Segmented organic fertilizer market in Kutch District, Gujarat, India

ABSTRACT:

The present study was an attempt to develop the probable market segments for the organic fertiliser based on its sale by different companies to their respective farming communities. For that sake, Kutch district of Gujarat was purposively selected looking into the growing importance of the area in the organic fertiliser market and 200 respondents were selected from five different talukas due to the large number of target respondents in that region. Correspondence analysis was used for creating perceptual map and developing probable market segments whereas descriptive statistic was used to understand other critical areas of the study. It was found that organic fertiliser is always preferred in bulk, with other inputs as the complementary products. As it was high in price, farmers expected some discounts on the product purchase. Companies may come with package of solutions in product distribution by giving discounts, intime supports, easy availability, adequate storage and transportation facility, technical knowhow and many more for luring customers towards their market segments. The market is lucrative for companies that sell organic fertiliser to farmers engaged in dairy farming and agriculture. However, other areas of market segments like agriculture, business and potential combinations thereof.

Keyword: Organic fertiliser, Correspondence analysis, market, segment

1.INTRODUCTION

The green revolution brought impressive gains in food production but its adverse impact on water and soil put a challenge on future food security of a growing populated country like India. Between 2015–16 and 2018–19, more than five crore soil samples from across India were tested in government-approved laboratories to understand the state of the soils. The results revealed severe and widespread deficiency of organic carbon and micronutrients in Indian soils [1]. Another side, rampant use of chemical fertilizer also impact on both the underground and surface water quality and many parts of India are experiencing water stress due to irrigation in agriculture [2] . India is fortunate to have an abundance of organic fertilizer sources. In 2020–21, with a share of 63 percent, Chhattisgarh led the countrywide production of organic fertilizers [3,14,15,16]. A 2020 study mentions that the potential quantity of organic material (cattle dung, crop residue and municipal solid waste) in the country is about 1,056 million tonne

per annum, of which about 35 per cent is actually available for utilization [3]. Even high amount of pesticide use disturbs natural predator and prey imbalance in the ecosystem. As a result, fertility of soil decreases that again lead to more pesticide use for control of pests. In total, more chemical fertiliser, pesticides and other inputs for agricultural production escalate subsidies and country exchequers system which again difficult in a suffocate soil ecosystem and environment.

Organic ways of farming need to be adopted for sustainable agricultural practices. Similarly, alternative agriculture techniques, such as intercropping[1], Zero Budget Natural Farming (ZBNF)[2] with essential principles involving the enhancement of nature's processes, and elimination of external inputs, can be practiced [4]. Organic source of nutrient also helps to combat with the problem of multi nutrient deficiency and low organic content in our soil which is affecting productivity of major food crops at farmer field [5]. Organic farming is a method of farming system which primarily aimed at cultivating the land and raising crops in such a way, as to keep the soil alive and in good health by use of organic wastes (crop, animal and farm wastes, aquatic wastes) and other biological materials along with beneficial microbes (bio-fertilizers) to release nutrients to crops for increased sustainable production in an eco-friendly pollution free environment [6,7].

Organic fertilizers are decomposed organic material derived from animal, human and plant residues. Their type varies depending on the source of the organic material and the nature of composting, for example, City compost, Vermicompost, PROM, Organic manure, Raw bone meal, Steamed bone meal, Bio-enriched organic manure, fermented organic manure, liquid fermented organic manure, Potash derived from Rhodophytes [8]. As demand and varieties of forms of organic fertiliser has been increasing day by day, it segmented the market of customers in a different homogenous category for future growth and profit potential of the industries.

Farmers' purchasing behavior towards organic fertilizers is influenced by varieties of factors, including knowledge, attitude, extension services and market availability [9]**.** The types of fertilizers used, training received, and farm size can impact on a farmer's decision-making process [10]. Access to agro-input shops and extension services is crucial for facilitating the adoption of organic fertilizers [11]. Moreover, access to markets, institutional services, and

[1] Intercropping is the practice of growing two or more crops in proximity.
[2] Zero Budget Natural Farming (ZBNF) is a type of chemical-free farming where the total cost of growing and harvesting plants comes out to be zero (taking into consideration the costs incurred by the farmers are recovered through inter-cropping).

training programs significantly affects farmers' knowledge and their adoption of new technologies [12]. In this challenging atmosphere and business environment understanding the consumers behaviour is quite difficult and segmented market in this direction will be beneficial for the organic farming and industries.

With this back drop, this research paper is going to unveil the pattern of organic fertiliser consumption and probable market segment for this critical input with paramount strategy for the stakeholders involved in it.

2.MATERIALS AND METHODS

Kutch is a district of Gujarat state in western India, with its headquarters (capital) at Bhuj. Covering an area of 45,674 km^2, it is the largest district of India. The area of Kutch is larger than the entire area of other Indian states like Haryana (44,212 km^2) and Kerala (38,863 km^2). However, the locational disadvantage of the district as a dry and semi-arid climate with substantial desert create a situation of an area of water crisis, and deficit in soil water moisture percentage that triggers efficient use of agricultural pattern supported by organic fertiliser base over chemical one. Out of ten talukas of Kutch district, five talukas viz., Anjar, Bhuj, Bhachau, Mandavi and Nakhatrana talukas occupies more than 90 percent of the total area under better cultivation and progressive farmers. Therefore, these five talukas were selected purposively to have a for representation of the districts. From each selected taluka, four villages and from each selected village, ten organic fertilizer users were selected randomly. Thus, total 200 organic fertilizer users were selected as a sample, purposively (as per their organic fertilizer use history and dealers' comment on them) for this research work which was handled in between January to April, 2024.

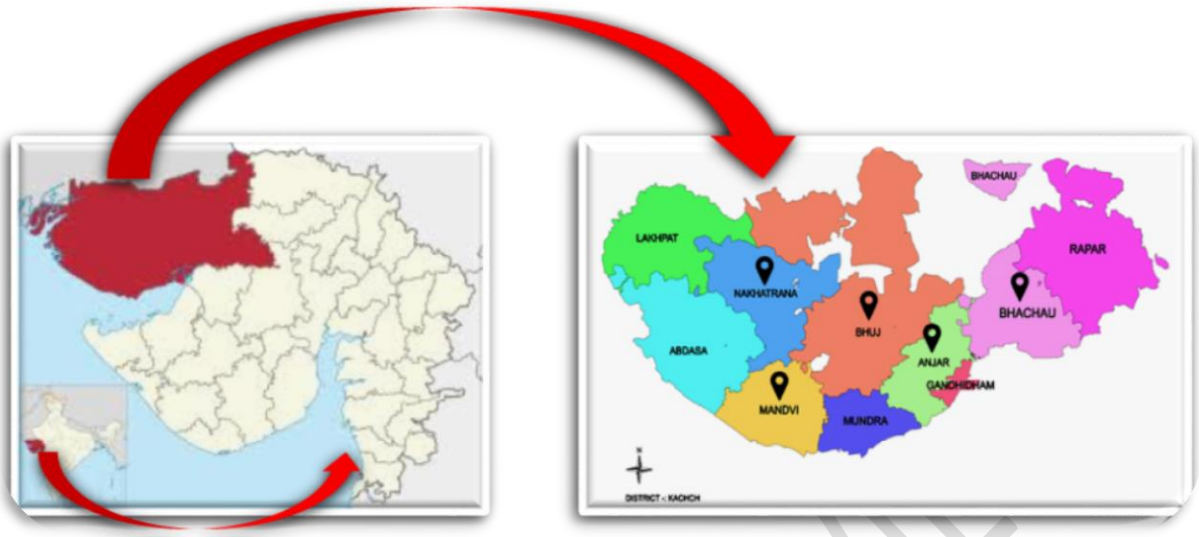

Figure 1 selected area for the study

The complete research work was targeted to the user of organic fertilisers which were predominantly marketed by ABC, DEF, XYZ, XLM, VED [3]and other small companies with their products in their respective domain name. The companies were perceived differently among different uses as per their availability, product range, efficiency, storage and transportation facilities, selling pattern, credit facility, training and technical knowhow facility, and many more. Accordingly, the market is segmented to different homogenous group and create a perceptual map for the organic market and industries as well.

The present research work embodies descriptive statistics and correspondence analysis technique for the solutions and strategy building work in the direction to organic fertiliser market segment.

Correspondence analysis is a multidimensional technique for scaling qualitative data in marketing research. It is an explorative research technique. The measure of correspondence can show the similarity, affinity, confusion, association or interaction among the variables. Correspondence table is the cross tabulation of row and column object [13].

3.RESULTS AND DISCUSSION

The main crop grown by farmers presents a diverse array of agricultural products, with pomegranate being the most commonly cultivated crop, representing 51 percent of the total

[3] ABC is the company that predominately in the Kutch market and sale product in the sachets. DEF is the company sell products in raw form. XYZ, XLM and VED company were the small one but have their own users in the Kutch market.

sample (figure 2). Due to semi-arid region and low water holding capacity of soil, people were used to grow pomegranate in their field followed by castor and cotton comprising 14 percent and 10 percent of the total sample, respectively. Other crops such as vegetable crop, wheat, mango, mustard, and date palm were also represented, albeit in smaller percentages. Additionally, 9 percent of the respondents grow other crops. Different crops were having different degrees of nutrient requirements, susceptibility to pests and diseases, and responses to fertilizer inputs. Consequently, the choices and applications of organic fertilizers may differ based on the specific crop being cultivated. For instance, certain crops like pomegranate, may benefit from specific types of organic fertilizers to enhance fruit quality and yield. While others, such as castor or cotton may require different nutrient compositions for optimal growth and productivity. Moreover, factors such as crop rotation practices, soil health management, and pest control strategies can influence the demand for and efficacy of organic fertilizers across different crop types. Identified companies were also looking into these opportunities of crop diversification and varieties and entered the market with various solutions and strategies.

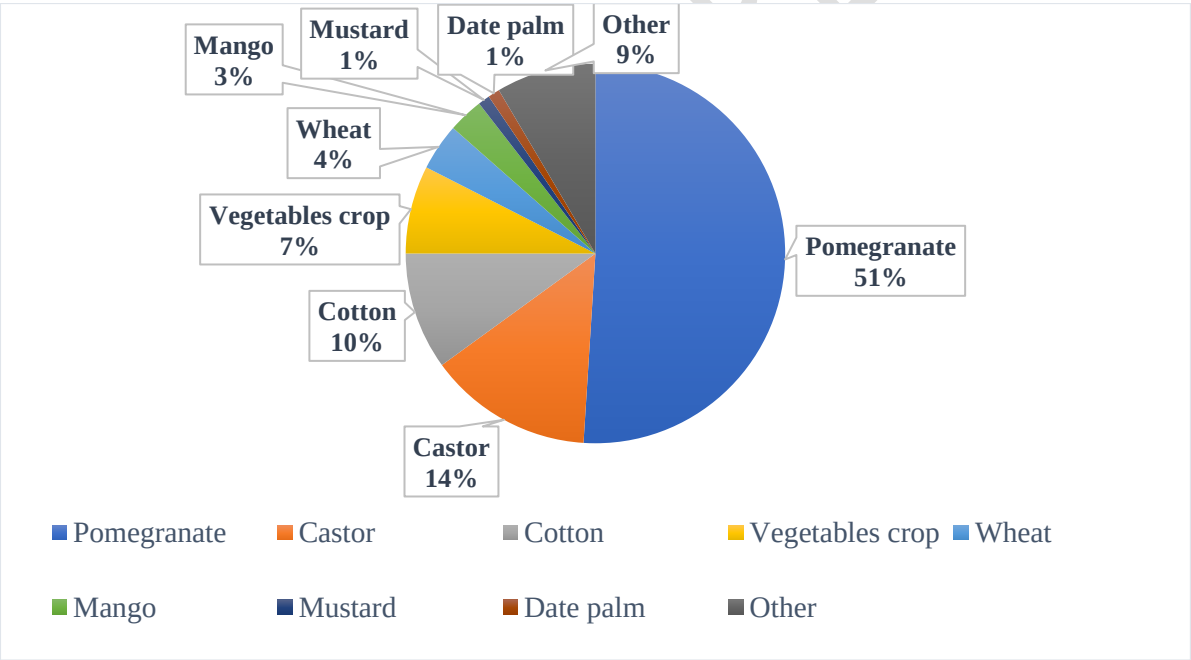

Figure 2 Main crop grown by the farmers

Meanwhile tube well and canal irrigation pattern of cultivation in the district make companies more optimistic for their business. Dominated by tube well irrigation system (96%), make the available water harder and scarce day by day. Even, larger farmers may take the advantage more over than the smaller one due to access to technology (higher HP motors) and again that reduce the water tables and difficult further use in irrigation purpose. In this context, organic

fertiliser has the great scope ahead to conserve the water in the soil and innovation od products will definitely use as a fertigation practices in the way forward.

Table 1 Source of irrigation

Source of Irrigation	Frequency	Percentage
Tube well	192	96
Canal	8	4
Total	200	100

As per the table 2, it was highlighted that organic fertilizer purchasing behavior among respondents depends on preferences and considerations when acquiring organic fertilizers. The companies make their market suitable for them after visualisation the purchased pattern of organic fertiliser that helps them to divide the market in to different segments.

Table 2 Purchasing behaviour of farmers towards organic fertilizer

Attributes	Yes	Percentage
Purchase in bulk	112	56.0
Purchase every year	119	59.5
Purchase with other input	104	52.0
Expect discount due to high price	81	40.5
Select retailer whose behaviour is good	145	72.5

Majority of respondents (56%) indicated that they purchased organic fertilizers in bulk, that indicates a preference for larger quantities, possibly for cost savings or convenience. Additionally, a significant portion (59.5%) reported that purchasing of organic fertilizers every year, highlighting the regularity of their fertilizer procurement practices. Interestingly, a considerable proportion (52%) also indicated purchasing organic fertilizers with other complement inputs, indicating potential bundling strategies or integrated purchasing behaviors. Furthermore, 56 percent of respondents expressed their expectation for discounts due to the high price of organic fertilizers, indicating price sensitivity and a desire for cost-effective options. Lastly, a notable majority (72.5%) prioritize selecting retailers based on good

behavior, indicating the importance of customer service and interpersonal relationships in their purchasing decisions. These findings provide valuable insights into the organic fertilizer purchasing behavior of farmers, suggesting avenues for further research into factors influencing purchasing decisions, strategies for promoting organic fertilizer adoption, and interventions aimed at enhancing the accessibility and affordability of organic fertilizers.

Brand preference for the organic fertiliser products in the study area (fig 3) bifurcated market in to 2X2 matrix where XLM, VED and XYZ companies were clustered in one segment whereas DEF company and ABC company have their own distinct characteristics to target their respective customer. The complete market was developed by considering education and awareness as the possible factors for understanding farmers' choice regarding the organic fertiliser. Producers purchased organic fertiliser every year from ABC company but facing the issues of improper technical knowledge to use the same. XYZ company, XLM company, VED Company and other similar products enter the market by providing discounts to the producers. However, availability of these products are the issues in the study area. Organic fertilizer of DEF company is poor in efficiency and facing the issues of storage, delayed in effect, and transportation. Less Product range, bulk Purchase and credit issues are some important areas in which companies are not putting their effort till date.

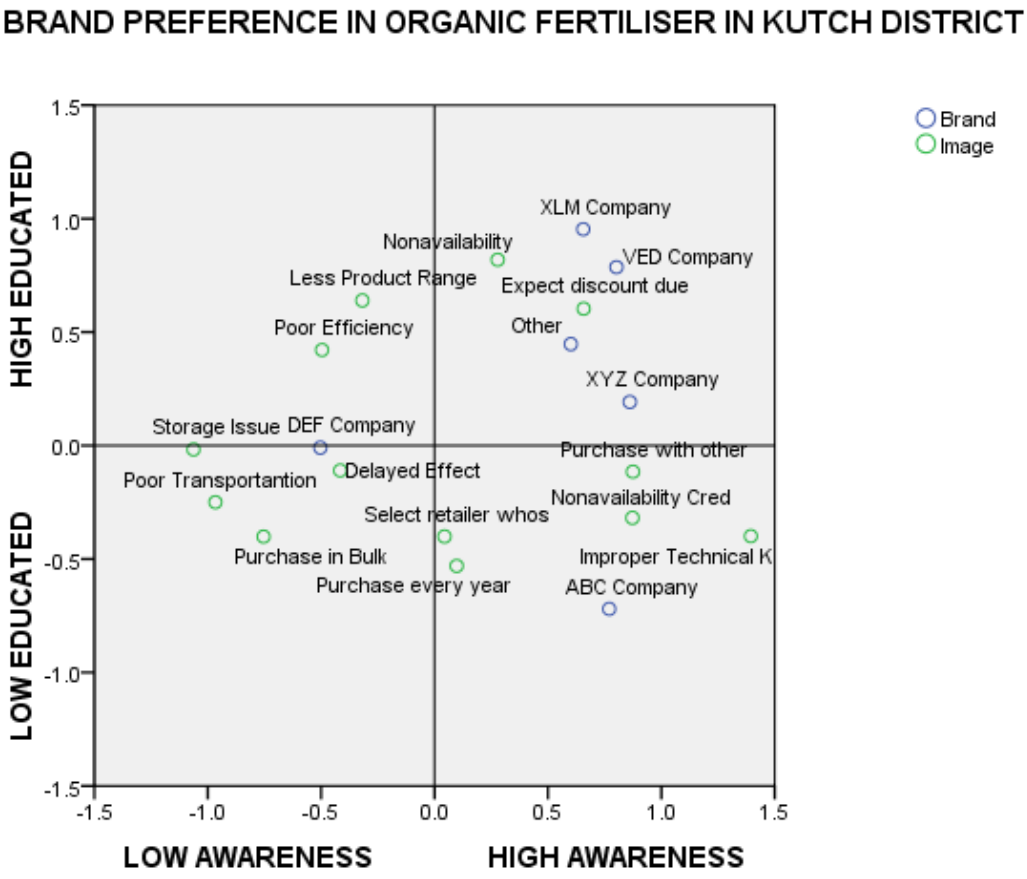

Figure 3 Brand preference in Organic fertilizer market

As observed in the table 3, brand is only associated with different occupations in the study area. Among the brands, ABC company majorly targets the Agricultural producers who have the livestock (42%). DEF company and its organic fertiliser majorly targets the agriculture market (69%) segment followed by agricultural farmers (56%) who are also involved in some other business as well. While ABC company targets business people who are also involved in agriculture (28%), DEF company targets agriculture people who have livestock (32%) in their future market endeavour and penetration. Small companies like XYZ, XLM, VED and other small companies have not shown any specific criteria of their market entry as per the occupational segment market in to concern.

Table 3 Brand Occupation relationship in Organic Fertiliser market

		Occupation			Total
	Name of Company	Agriculture	Agriculture & Animal Husbandry	Agriculture & Business	
Brand	ABC	0.10	0.42	0.28	0.19
	DEF	0.69	0.32	0.56	0.60
	XYZ	0.04	0.04	0.00	0.04
	XLM	0.06	0.10	0.07	0.07
	VED	0.09	0.04	0.06	0.07
	Other	0.02	0.08	0.03	0.03
Total		1.00	1.00	1.00	1.00

4.CONCLUSION

Organic fertiliser will be the key input for our future agriculture by conserving soil quality, its moisture content and efficacy by which country can address the requirement of quality food for its growing population. Meanwhile, many organic fertiliser companies are coming to the market and target to their respective customers by creating market segments. Organic fertiliser is always preferred to be purchased in bulk, with other inputs as the complementary products. As it is high in price, farmers expect some discounts on the product purchase. Companies may come with package of solutions in product distribution by giving discounts, in time supports, easy availability, adequate storage and transportation facility, technical knowhow and many more for luring customers towards their market segments. The market is lucrative for companies that sell organic fertiliser to farmers engaged in dairy farming and agriculture. However, other areas of market segments like agriculture, business and potential combinations thereof.

Disclaimer (Artificial intelligence)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of manuscripts.

References

1. Soil health card. Nutrient Dashboard, 2024. Retrieved from https://soilhealth.dac.gov.in/piechart
2. Davis KF, Chiarelli DD, Rulli MC, Chhatre A, Richter B, Singh D, DeFries R. Alternative cereals can improve water use and nutrient supply in India. Science advances, 2018; 4(7): 1108.
3. Khurana A, Kumar V. State of Biofertilizers and Organic Fertilizers in India. Centre for Science and Environment, New Delhi,2022
4. Khadse A, Rosset PM, Morales H, Ferguson BG. Taking agroecology to scale: The zero budget natural farming peasant movement in Karnataka, India. The Journal of Peasant Studies, 2018; 45(1): 192-219
5. Singh R, Ravisankar N, Prasad K. Improvement in productivity and economics of major food production systems of India through balanced dose of nutrients. Current Science, 2017; 2470-2474
6. Narayanan S. Organic farming in India: Relevance, problems and constraints. Department of Economic Analysis and Research, Notional Bonk for Agriculture and Rural Development. Mumbai, 2005
7. Makadia JJ, Patel KS. Prospects, status and marketing of organic products in India-A Review. Agricultural reviews, 2015; 36(1): 73-76.
8. Department of Agriculture and Cooperation. The Fertilizer Control Order. New Delhi, India,1985
9. Wasil AH, Shah JA, Kakar SM, Ragashtai AR, Yusuf MSA, Sadat A. The Influential Factors of Organic Fertilizer Adoption among Farmers: A Review. International journal of academic research in business & social sciences, 2023;13(5): 3020-3036.
10. Thomas S, Vijay A, Nair DS, Varghese T, Mathew MA. A study on farmers' awareness and perception towards biofertilizers. Journal of Research Administration, 2023; 5(2): 2443-2453.
11. Avane A, Amfo B, Aidoo R, Mensah JO. Adoption of organic fertilizer for cocoa production in Ghana: perceptions and determinants. African Journal of Science, Technology, Innovation and Development,2022; 14(3): 718-729.
12. Aryal JP, Sapkota TB, Krupnik TJ, Rahut DB., Jat ML, Stirling CM. Factors affecting farmers' use of organic and inorganic fertilizers in South Asia. Environmental Science and Pollution Research, 2021;28(37): 51480-51496.
13. Malhotra NK, Dash S. Marketing Research. An Applied Orientation. Pearson Publication, 7th Edition,2019

14 Tanimonure , Victoria Adeyemi, Olabisi Damilola Omodara, Akinsola Temitope Oyebanji, and Abiodun Olutunde Babalola. 2024. “Unlocking the Niche Market Potential of Organic Fertilizer: Evaluation and Projections for the Nigeria Organic Input Market Development”. Asian Journal of Agricultural Extension, Economics & Sociology 42 (5):120-27. https://doi.org/10.9734/ajaees/2024/v42i52419.

15 Jiang Y, Li K, Chen S, Fu X, Feng S, Zhuang Z. A sustainable agricultural supply chain considering substituting organic manure for chemical fertilizer. Sustainable Production and Consumption. 2022 Jan 1;29:432-46.

16 Jouzi Z, Azadi H, Taheri F, Zarafshani K, Gebrehiwot K, Van Passel S, Lebailly P. Organic farming and small-scale farmers: Main opportunities and challenges. Ecological economics. 2017 Feb 1;132:144-54.