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Purchase Intention and Constraints in Purchasing Pesticides from e-commerce platform: A Study of farmers in Junagadh District of Gujarat

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Abstract

The study examined farmers' awareness, purchase intention, influencing factors, and constraints regarding purchasing pesticides through e-commerce platforms in Junagadh district of Gujarat. A descriptive cross-sectional research design was adopted, and primary data were collected from 200 farmers using a structured interview schedule through a multi-stage sampling technique. The findings revealed that 63.5% of farmers were aware of online pesticide purchasing. Lower prices, discounts, easy price comparison, and product information were the key factors encouraging online purchases. The perceived usefulness, perceived ease of use, social influence, and facilitating conditions positively influenced farmers' purchase intention. Major constraints included counterfeit products, delayed delivery, inability to inspect products, and limited digital literacy. The study concludes that improving product authenticity, delivery services, farmer awareness can enhance the adoption of e-commerce platforms for pesticide purchasing, providing useful insights for agri-input companies, Agri-Tech firms, extension agencies, and policymakers.

Keywords: E-commerce platformsm, Pesticides, Purchase intention, Junagadh district

Introduction

Agriculture is one of the most important sectors of the Indian economy, contributing significantly to national income, food security, employment generation, and rural development. India is among the world's leading agricultural producers, and the sector supports the livelihoods of nearly half of the country's population. However, Indian agriculture is undergoing rapid transformation due to technological advancements, increasing smartphone penetration, improved internet connectivity, and the expansion of digital services in rural areas. These developments have accelerated the adoption of digital agriculture and created new opportunities for marketing and distributing agricultural inputs through e-commerce platforms (IBEF, 2024; Mordor Intelligence, 2025). The pesticide industry plays a crucial role in modern agriculture by protecting crops from insect pests, diseases, and weeds, thereby improving crop productivity and ensuring food security. The Indian agrochemical industry has emerged as one of the fastest-growing sectors, driven by increasing demand for crop protection products, commercialization of agriculture, and continuous technological innovations. Simultaneously, the rapid growth of agricultural e-commerce platforms has transformed the conventional agricultural input distribution system by providing farmers with easy access to quality products, competitive prices, doorstep delivery, and technical information. Digital platforms such as AgroStar, IFFCO Bazar, and other Agri-Tech companies are increasingly connecting farmers directly with manufacturers and authorized suppliers, thereby improving transparency and expanding market access (Grand View Research, 2025; TechSci Research, 2025). Although e-commerce offers several advantages, its adoption for purchasing pesticides remains relatively limited among Indian farmers. The willingness to purchase pesticides online is influenced by multiple technological, economic, behavioural, and social factors. Farmers evaluate online platforms based on perceived usefulness, ease of use, product authenticity, pricing, payment convenience, availability of technical support, and recommendations received from dealers, fellow farmers, and digital media.

The Technology Acceptance Model, Theory of Planned Behaviour, and Unified Theory of Acceptance and Use of Technology suggest that perceived usefulness, perceived ease of use, social influence, and facilitating conditions significantly influence consumers' behavioural intentions towards adopting new technologies. At the same time, concerns regarding counterfeit products, delayed delivery, inability to physically inspect products before purchase, lack of credit facilities, and limited digital literacy continue to discourage many farmers from adopting e-commerce platforms for agricultural input procurement (Dhandhukiya *et al.*, 2023; Rai & Kulshreshtha, 2023; Singh & Kumar, 2025) ^[1, 10, 12]. Junagadh district of Gujarat is one of the major agricultural regions of the Saurashtra zone, where crops such as groundnut, cotton, wheat, cummin, and horticultural crops are extensively cultivated. The increasing use of smartphones, digital payment systems, and online agricultural advisory services has created favourable conditions for the adoption of e-commerce platforms among farmers in the district. Nevertheless, empirical information regarding farmers' awareness, purchase intentions, factors influencing adoption, and constraints associated with purchasing pesticides through online platforms remains limited. Understanding these behavioural aspects is essential for agri-input companies, AgriTech firms, extension agencies, and policymakers to formulate effective digital marketing strategies, strengthen rural e-commerce ecosystems, and promote the digital transformation of agricultural input distribution. Therefore, the present study was undertaken to examine the awareness and intentions of farmers to purchase pesticides through e-commerce platforms in Junagadh district of Gujarat.

Review of Literature

Singh and Kumar (2025) ^[12] investigated farmers' acceptance of e-commerce platforms in digital agriculture and found that perceived usefulness, perceived ease of use, facilitating conditions, and social influence significantly influenced farmers' intention to adopt online purchasing platforms. The study also identified smartphone availability, internet connectivity, and digital payment facilities as key enablers, while concerns about product authenticity and limited technical skills were the major barriers. The authors concluded that strengthening digital infrastructure and providing farmer training can enhance the adoption of e-commerce platforms for agricultural inputs. Tupe (2024) ^[14] studied the adoption of e-commerce among small and marginal farmers in India and found that digital literacy, internet accessibility, and awareness significantly influenced the use of online platforms for purchasing agricultural inputs. The study also identified inadequate technical knowledge, poor internet connectivity, and lack of trust in online transactions as the major constraints. The author concluded that training programmes, awareness campaigns, and improved digital infrastructure are essential to enhance farmers' participation in agricultural e-commerce. Makhija and Sharma (2023) ^[7] studied the prospects of e-retailing of agricultural inputs in India and found that better price transparency, wider product availability, discounts, and promotional schemes significantly encouraged farmers to purchase agricultural inputs online. The study also revealed that convenience, access to product information, and price comparison positively influenced purchase intention, particularly among younger and educated farmers. The researchers concluded that competitive pricing, attractive offers, and easy access to information are key determinants

of farmers' adoption of e-commerce platforms. Kumar and Meena (2023) ^[6] examined the constraints faced by farmers in adopting e-commerce platforms for agricultural input purchases and found that delayed delivery, concerns about counterfeit or substandard products, inadequate technical assistance, lack of trust, and limited digital literacy were the major barriers. The authors concluded that efficient logistics, quality assurance measures, and farmer training programmes are essential to promote e-commerce adoption in agriculture. Kaur and Kaur (2022) ^[4] examined the challenges faced by rural consumers in adopting e-commerce platforms and found that concerns about product quality, authenticity, lack of trust in online sellers, delayed delivery, and inadequate customer support were the major barriers to online purchasing. The study also revealed that the inability to physically inspect products negatively affected consumers' buying behaviour. The authors concluded that improving product quality assurance, customer service, and timely delivery is essential for increasing the adoption of e-commerce platforms among rural consumers. Patel and Desai (2022) ^[9] studied the adoption of digital agriculture platforms among farmers in Gujarat and found that fear of online fraud, lack of confidence in digital payment systems, difficulties in using mobile applications, and inadequate technical support were the major barriers to adoption. The authors concluded that awareness programmes, secure payment mechanisms, and farmer training initiatives are essential to promote the use of e-commerce platforms among farmers. Yadav *et al.* (2021) ^[15] studied farmers' perception towards digital agricultural services and found that inadequate technical knowledge, poor internet connectivity, language barriers, and low confidence in online transactions were the major constraints affecting the use of digital platforms. The authors concluded that improving digital literacy, awareness, and rural internet infrastructure is essential to enhance farmers' participation in online agricultural transactions. Zinnia *et al.* (2020) ^[16] studied consumer switching behaviour towards digital transaction platforms and found that service quality, pricing transparency, convenience, and platform innovation significantly influenced consumers' intention to adopt online purchasing channels. The study also revealed that trust and perceived benefits positively affected digital adoption. The researchers concluded that service quality and customer value are the key drivers of consumers' transition to online purchasing platforms. Kulkarni *et al.* (2018) ^[5] examined the buying behaviour of cotton growers in Nanded district of Maharashtra and found that timely technical guidance and the availability of quality agricultural inputs were the major factors influencing farmers' purchase decisions. The study revealed that agronomic advisory services increased farmers' confidence, strengthened customer loyalty, and positively influenced their purchase intentions. The researchers concluded that integrating technical support with input distribution can enhance farmers' adoption of modern procurement channels, including digital platforms. Sharma *et al.* (2017) ^[11] examined the factors influencing brand-switching behaviour, technology adoption, and digital purchasing intentions among consumers. The study found that ease of use, technological awareness, platform features, social influence, and promotional incentives significantly encouraged online purchasing behaviour. The researchers concluded that positive user experiences and awareness of digital technologies are key determinants of consumers' willingness to adopt online purchasing channels.

Materials and Methods

The present study was conducted in Junagadh district of Gujarat, India, one of the major agricultural regions of the Saurashtra zone, where crops such as groundnut, cotton, wheat, cumin, and horticultural crops are extensively cultivated. The district was selected due to the increasing penetration of smartphones, digital payment systems, and agricultural e-commerce services, making it suitable for studying farmers' awareness and intention towards purchasing pesticides through online platforms. A descriptive cross-sectional research design was adopted to purchase intention, factors influencing adoption, and perceived constraints related to purchasing pesticides through e-commerce platforms. A multi-stage sampling technique was employed for the selection of respondents. In the first stage, four talukas namely Junagadh, Visavadar, Bhesan, and Mendarda were selected randomly. In the second stage, five villages were randomly selected from each taluka, resulting in a total of 20 villages. In the final stage, 10 farmers were selected randomly from each village, constituting a total sample of 200 respondents. Primary data were collected during the survey period through personal interviews using a pretested and structured interview schedule. The questionnaire comprised socio-economic characteristics, awareness of agricultural e-commerce platforms, purchase intention towards online pesticide purchasing, factors influencing adoption, perceived risks, and constraints faced by farmers while purchasing pesticides through online platforms. Secondary information was collected from published research articles, government reports, industry publications, books, and authenticated websites to support the study. The collected data were coded, tabulated, and analysed using appropriate statistical tools. Percentage analysis was used to describe the socio-economic profile and awareness level of respondents. Likert's five-point rating scale and weighted mean scores were employed to measure farmers' purchase intention. The Garrett Ranking Technique was used to prioritize the

constraints perceived by farmers in purchasing pesticides through e-commerce platforms.

Objectives of Study

- To study the socio-economic characteristics of farmers in the study area.
- To examine farmers' intention to purchase pesticides through e-commerce platforms.
- To identify the factors influencing farmers' intention to purchase pesticides e-commerce platforms.
- To identify the perceived constraints by farmers in purchasing pesticides through e-commerce platforms.

Results and Discussion

Socio-Economic Characteristics of Farmers

The socio-economic characteristics of the respondents are presented in Table 1. All respondents (100%) were male farmers, indicating that pesticide purchasing decisions in the study area are predominantly undertaken by male members of the household. The majority of farmers (35.50%) belonged to the 41–50 years age group, followed by 32.00% in the 18–30 years age group and 27.50% in the 31–40 years age group. Regarding education, 41.50% of the respondents had completed HSC/Diploma, followed by 29.00% with SSC & below education and 26.00% who were graduates. Agriculture was the primary occupation of 42.00% of the respondents, whereas 36.00% were engaged in agriculture along with allied activities. In terms of landholding, 34.50% of the respondents belonged to the small farmer category (1–2 ha), followed by 29.50% semi-medium farmers. Furthermore, 30.50% of the respondents reported an annual family income between ₹3,00,001 and ₹5,00,000, indicating a moderate economic status of the farming households in the study area. These findings suggest that the respondents were predominantly middle-aged, moderately educated, small-scale farmers with agriculture as their principal occupation, which may influence their awareness and intention towards purchasing pesticides through e-commerce platforms.

Table 1: Socio-economic Characteristics of the Respondents (n = 200)

Variable	Parameter	Frequency	Percentage (%)
Gender	Male	200	100.00
	Female	0	0.00
Age Group	18–30 years	64	32.00
	31–40 years	55	27.50
	41–50 years	71	35.50
	Above 50 years	10	5.00
Education Level	SSC & Below	58	29.00
	HSC/Diploma	83	41.50
	Graduate	52	26.00
	Post Graduate	7	3.50
Occupation	Agriculture	84	42.00
	Agriculture + Allied	72	36.00
	Farming + Business	44	22.00
Landholding Size (ha)	Marginal (up to 1 ha)	49	24.50
	Small (1–2 ha)	69	34.50
	Semi-medium (2–4 ha)	59	29.50
	Medium (4–10 ha)	10	5.00
	Large (Above 10 ha)	13	6.50
Annual Family Income (₹)	Below 1,00,000	19	9.50
	1,00,001–3,00,000	56	28.00
	3,00,001–5,00,000	61	30.50
	5,00,001–8,00,000	48	24.00
	Above 8,00,000	16	8.00
Awareness of purchasing agricultural inputs through e-commerce platforms	Yes	127	63.50
	No	73	36.50

Table 2: Farmers' Purchase Intention towards Purchasing Pesticides through E-commerce Platforms (n = 127)

Particulars	SD (1)	D (2)	N (3)	A (4)	SA (5)	CS	Mean	Rank
Willing to try purchasing online within next year	8 (8)	12 (24)	28 (84)	52 (208)	27 (135)	459	3.61	III
Prefer online if price is lower than local market	3 (3)	6 (12)	15 (45)	61 (244)	42 (210)	514	4.05	I
Intend to use mobile apps for next purchase	10 (10)	14 (28)	31 (93)	49 (196)	23 (115)	442	3.48	IV
Recommend other farmers to purchase online	9 (9)	16 (32)	35 (105)	45 (180)	22 (110)	435	3.43	V
Use platform for price & information checking	4 (4)	8 (16)	20 (60)	58 (232)	37 (185)	497	3.91	II

(Strongly Disagree (1), Disagree (2), Neutral (3), Agree (4), Strongly Agree (5))

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

Table 2. presents the purchase intention of farmers towards purchasing pesticides through e-commerce platforms. Among the various statements, "Prefer online if price is lower than the local market" secured the highest mean score (4.05) and ranked first, followed by "Use platform for price and information checking" (Mean = 3.91). "Willing to try

purchasing online within the next year" ranked third with a mean score of 3.61. The findings indicate that competitive pricing and easy access to product information are the major factors encouraging farmers to purchase pesticides through e-commerce platforms

Table 3: Factors Influencing Farmers' Intention to Purchase Pesticides through E-commerce Platforms (n = 127)

Construct	Particulars	SD D (1)	D (2)	N (3)	A (4)	SA (5)	CS	Mean	Rank
Perceived Usefulness	Discounts and promotional schemes encourage me to purchase pesticides online.	2 (2)	5 (10)	15 (45)	59 (236)	46 (230)	523	4.12	I
	Online platforms help me compare prices easily.	2 (2)	6 (12)	17 (51)	63 (252)	39 (195)	512	4.03	II
	Purchasing pesticides online saves time.	3 (3)	8 (16)	18 (54)	61 (244)	37 (185)	501	3.95	III
	Online platforms provide detailed product information.	4 (4)	8 (16)	18 (54)	59 (236)	38 (190)	500	3.94	IV
	Online platforms offer more product choices.	5 (5)	9 (18)	21 (63)	58 (232)	34 (170)	488	3.84	V
	Online purchasing improves my buying decisions.	6 (6)	10 (20)	22 (66)	56 (224)	33 (165)	482	3.79	VI
	Online purchasing is more convenient than local dealers.	5 (5)	12 (24)	24 (72)	54 (216)	32 (160)	477	3.76	VII
Perceived Ease of Use	Easy to search pesticides online.	4 (4)	9 (18)	21 (63)	61 (244)	32 (160)	489	3.85	I
	Easy to place online orders.	6 (6)	10 (20)	23 (69)	58 (232)	30 (150)	477	3.76	II
	Easy to make online payments.	7 (7)	12 (24)	24 (72)	55 (220)	29 (145)	469	3.69	III
	Easy to learn how to use the platform.	8 (8)	12 (24)	25 (75)	54 (216)	28 (140)	464	3.65	IV
	Easy to communicate with sellers.	8 (8)	14 (28)	26 (78)	51 (204)	28 (140)	458	3.61	V
	Can use the application without assistance.	12 (12)	18 (36)	27 (81)	46 (184)	24 (120)	433	3.41	VI
Social Influence	Social media advertisements influence my decision.	3 (3)	7 (14)	19 (57)	62 (248)	36 (180)	501	3.95	I
	Company representatives encourage online purchasing.	4 (4)	8 (16)	21 (63)	60 (240)	34 (170)	493	3.88	II
	Fellow farmers influence my decision.	5 (5)	10 (20)	23 (69)	58 (232)	31 (155)	481	3.79	III
	Friends encourage me to purchase online.	9 (9)	14 (28)	28 (84)	52 (208)	24 (120)	450	3.54	IV
	Family members encourage online purchasing.	10 (10)	15 (30)	26 (78)	50 (200)	26 (130)	448	3.53	V
Facilitating Conditions	Smartphone availability supports online purchasing.	2 (2)	5 (10)	14 (42)	58 (232)	48 (240)	526	4.14	I
	Digital payment facilities are available.	5 (5)	9 (18)	20 (60)	60 (240)	33 (165)	488	3.84	II
	Reliable internet connectivity is	6	10	24	57	30	476	3.75	III

	available.	(6)	(20)	(72)	(228)	(150)			
	Platform is available in the local language.	6 (6)	10 (20)	25 (75)	56 (224)	30 (150)	475	3.74	IV
	Help is available when required.	7 (7)	12 (24)	24 (72)	55 (220)	29 (145)	469	3.69	V
	Delivery service is available in my area.	8 (8)	14 (28)	23 (69)	53 (212)	29 (145)	462	3.64	VI
Trust & Perceived Risk	Concern about receiving fake/expired products.	2 (2)	4 (8)	11 (33)	52 (208)	58 (290)	541	4.26	I
	Concern about delayed delivery.	3 (3)	5 (10)	15 (45)	54 (216)	50 (250)	525	4.13	II
	Concern about product damage.	5 (5)	8 (16)	20 (60)	58 (232)	36 (180)	493	3.88	III
	Fear of financial loss.	6 (6)	10 (20)	22 (66)	56 (224)	33 (165)	482	3.79	IV
	Trust in online payment systems.	6 (6)	10 (20)	23 (69)	57 (228)	31 (155)	477	3.76	V
	Concern about misuse of personal information.	7 (7)	12 (24)	24 (72)	53 (212)	31 (155)	470	3.70	VI
	Trust in product quality.	8 (8)	14 (28)	25 (75)	53 (212)	27 (135)	458	3.61	VII
	Trust in online sellers.	9 (9)	15 (30)	24 (72)	51 (204)	28 (140)	454	3.58	VIII

(Strongly Disagree (1), Disagree (2), Neutral (3), Agree (4), Strongly Agree (5))

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

Table 4. presents the factors influencing farmers' intention to purchase pesticides through e-commerce platforms under the constructs of the Technology Acceptance Model, Theory of Planned Behaviour, Unified Theory of Acceptance and Use of Technology and Trust & Perceived Risk. Among the perceived usefulness factors, discounts and promotional schemes (Mean = 4.12) and better price comparison (Mean = 4.03) emerged as the most influential factors encouraging online purchase intention. Under perceived ease of use, easy search of pesticides (Mean = 3.85) and easy order placement (Mean = 3.76) positively influenced farmers' adoption. Social media advertisements (Mean = 3.95) and company representatives (Mean = 3.88) were the major social influences affecting purchase decisions. Among the facilitating conditions, availability of smartphones (Mean = 4.14) and digital payment facilities (Mean = 3.84) played an important role in promoting online purchasing. However, under the trust and perceived risk construct, concerns regarding fake or expired products (Mean = 4.26) and delay in delivery during pest outbreaks (Mean = 4.13) were identified as the major issues affecting farmers' intention to purchase pesticides through e-commerce platforms. Overall, the findings indicate that economic benefits, ease of use, digital infrastructure, and trust are the key determinants of farmers' online purchasing behaviour.

Table 4: Average mean score Factors Influencing Farmers' Intention to Purchase Pesticides through E-commerce Platforms

Construct	Average mean score
Perceived Usefulness	3.92
Perceived Ease of Use	3.66
Social Influence	3.73
Facilitating Conditions	3.80
Trust & Perceived Risk	3.83

The above table indicates that Perceived Usefulness was the most influential factor affecting farmers' intention, with the highest average mean score of 3.92 (Rank 1). It was followed by Trust & Perceived Risk with an average mean

score of 3.83 (Rank 2), Facilitating Conditions with an average mean score of 3.80 (Rank 3), and Social Influence with an average mean score of 3.73 (Rank 4). Perceived Ease of Use recorded the lowest average mean score of 3.66 (Rank 5), indicating that although it influenced farmers' intention, it was considered less important than the other factors. Overall, the findings suggest that farmers' intention is primarily driven by the perceived usefulness and trustworthiness of the product.

Table 5: Perceived Constraints Faced by Farmers in Purchasing Pesticides through Ecommerce Platforms (n = 127)

Constraints	Total Garrett Score	Mean Garrett Score	Rank
Risk of receiving fake or expired products	8915	70.20	I
Delay in delivery during pest outbreak	8658	68.17	II
Lack of physical inspection before buying	8396	66.11	III
Lack of credit facility	7962	62.69	IV
Difficulty in using mobile apps/technology	7428	58.49	V
Complicated return/refund process	7015	55.24	VI

The perceived constraints faced by farmers in purchasing pesticides through e-commerce platforms are presented in Table 6. The Garrett Ranking analysis revealed that risk of receiving fake or expired products was the most serious constraint, securing the highest mean Garrett score of 70.20 and ranking first. This was followed by delay in delivery during pest outbreaks (68.17) and lack of physical inspection before buying (66.11). Other constraints such as lack of credit facilities, difficulty in using mobile applications, and complicated return/refund procedures were ranked fourth, fifth, and sixth, respectively. The findings indicate that product authenticity, timely delivery, and farmers' confidence in online transactions are the major

challenges limiting the adoption of e-commerce platforms for pesticide purchasing.

Conclusion

The perceived constraints faced by farmers in purchasing pesticides through e-commerce platforms are presented in Table 6. The Garrett Ranking analysis revealed that risk of receiving fake or expired products was the most serious constraint, securing the highest mean Garrett score of 70.20 and ranking first. This was followed by delay in delivery during pest outbreaks (68.17) and lack of physical inspection before buying (66.11). Other constraints such as lack of credit facilities, difficulty in using mobile applications, and complicated return/refund procedures were ranked fourth, fifth, and sixth, respectively. The findings indicate that product authenticity, timely delivery, and farmers' confidence in online transactions are the major challenges limiting the adoption of e-commerce platforms for pesticide purchasing.

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