sr. No.	Socio-economic parameter	Frequency	Percentage
1	**Age**		
A	25 to 40	35	58
B	41 to 60	19	32
C	Above 60	6	10
2	**Education level**		
A	Below or equivalent to SSC	6	10
B	Below or equivalent to HSC	14	23
C	Equivalent or above Graduation	40	67
3	**Experience (Years)**		
A	2 to 5	3	5
B	5 to 10	20	33
C	More than 10	37	62

The dealer's survey revealed that the majority of dealers (35%) were between 25 to 40 years old, with more than 10 years of experience (62%) in the industry. Most dealers (62%) had attained at least a graduation level of education. Dealers predominantly engaged in both cash and credit sales, with only a small percentage exclusively conducting cash or credit sales.

Type of Sale

Table 25: Type of sale

Sr. No.	Type of sale	Frequency	Percentage
1	Both	56	93
2	Cash	3	5
3	Credit	1	2
Total		60	100

The type of sale among dealers was categorized into three groups, namely Both, Cash, and Credit. The dealers, comprising 93 per cent of the total, engaged in both cash and credit sales. A smaller proportion, accounting for 5 per cent of dealers, conducted cash sales only. Additionally, 2 per cent of dealers exclusively conducted credit sales.

Time for Stocking

Table 26: Time for stocking

Sr. No.	Time period	Frequency	Percentage
1	15 Days before season	46	77
2	2 Days before season	3	5
3	30 Days before season	11	18
Total		60	100

Dealers indicated that the most common time for stocking is 15 days before the season, accounting for 77 per cent of responses. This timing allows for timely availability of products, ensuring that dealers are well-prepared for the upcoming season. Some dealers also opt to stock 30 days before the season, representing 18 per cent of responses. This is often due to availability of products at lower prices during this period, allowing dealers to capitalize on cost savings. A smaller proportion of dealers, 5 per cent prefer to stock just 2 days before the season begins.

Factors Influencing in Stocking Particular Pesticides and Fertilizers

Garrett's ranking technique was used to find out factors influencing in stocking particular pesticides and fertilizers.

Table 27: Factors Influencing in Stocking Particular Pesticides and Fertilizers

Particulars	Average Garette Score	Rank
Product Quality	81.60	1
Farmers Demands	68.27	2
Brand Image	63.23	3
Product Price	50.83	4
Salesforce	47.80	5
Credit Availability	45.58	6
Margin	44.87	7
Timely Availability	44.18	8
Packaging Size	27.40	9
Incentives	26.23	10

Dealers ranked the factors influencing stocking particular pesticides and fertilizers, based on their average Garette scores. Product quality emerged as the top-ranked factor with an average Garette score of 81.60, highlighting the importance dealers place on the quality of the products they stock. Farmers' demands ranked second with a score of 68.27, reflecting the significance of meeting customer preferences and requirements. Brand image followed closely at third place with a score of 63.23, indicating the influence of brand reputation on stocking decisions. Product price ranked fourth with a score of 50.83, underscoring the importance of competitive pricing strategies. Salesforce and credit availability rounded up the top five factors, with scores of 47.80 and 45.58 respectively. Other factors such as margin, timely availability, packaging size, and incentives also played a role, albeit to a lesser extent, in influencing stocking decisions.

Problems Faced by Dealers in Selling Pesticides and Fertilizers

The weighted average mean (WAM) technique was utilized to assess the problems and concerns faced by farmers when purchasing fertilizers.

Table 28: Problems Faced by Dealers in Selling Pesticides and Fertilizers

Particulars	WAM	Rank
Competition from other dealers	4.67	1
Demand for credit from farmers	4.58	2
Low Margin	4.12	3
Insufficient loan facilities	3.63	4
High transportation cost	3.10	5
After sales service	2.47	6
Packaging size	2.00	7
Not Timely Supply of products	1.98	8
Inadequate training	1.93	9

Competition from other dealers emerged as the top-ranked problem with a WAM score of 4.67, highlighting the intense competition within the market. Demand for credit from farmers ranked second with a score of 4.58, indicating the challenges dealers face in managing credit requests. Low margin followed closely at third place with a score of 4.12, underscoring the impact of profit margins on dealers' profitability. Insufficient loan facilities and high transportation costs also posed notable challenges, with scores of 3.63 and 3.10 respectively. After-sales service, packaging size, and not timely supply of products were identified as problems, but to a lesser extent.

Conclusion

The socio-economic profile of farmers reveals that a majority are aged between 41 and 60, predominantly have education levels below or equivalent to SSC, and are engaged in both farming and animal husbandry, with land holdings primarily between 2.1 to 4 hectares and an annual income mostly between 1 to 3 lakh. Farmers primarily purchase pesticides from agri-input stores, influenced by effectiveness, retailer suggestions, and brand reputation, although health hazards and high prices are major concerns. In terms of fertilizer use, the primary goal is to increase crop yield, with purchasing decisions driven by brand reputation and effectiveness, despite concerns over soil deterioration and high costs. Dealers, mainly aged 25 to 40 with significant industry experience, stock products based on quality and farmers' demand but face challenges such as intense competition, high demand for credit from farmers, and low-profit margins. Limited adoption of online purchasing highlights a preference for traditional procurement methods. To address these issues, training farmers on pesticide usage, balanced fertilization, and soil testing is essential. Enhancing the role of retailers through regular training, expanding detailed promotional activities, building strong relationships with dealers, and improving farmers' digital literacy to build trust in e-commerce platforms are recommended.

References

1. Care Ratings. Indian agrochemicals industry: Insights and outlook. Mumbai: Care Ratings.
2. Department of Chemicals and Petrochemicals. Chemical and petrochemical statistics at a glance. New Delhi: Government of India; 2022.
3. Department of Fertilizers. Annual report. New Delhi: Government of India; 2022.
4. Directorate of Plant Protection, Quarantine and Storage. Consumption of chemical pesticides in various states and union territories during 2018-19 to 2022-23. Faridabad: Government of India.
5. Expert Market Research. India agrochemicals market.
6. Food and Agriculture Organization. India at a glance. Rome: Food and Agriculture Organization of the United Nations.
7. Food and Agriculture Organization. Pest and pesticide management. Rome: Food and Agriculture Organization of the United Nations.
8. Hena M. SWOT analysis of agro-chemical distribution system in Thrissur district. Kerala: Kerala Agricultural University; 2004.
9. Ministry of Statistics and Programme Implementation. Workforce engaged in agriculture. New Delhi: Government of India.
10. Singh D, Singh SK, Modi A, Singh PK, Zhimo VY, Kumar A. Impacts of agrochemicals on soil microbiology and food quality. In: Prasad MNV, editor. Agrochemicals detection, treatment and remediation. Oxford: Butterworth-Heinemann; 2020. p. 101-116.
11. World's Top Exports. Top fertilizers exports by country.
12. World's Top Exports. Top pesticides exporters.