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# **Farmers Purchasing Behaviour and Satisfaction towards Fertilizer in Kheda District**

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## **Authors' contributions**

*This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.*

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## **ABSTRACT**

Fertilizers are food for plants as they provide nutrients to plants for their growth and thrive. In the financial year 2022, over 42 million metric tons of fertilizers were produced in India. The Indian fertilizer market is expected to grow at a CAGR of 4.7 per cent between 2023 and 2028, reaching a projected value of 1160.18 billion USD by 2028. So, it is needed to study the fertilizer use and purchasing behavior of paddy farmer for better production. The study covered 100 farmers from 10 villages of Kheda district and tabular analysis was used to conduct the study. The study revealed that 48 per cent of farmers in the Kheda district earn between ₹ 20001-30000 as their monthly income and 13 per cent were graduates. Out of the total 100 farmers, all the farmers use fertilizer in paddy crops, and 41 per cent grow paddy on 2.01-4 acres of land. 54 per cent of farmers were found of using fertilizer mixed with other fertilizers. Quality of the product was a major factor and

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past experience, price of the product, and dealer opinion were considered by farmers while purchasing any fertilizer. The study found that 68 per cent of farmers were satisfied with fertilizer price, 83 per cent satisfied with performance, and 92 per cent satisfied with quality of fertilizer.

**Keywords:** Fertilizer; paddy; quality of product; price of the product; past experience.

## 1. INTRODUCTION

India is an agrarian nation where more than 50 per cent of the population relies on agriculture for a living. It is the world's largest producer of spices, pulses, milk, tea, cashew, and jute and ranks second in the production of wheat, rice, fruits and vegetables, sugarcane, cotton, and oilseeds. Agriculture is defined as the backbone of the Indian economy. About 60–70 per cent of the population in India works in agriculture, which contributes 20 per cent to the country's GDP.

Fertilizers are generally defined as "Any substance, whether natural or synthetic, organic or inorganic, that provides one or more of the chemical components needed for plant growth". The three essential plant nutrients nitrogen, phosphorus, and potassium are present in the majority of fertilizers that are frequently applied to agricultural fields. Some fertilizers also contain certain "micronutrients," such as zinc, sulphur and other metals necessary for plant growth. Fertilizers are important agricultural inputs that are necessary for growing crops that feed people worldwide [1].

In 2021, Russia was the main exporter of agricultural fertilizers worldwide, with an export value of approximately 12.5 billion U.S. dollars. China and Canada followed, with some 11.5 and 6.6 billion U.S. dollars, respectively. In the financial year 2022, over 42 million metric tons of fertilizers were produced in India. The Indian fertilizer market is expected to grow at a CAGR of 4.7 per cent between 2023 and 2028, reaching a projected value of 1160.18 billion USD by 2028. The market growth is being driven by increasing demand for food production and improvements in agriculture processes. Fertilizer production in India peaked in the financial year 2020 at over 46 million metric tons [2].

The Indian fertilizer industry has made good progress in the case of Nitrogen-based fertilizers. India is the 2<sup>nd</sup> largest consumer of Urea fertilizers after China. India also ranks 2<sup>nd</sup> in the production of nitrogenous fertilizers and 3<sup>rd</sup> in phosphatic fertilizers. Potash requirement is satisfied through imports since we have limited

deposits of potash. Popular PSUs are The Fertilizer Corporation of India Ltd, National Fertilizers Limited, Hindustan Fertilizer Corporation Ltd., etc. After iron and steel, the fertilizers sector is India's second-largest industry. The industry for fertilizers as a whole has low productivity. In terms of fertilizer production, India is still not independent (approximately 50% of fertilizers are imported). India produces 85 per cent of the urea it needs domestically, but it significantly depends on imports to meet its phosphate and potash (P & K) fertilizer needs [3].

The objectives of the study were:

- To study factors affecting farmers purchasing behavior toward fertilizer
- To study farmer satisfaction toward fertilizer

## 2. METHODOLOGY

**Source of the data:** Primary as well as secondary data were collected to meet the stipulated objectives of the study.

**Primary data:** Primary data were collected from the respondents with the help of schedule.

**Secondary data:** Secondary data were collected from Literature, Private and Government publications and websites.

### 2.1 Research Design

This study employs a descriptive research design, which aims to provide an overview of the current situation of summer paddy farming in 10 villages of Kheda district. The sampling method used was non-probability, specifically a purposive sampling technique. The sample unit is summer paddy farmers, and the sample size was 100. The study takes place over a period of 90 days. To gather data, a semi-structured schedule utilized to ensure that authentic information is collected from the respondents. Analytical tools such as percentage analysis, and tabular analysis was used to analyze the data

collected. Overall, the study's findings provide insights into the current practices of summer paddy farming in Kheda district and may potentially inform policymaking and future research in the field [4-7].

### 3. RESULTS AND DISCUSSION

**Table 1. Age of the farmers**

Age (Years)	Percentage
21-35	17
36-50	39
51-65	28
Above 65	16
<b>Total</b>	<b>100</b>

Source - Field survey

The age of farmers was a very important demographic factor that influences the purchasing behavior and decision-making process. Table 1 indicates that 39 per cent of farmers were between the 36-50 years age group. It was observed that middle age people were predominant in the region. This indicates that farmers who were purchasing and using fertilizer were of middle age. The elderly farmers i.e. who were between 51-65 years comprised 28 per cent, and young farmers' i.e., 21-35 years were 17 per cent of the sample.

**Table 2. Family income of the farmers (per month)**

Income (RS.)	Percentage
≤ 10000	9
10001-20000	18
20001-30000	48
30001 ≥	25
<b>Total</b>	<b>100</b>

Source - Field survey

In this area income of farmers was good because farmers of this area have the knowledge about cultivation of crops, and also good marketing facility available for dairy business. Table 2 shows that 25 per cent farmers were earning above ₹ 30000 as their monthly income, 48 per cent farmers were earning between ₹ 20001-30000, 18 per cent of the farmers were earning between ₹ 10001-20000 and 9 per cent of the farmers earning was less than ₹ 10000. It was found from analysis that the majority (48%) of the farmers were earning between ₹ 20001-30000 as their monthly income, implying that majority of farmers belong to middle income group.

**Table 3. Education of the farmers**

Educational level	Percentage
Below SSC	18
SSC	31
HSC	38
Graduate	13
<b>Total</b>	<b>100</b>

Source - Field survey

Education helps farmers to incorporate the latest scientific advances and technology tools into their daily operations. The results of performing their operations with these tools increase efficiency and can also lead to: Less harm to the environment, Reduction of the need for water and chemicals for crops which directly increased the profit. Table 3 shows that 18 per cent of farmers have education below SSC, 31 per cent of farmers has completed SSC, 38 per cent of farmers has completed HSC and 13 per cent of farmers were graduate. This indicates that majority of the farmers in the study area were educated.

**Table 4. Occupation of the farmers**

Occupation	Percentage
Agriculture	20
Agriculture + Animal husbandry	68
Agriculture + Business	12
<b>Total</b>	<b>100</b>

Source - Field survey

Most of the farmers in Kheda district were engaged in the dairy business because in Kheda district, there is opportunities and good marketing facility for dairy business. Table 4 show that, 68 per cent farmer's occupation is both agriculture and animal husbandry, around 20 per cent farmers were engaged in agriculture and 12 per cent farmer's occupation is agriculture and business.

**Table 5. Total land holding of farmers**

Total Acreages of farmer	Percentage
1.00-2.00 Acreages	11
2.01-4.00 Acreages	24
4.01-10.00 Acreages	46
Above 10.01 Acreages	19
<b>Total</b>	<b>100</b>

Source - Field survey

The study, found that 46 per cent of farmers have 4.01-10 acreages of land holding. Out of

the total 100 farmers, 11 per cent have 1-2 acreages, 24 per cent have 2.01-4 acreages and 19 per cent have above 10.01 acreages land holding.

**Table 6. Area under paddy crop**

Total Acres of farmer	Percentage
1.00-2.00 Acres	23
2.01-4.00 Acres	41
4.01-10.00 Acres	25
Above 10.01 Acres	11
<b>Total</b>	<b>100</b>

Source - Field survey

In Kheda district there is availability of good water sources in summer season also so most of farmers prefers to grow summer paddy during the summer season. Table 6 shows that, 41 per cent of farmers grow paddy in 2.01- 4.00 acreages, 25 per cent farmers grow paddy in 4.01-10.00 acreages, 23 per cent grow paddy in 1-2 acreages and only 11 per cent farmers grow paddy in more than 10.01 acreages of land. This implies that farmers grow paddy in large area due to good water availability as mentioned above.

**Table 7. Use of fertilizer**

Use of fertilizer	Percentage
Yes	100
No	0
<b>Total</b>	<b>100</b>

Source - Field survey

Fertilizer is essential for paddy plant growth, plant height, leaf size, panicle number and high yield per hectare. Table 7 indicates that the 100 per cent farmer use fertilizer for better plant growth.

**Table 8. Pattern of fertilizer use in paddy crop**

Pattern of fertilizer use in paddy crop	Percentage
Mix with other fertilizer	54
Mix with sand	43
Directly	3
<b>Total</b>	<b>100</b>

Source - Field survey

In paddy, fertilizer applied after mixing it with other fertilizers that contains the nutrients which improves soil fertility, increase crop yield, and boost plant health. Fertilizer with other types of fertilizer can provide a more balanced and

comprehensive nutrient supply to the crops. From the study, it was found that 54 per cent farmers mix fertilizer with other fertilizer, 43 per cent mixed with sand and only 3 per cent farmers directly use of fertilizer. This indicates that for better results and plant growth majority of the farmers believes to use mixed fertilizer.

**Table 9. Sources of awareness about fertilizer**

Sources of awareness	Frequency (n-100)
Farmer meeting	92
Retailer suggestion	85
Field Demonstration	83
Leaflet/Poster	77
Progressive farmer	89
TV advertisement	60
Wall painting	67

Source - Field survey

In rural area, several sources of awareness for farmers were available, and these sources were quite effective in spreading information and knowledge among farmers. Farmer meetings were the most commonly used source of awareness. These meetings offer an opportunity for farmers to interact with each other and exchange ideas and knowledge. To increase the selling of any products, company do promotional activities or marketing activity, so that people get to know about the products and thus ultimately selling of products is increase and because of promotional activities or marketing activity will create or increase awareness among people about products. There were various sources of awareness for farmers, but farmers meetings and progressive farmers were the most effective ones. Field demonstrations, leaflets, and retailer suggestion were also quite helpful sources, while TV advertisements and wall paintings had comparatively lower frequency.

**Table 10. Factors consider while purchasing fertilizer for paddy crop**

Factors	Frequency (n-100)
Availability of product	80
Brand Image	69
Price of the product	86
Quality of the product	92
Availability of credit	73
Dealer opinion	84
Past experience	91
Promotional activity	77

Source - Field survey

The quality of fertilizer was the major factor to make purchase decision because poor or substandard fertilizer, may not be able to provide the necessary nutrients to the crops, leading to poor growth, reduced yield, and lower quality of the produce. Past experience helps them to make informed decisions about the type of fertilizer to use and the application methods that are most effective. Table 10 revealed the factor that had been considered which purchasing fertilizer for paddy. The table shows that Quality of product was most common factor in farmer's community. Past experience of product was reported to be the second most important factor and followed by other factor like price of the product, dealer opinion, availability of product, promotional activity, availability of credit, and brand Image. The primary concern of farmers while buying fertilizer is the nutrient content, quality, and price of the product. Brand name of the fertilizer company may not be a determining factor in this decision-making process because there were many smaller companies or local manufacturers that produce high-quality fertilizers which may not had a recognizable brand name, but still had a loyal customer base.

**Table 11. Farmer Satisfaction towards fertilizer price, quality and performance**

Satisfaction towards	Price	Quality	Performance
Satisfied	68	83	92
Neutral	19	13	3
Not satisfied	13	4	5
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>

Source - Field survey

Fertilizer is a significant expense for farmers, and its price impact their budgeting decisions. The data shows that 68 per cent of the farmers were satisfied with the price but 13 percent of the farmers were not satisfied with the price of fertilizer. The quality of fertilizer is critical to farmers as it affects the growth, health, and yield of crops. High-quality fertilizers contain the right balance of essential nutrients like nitrogen, phosphorus, potassium, and other micronutrients that the plants need to grow and thrive. The table 11 shows the farmer satisfaction with the quality of fertilizer was 83 per cent. Performance of fertilizer was highly important to farmers as it directly affects their crop yield and ultimately their income. Farmers invest a considerable amount of money into buying and applying fertilizers, hoping to obtain the maximum possible yield from their crops. The majority of the farmers

(92%) reported of being satisfied with the product's performance [8-10].

#### 4. CONCLUSION

Results shows that 48 per cent of the farmers were earning between ₹ 20001-30000 as their monthly income and 13 percent of farmers are graduate. In this region, majority of farmer's main occupation was both agriculture and animal husbandry. 46 per cent of farmers were medium farmers whose total land area is between 4.01-10.00 acres. Out of the total farmers, 100 per cent of farmers use fertilizer in paddy crop and 41 per cent of farmers grow rice in 2-4 acreages. In our farmer survey, we observe that 54 per cent of farmers used fertilizer mix with other fertilizers.

From the study it was found that to increase the sales of any products, the company should do marketing activity. Majority of the farmers were aware through farmers' meetings after followed by with the help of progressive farmers. Among the factors that affect the purchasing of fertilizer quality of the product was a major factor and past experience, price of the product, and dealer opinion also were considered by farmers while purchasing of any fertilizers. In the study, it was found that 68 per cent of farmers were satisfied with fertilizer price, 83 per cent satisfied with quality, and 92 per cent satisfied with performance of fertilizer.

#### NOTE

This paper is based on MBA-ABM project work of first authors under International Agribusiness Management Institute, AAU, Anand-388110.

#### COMPETING INTERESTS

Authors have declared that no competing interests exist.

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