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Purchase behaviour and satisfaction level of groundnut farmers towards pre-emergence herbicides in Junagadh District of Gujarat

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Abstract

Groundnut is one of the major oilseed crops cultivated in Junagadh district of Gujarat, where weed infestation poses a significant challenge to crop productivity. Pre-emergence herbicides are widely used to control weeds during the early growth stages of the crop. In this context, this empirical research study, utilizing the published theoretical literature and descriptive cross-sectional research design, aims to analyze the purchase behaviour and satisfaction level of groundnut farmers towards pre-emergence herbicides. The study was conducted using a structured interview schedule with a sample of 120 farmers selected through multistage sampling technique. The objectives included analyzing socio-economic characteristics, understanding purchasing behaviour, evaluating satisfaction levels, and identifying constraints faced by farmers. The findings revealed that the majority of farmers were middle-aged with considerable farming experience and small landholdings. Local dealers were the primary source of purchase, and credit availability, price, and product quality were key factors influencing purchasing decisions. Satisfaction levels were highest for product performance and weed control effectiveness. However, major constraints included high product prices, fear of adulteration, lack of technical knowledge, and limited availability during peak periods. The study suggests that agrochemical companies should strengthen dealer networks, provide training and field demonstrations, offer flexible packaging and credit facilities, and improve awareness among farmers. These measures can enhance farmer satisfaction and promote the effective adoption of pre-emergence herbicides in groundnut cultivation.

Keywords: Agrochemicals, constraints, farmer satisfaction, groundnut, herbicides, Junagadh, purchase behaviour

Introduction

Agriculture remains a crucial component of the Indian economy, contributing approximately 18.3 per cent to the country's Gross Value Added (GVA) and supporting the livelihoods of a large proportion of the rural population. The increasing demand for food due to population growth has intensified the need for higher agricultural productivity. However, crop losses due to pests, diseases, and weeds continue to be a major challenge, significantly affecting yield levels. Agrochemicals, including pesticides and herbicides, play a vital role in minimizing these losses and improving crop productivity. India is among the leading producers of agrochemicals globally, yet per hectare consumption/usage is relatively low compared to developed countries, indicating substantial growth potential (FICCI, 2024; IBEF, 2024).

Groundnut (*Arachis hypogaea* L.) is one of the most important oilseed crops cultivated in Gujarat, particularly in the Junagadh district of Saurashtra region, where it contributes significantly to farmers' income and regional agricultural development. Weed infestation is a critical issue in groundnut cultivation, as it competes with crops for

essential resources such as nutrients, water, and sunlight, especially during the early growth stages. Traditionally, farmers relied on manual weeding; however, increasing labour costs and scarcity have led to a shift towards chemical weed management practices. Pre-emergence herbicides are widely used as they control weeds at the germination stage, ensuring better crop establishment and reducing labour dependency.

Despite the increasing use of herbicides, variations exist in farmers' purchase behaviour and satisfaction levels due to differences in socio-economic conditions, awareness, and access to information. Farmers' decisions are influenced by factors such as price, product availability, dealer recommendations, and perceived product performance. Additionally, farmers face several constraints, including high product prices, lack of technical knowledge, and untimely availability, which affect adoption and usage patterns. Therefore, the present study aims to analyze the purchase behaviour and satisfaction level of groundnut farmers towards pre-emergence herbicides in Junagadh district, along with identifying the constraints faced by them.

Review of Literature

The review of literature provided a comprehensive understanding of previous research related to groundnut farmers' socio-economic characteristics, purchase behaviour towards pre-emergence herbicides, satisfaction levels, and the constraints faced during their procurement and use. This review helped in identifying existing research gaps and provides a strong foundation for the present study.

Tiwari *et al.* (2025) ^[11] conducted a study on 300 farmers in Madhya Pradesh using multistage sampling and statistical tools like percentage analysis, mean, and chi-square test. The study revealed that 55% of farmers were marginal and socio-economic factors such as education, income, and landholding significantly influenced farming practices and income levels.

Bodar, Thakkar and Sharma (2025) ^[1] in their landmark study conducted in Jamnagar district of Gujarat examined the brand preferences, purchase behaviour, and satisfaction levels of summer groundnut farmers towards insecticides. The findings revealed that the groundnut farmers were highly aware of insect pests affecting their crops and relied significantly on insecticides to manage yield losses. Purchase decisions were primarily influenced by factors such as product quality, performance, competitive pricing, and timely availability, while dealers remained the most trusted source of information. Most farmers purchased insecticides from local agro-input dealers using credit payments.

Murthathi, Thakkar and Sharma (2025) ^[6] in their landmark study conducted in Kurnool district of Andhra Pradesh with a sample of 200 farmers, reported that the major five constraints faced by farmers include high prices of insecticides, poor product quality, lack of discounts, fear of adulteration, and limited product availability. These challenges indicate ongoing concerns regarding affordability, authenticity, and access to reliable agricultural inputs. Actionable recommendations of enhancing dealer networks, promoting peer learning, building trust of farmers and ensuring consistent product performance can positively impact farmer decision-making. Simultaneously, addressing key barriers such as pricing, quality assurance, and timely availability is essential to encourage wider adoption and effective usage of insecticides. The insights from this research can inform agrochemical companies, policymakers, and extension services in developing farmer-centric strategies that support sustainable and efficient agricultural practices.

Meghana *et al.* (2024) ^[5] studied 120 farmers in Karnataka using a structured interview schedule and analyzed data through frequency, percentage, and correlation analysis. The results indicated that variables like education, income, extension contact, and mass media exposure had a significant positive relationship with farmers' performance and adoption behaviour.

Chauhan *et al.* (2024) ^[12] conducted a study in Gujarat using survey method and statistical tools like percentage and regression analysis. The findings showed that most farmers were middle-aged with more than 15 years of experience, and factors such as price, income, and landholding significantly influenced purchasing behaviour.

Kiyada and Prajapati (2023) ^[4] studied 120 farmers and 80 agro-dealers using purposive sampling and tabular analysis

along with Weighted Average Mean (WAM). The study found that 90.83% of farmers relied on dealer recommendations, and product performance and past experience were key factors influencing herbicide purchase decisions.

Sharma *et al.* (2023) ^[9] conducted a study on 120 farmers using personal interviews and percentage analysis. The findings revealed that 30% of farmers depended on dealer relationships, 20% on product quality, and 24% preferred dealers due to credit availability, highlighting the importance of dealer influence.

Vasoya *et al.* (2023) ^[12] carried out a study using survey and statistical tools such as chi-square test and descriptive analysis. The results indicated that price was the most important psychological factor influencing pesticide purchase, followed by promotional activities and product awareness.

Parasuraman *et al.* (2022) ^[7] studied 200 farmers and 48 dealers using structured interview schedules and analytical tools like chi-square test, RBQ, and percentage analysis. The study revealed that 89% of farmers preferred chemical weed control due to labour scarcity and cost effectiveness, with product quality and dealer behaviour as major influencing factors.

Surender *et al.* (2021) ^[10] conducted a field study using survey method and analytical tools like ranking and percentage analysis. The results showed that labour saving, cost reduction, and ease of application were the primary factors influencing herbicide usage along with dealer recommendations.

Parmar *et al.* (2020) ^[8] conducted a study on 130 farmers using Likert scale and multiple regression analysis. The study found that most farmers had a positive perception of herbicides, and factors like brand image, cropping area, and past experience significantly influenced buying behaviour.

Vekariya *et al.* (2019) ^[13] studied 160 farmers using tabular analysis and Cobb-Douglas production function. The findings revealed that herbicide users achieved higher productivity (23.12 q/ha) and net returns compared to non-users, although concerns about cost and crop safety limited adoption.

Verma *et al.* (2019) ^[14] conducted a study using survey and percentage analysis to examine socio-economic characteristics of farmers. The results showed that 61.88% of farmers were above 45 years, 57.5% were marginal farmers, and factors like education, income, and landholding significantly influenced decision-making behaviour.

Hosukar and Kerur (2018) carried out a study using survey method and descriptive statistical tools. The study revealed that farmers with higher education and better extension contact showed higher adoption of agrochemicals, emphasizing the importance of awareness and advisory services.

Overall, the reviewed studies indicate that farmers' purchase behaviour and satisfaction towards agrochemicals are influenced by socio-economic factors, dealer recommendations, product quality, and price. At the same time, constraints such as high cost, lack of technical knowledge, and limited awareness continue to hinder effective adoption. These insights formed the basis for the present study and guided the researchers in framing the interview schedule for the present study.

Methodology

The present study was conducted in Junagadh district of Gujarat, which was selected purposively due to its significant area under groundnut cultivation. A descriptive cross-sectional research design was adopted to analyze the purchase behaviour and satisfaction level of groundnut farmers towards pre-emergence herbicides.

Both primary and secondary data were used for the study. Primary data were collected from 120 groundnut farmers through personal interviews using a structured interview schedule, while secondary data were obtained from research articles, reports, and relevant publications.

Multistage sampling technique was employed for the selection of respondents. In the first stage, Junagadh taluka was selected purposively. In the second stage, 5 Talukas were selected randomly. In the third stage, 10 villages were selected randomly, and in the final stage, 12 farmers were selected purposively from each village, resulting in a total sample size of 120 respondents.

The collected data were analyzed using statistical tools such as frequency distribution, percentage analysis, mean score, tabular analysis and graphical analysis. Rank analysis was also used to identify the major factors influencing purchase behaviour and the constraints faced by farmers. This methodology provided a systematic approach to understand farmers' behaviour, satisfaction level, and challenges related to pre-emergence herbicide usage.

Results and Discussion

Socio-Economic Characteristics of Groundnut Farmers

The socio-economic profile of the respondents revealed that a majority of the farmers belonged to the middle-age group, with 39% in the age group of 41–50 years, followed by 29% above 50 years, indicating that experienced farmers are actively engaged in groundnut cultivation. In terms of education, most farmers (61%) had education below SSC, while only a small proportion attained higher education. A large majority (81%) practiced conventional farming, and 40% of the farmers had more than 20 years of farming experience, reflecting strong practical exposure. Regarding occupation, 53% depended solely on farming, while others were engaged in allied activities such as animal husbandry and business. Landholding pattern showed that 44% were small farmers (1–2 ha), followed by 28% semi-medium farmers, indicating dominance of small-scale farming. Further, 62% of farmers practiced irrigated farming, with surface irrigation being the most common method. In terms of annual income, the highest proportion (31%) earned between ₹3,00,001 to ₹5,00,000, followed by 28% in the ₹1,00,001 to ₹3,00,000 category. The area under groundnut cultivation was mostly limited, with 43% cultivating up to 1 hectare and 36% between 1–2 hectares. Regarding herbicide usage, 47% of farmers used post-emergence herbicides, 41% used pre-emergence herbicides, and 12% used both types.

Table 1: Socio-Economic Characteristics of Groundnut Farmers

Variable	Parameter	Frequency	Percentage (%)
Age Group	21–30 years	7	6.00
	31–40 years	31	26.00
	41–50 years	47	39.00
	Above 50 years	35	29.00
Education Level	Illiterate	12	10.00
	Below SSC	73	61.00
	SSC	21	17.00
	HSC	9	8.00
	Graduate	4	3.00
	Post Graduate	1	1.00
Farming system	Conventional	97	81.00
	Organic farming	4	3.00
	Both	19	16.00
Farming Experience	Below 5 years	4	3.00
	5 – 10 years	12	10.00
	10 – 15 years	21	18.00
	15 – 20 years	35	29.00
	More than 20 years	48	40.00
Occupation	Farming	64	53.00
	Farming + AH	31	26.00
	Farming + Service	9	8.00
	Farming + Business	16	13.00
Landholding Size (Ha)	Marginal (up to 1 ha)	22	18.00
	Small (1.01–2.00 ha)	52	44.00
	Semi-medium (2.01–4.00 ha)	34	28.00
	Medium (4.01–10.00 ha)	5	4.00
	Large (more than 10 ha)	7	6.00
Type of Farming	Irrigated	76	62.00
	Rainfed	54	38.00
Method of Irrigation	Surface	76	100.00
	Drip	35	46.00
	Sprinkler	21	28.00
Annual Income (₹)	Below ₹1,00,000	12	10.00
	₹1,00,001 – ₹3,00,000	34	28.00
	₹3,00,001 – ₹5,00,000	37	31.00

	₹5,00,001 – ₹8,00,000	26	22.00
	Above ₹8,00,000	11	9.00
Area Under Groundnut Cultivation	Up to 1 ha	51	43.00
	1–2 ha	43	36.00
	2.01–4 ha	19	16.00
	4.01–10 ha	4	3.00
	More than 10 ha	3	2.00
Types of herbicides used by farmers	Pre-emergence	49	41.00
	Post-emergence	57	47.00
	Both	47	12.00

Purchase Behaviour of Groundnut Farmers towards Pre-emergence Herbicides

The study revealed that herbicide usage among groundnut farmers was varied, with 47% of respondents using post-emergence herbicides, 41% using pre-emergence herbicides, and 12% using both types. All the farmers who used pre-emergence herbicides purchased from local dealers, indicating their dominance as the main supply source. In terms of information sources, agro-service centres, progressive farmers, and company representatives were the key influencers in farmers' purchase decisions. A

considerable proportion of farmers preferred purchasing herbicides on credit basis (46%), while others used cash or a mix of both modes of payment. With respect to factors influencing purchase behaviour, credit facility (mean = 4.13), price (3.85), and product quality (3.80) were the major determinants affecting farmers' decisions, followed by Progressive farmers' opinion (3.61) and dealer influence (3.45). These findings indicate that farmers' purchasing behaviour is primarily influenced by economic factors and accessibility of inputs, along with interpersonal sources of information.

Table 2: Influencing Factors for Purchase of Pre-emergence Herbicides

Factors	HI (5)	I (4)	N (3)	SI (2)	UI (1)	CS	Mean	Rank
Price	18 (90)	13 (52)	8 (24)	4 (8)	3 (3)	177	3.85	II
Dealer influence	13 (65)	11 (44)	10 (30)	8 (16)	4 (4)	159	3.45	V
Credit facility	21 (105)	14 (56)	7 (21)	4 (8)	0	190	4.13	I
Past experience	8 (40)	13 (52)	11 (33)	9 (18)	5 (5)	148	3.22	VI
Progressive farmers opinion	14 (70)	12 (48)	10 (30)	8 (16)	2 (2)	166	3.61	IV
Product quality	17 (85)	14 (56)	7 (21)	5 (10)	3 (3)	175	3.80	III

Highly important: 5, Important: 4, Neutral: 3, Somewhat important: 2, Not important: 1

Cumulative Score (CS) = Maximum Scale × No. of Farmers

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

Satisfaction Level of Groundnut Farmers towards Pre-emergence Herbicides

The analysis of satisfaction level revealed that farmers showed varying levels of satisfaction towards pre-emergence herbicides across different parameters. The results indicated that product performance was ranked highest (mean = 4.15), followed by product quality (4.08), reflecting a high level of satisfaction among farmers regarding the effectiveness and reliability of the product. Dealer support (3.90) and availability of the product (3.67)

also received moderate to high satisfaction, indicating the importance of distribution and service support. However, comparatively lower satisfaction was observed in terms of packaging size (3.45) and price of the product (3.08), suggesting that these factors were less satisfactory to the farmers. Overall, the findings indicate that while farmers are highly satisfied with the performance and quality aspects of the herbicide, economic and packaging-related factors influence their overall satisfaction level.

Table 3: Satisfaction Level of Groundnut Farmers towards Pre-emergence Herbicides

Parameters	HS (5)	S (4)	N (3)	D (2)	HDS (1)	CS	Mean	Rank
Quality	21 (105)	14 (56)	6 (18)	4 (8)	1 (1)	188	4.08	II
Packaging size	13 (65)	12 (48)	8 (24)	9 (18)	4 (4)	159	3.45	V
Dealer support	20 (100)	13 (52)	7 (21)	4 (8)	2 (2)	183	3.9	III
Availability	17 (85)	11 (44)	8 (24)	6 (12)	4 (4)	169	3.67	IV
Price	8 (40)	10 (40)	11 (33)	12 (24)	5 (5)	142	3.08	VI
Product performance	22 (110)	14 (56)	6 (18)	3 (6)	1 (1)	191	4.15	I

Highly Satisfied: 05; Satisfied: 04; Neutral: 03; Dissatisfied: 02; Highly Dissatisfied: 01

Cumulative Score (CS) = Maximum Scale × No. of Farmers

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

Constraints faced by Farmers in the Purchase of Pre-emergence Herbicides

Several constraints were perceived by farmers in the purchase of pre-emergence herbicides, and it can be concluded that higher price was ranked first (mean = 4.17), followed by lack of technical knowledge (4.08), indicating that economic and knowledge-related factors are the major

challenges faced by farmers. Fear of adulteration (3.97) was ranked third, reflecting concerns regarding product authenticity. Further, inappropriate packaging size (3.86) and lack of timely availability of the product (3.67) were ranked fourth and fifth respectively, highlighting issues related to product accessibility and suitability. Poor product quality (3.35) was ranked last among the constraints.

Table 4: Constraints faced by Farmers in the Purchase of Pre-emergence Herbicides

Parameter	HA (5)	A (4)	N (3)	D (2)	HD (1)	CS	Mean	Rank
Higher Price	25 (125)	10 (40)	6 (18)	4 (8)	1 (1)	192	4.17	I
Inappropriate Packaging size	20 (100)	11 (44)	6 (18)	7 (14)	2 (2)	178	3.86	IV
Lack of Timely Availability of the product	15 (75)	14 (56)	8 (24)	5 (10)	4 (4)	169	3.67	V
Poor Product quality	13 (65)	11 (44)	6 (18)	11 (22)	5 (5)	154	3.35	VI
Fear of Adulteration	21 (105)	12 (48)	7 (21)	3 (6)	3 (3)	183	3.97	III
Lack of Technical Knowledge	24 (120)	10 (40)	7 (21)	2 (4)	3 (3)	188	4.08	II

HA= Highly Agree: 5; A= Agree: 4; N = Neutral: 3; D = Disagree: 2; HD= Highly Disagree: 1

Cumulative Score (CS) = Maximum Scale × No. of Farmers

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

Suggestions

The study revealed that a relatively smaller proportion of farmers were using pre-emergence herbicides, mainly due to low awareness, limited technical knowledge, and concerns about price. Hence, there is a need for regular farmer training programmes and field demonstrations to increase awareness about the benefits and proper usage of such herbicides.

Since progressive farmers and agro-service centers play a major role in influencing purchase behaviour, companies should focus on training these influencers as “lead farmers” or local ambassadors who can guide others in their community.

As most farmers are found to be dependent on credit for purchasing herbicides, partnerships with cooperative societies, input dealers, and rural banks could help design customized credit schemes or input loan facilities, making quality products more accessible.

Majority of farmers purchased herbicides through dealers, making them a key link in the supply chain. Hence, the company should prioritize dealer-driven promotional activities, as farmers rely heavily on them for product information.

Some farmers found the pack size unsuitable for their land size or had difficulty with dosage clarity. Additionally, the product’s high price was a major concern. Offering multiple pack sizes and exploring affordable pricing or credit options could improve adoption.

All farmers purchased pre-emergence herbicides only from local dealers, showing overdependence on a single channel. To improve accessibility, companies should also promote alternative platforms like cooperatives, agri-apps, or online portals.

Conclusion

The empirical investigation highlights key demographic and

economic characteristics of groundnut farmers in Junagadh Taluka of Junagadh District, revealing meaningful insights into their farming practices and pre-emergence herbicide usage. All respondents were male, with 39% aged between 41–50 years and 40% having over 20 years of farming experience, indicating a matured and experienced farming base. Most farmers (61%) had education below SSC, and 44% owned 1–2 hectares of land, categorizing them as smallholders. A large number (81%) practiced conventional farming, with 62% under irrigated conditions using surface irrigation. Most farmers (31%) had an annual income between ₹3–5 lakh, and all cultivated groundnut in Kharif, with many also growing crops in Rabi and Zaid seasons. Regarding herbicide usage, 47% used post-emergence and 41% used pre-emergence herbicides. Among pre-emergence users, 73% preferred Strongarm, which was purchased entirely through local dealers. The most influential sources of information were found to be agro-service centers and progressive farmers. Most farmers preferred credit payment, and the influencing factors were credit availability, price and Product quality. In terms of satisfaction, the highest ratings were given to product performance and quality, while price received the lowest score. Farmers faced several constraints: high price of herbicides, lack of technical knowledge, fear of adulteration. The findings clearly suggest a need for stronger dealer-based extension support, diverse and appropriately sized packaging, and more affordable pricing to improve herbicide adoption and satisfaction levels among groundnut farmers.

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