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Assessment of farmer's preference and buying behaviour towards use of organic fertilizers in Muzaffarpur district of Bihar

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Abstract

The project titled "Assessment of Farmer's Preference and Buying Behaviour towards Use of Organic Fertilizers in Muzaffarpur District of Bihar" was carried out under the guidance of Dr. Ramchandra. Muzaffarpur district was purposively selected for the study, and a multi-stage random sampling procedure was adopted to identify respondents. Out of 100 villages in Kanti block, five villages were purposively selected. A list of farmers using organic fertilizers in each selected village was prepared, and a structured questionnaire was designed to collect data. From each village, 20 farmers were interviewed, making a total sample size of 100 farmers. Data were collected using the survey method with a structured schedule.

The findings revealed that a majority of farmers (37%) belonged to the younger age groups of 15-25 and 25-35 years. Most of them lacked basic education. Regarding landholding size, 10% of the respondents were large farmers (>10 acres), while 50% were marginal and small farmers. Among the factors influencing the use of organic fertilizers, productivity was ranked as the most important. However, the high price of organic fertilizers and lack of information at the farm level emerged as the two major constraints limiting their adoption. The study pertains to the agricultural year 2021-2022.

Keywords: Organic fertilizers, farmer's preference, buying behaviour, productivity, constraints

Introduction

Organic fertilizers are derived from animal matter, animal and human excreta, and plant residues such as compost and crop wastes. Naturally occurring organic sources include manure, slurry, peat, guano, and green manures. These fertilizers enrich the soil by contributing essential nutrients through processes such as nitrogen fixation, phosphorus solubilization, and the stimulation of plant growth promoting substances. Organic manures also enhance the physical, chemical, and microbiological properties of the soil, thereby improving both fertility and crop productivity (Lampkin, 2000; White, 1987) [7, 12].

India ranks as the second-largest consumer of organic fertilizers globally. According to government data, about 11.8 million acres of land were under organic certification in 2013-14. By March 2018, the area under the organic certification process reached 3.56 million ha, comprising both cultivable land and wild harvest areas under the National Programme for Organic Production (NPOP). Such expansion reflects growing awareness among farmers and policymakers regarding the benefits of eco-friendly inputs. Despite the dominance of chemical fertilizers since the Green Revolution of the 1960s, concerns over environmental degradation, soil health, and food safety have renewed interest in organic and bio-fertilizers. Bio-fertilizers such as Rhizobium, Azotobacter, Azospirillum, and blue-green algae provide a sustainable alternative by restoring soil nutrient cycles, building organic matter, and

reducing dependency on synthetic agrochemicals. Similarly, organic manures like farmyard manure (FYM), compost, and green manure remain popular among Indian farmers. For instance, the application of 10 t/ha of FYM can add 50-60 kg N, 15-20 kg P₂O₅, and 50-60 kg K₂O to the soil (White, 1987) [12].

Globally, the organic fertilizer market is growing rapidly, projected to reach USD 4.6 billion by 2023 with a CAGR of 9.1%. In India, organic farming has also expanded significantly, with certified organic area increasing nearly 30-fold between 2003 and 2010. By 2009, over 9.2 million ha were under organic certification, highlighting the country's potential in organic agriculture and export. Currently, India exports a wide range of organic products, including cereals, pulses, oilseeds, spices, fruits, and textiles, mainly to the EU, US, Canada, and Southeast Asian countries.

Small and marginal farmers, who constitute nearly 74% of the farming population, stand to benefit the most from organic agriculture. Through diversified cropping systems, efficient use of bio-fertilizers, and integrated pest management, organic farming provides not only economic opportunities but also a means to conserve biodiversity and maintain long-term soil health. Government initiatives such as the National Project on Organic Farming, Rashtriya Krishi Vikas Yojana, and National Horticulture Mission have contributed significantly to the growth of the organic sector in India.

Given this context, the present study focuses on assessing the preferences and buying behavior of farmers towards organic fertilizers in Muzaffarpur district of Bihar, where both opportunities and constraints shape the adoption of sustainable farming practices.

Research Methodology

The present study was conducted in Muzaffarpur district of Bihar, which is one of the thirty-eight districts of the state and also serves as the headquarters of Tirhut Division. Geographically, the district is located at latitude 26.121473° N and longitude 85.368752° E, covering an area of 3,173 km² with a population of 4.8 million as per the 2011 census. The literacy rate is about 65 percent, and the district is well-known for litchi cultivation. The climate of Muzaffarpur is classified as warm and temperate (Cwa type under Köppen Geiger classification) with an average annual temperature of 25.3 °C and average rainfall of 1,271 mm, most of which is received during the monsoon season in July, while November records the least rainfall.

A multi-stage proportionate random sampling method was adopted for the study. In the first stage, Muzaffarpur district was selected purposively because of the relatively higher adoption of organic fertilizers. In the second stage, Kanti block was chosen purposively from among the sixteen blocks of the district as it had a larger population of farmers using organic fertilizers. In the third stage, five villages Bihta, Minapur, Saidpur, Neora, and Pali were purposively selected from Kanti block, considering their comparatively higher concentration of farmers engaged in organic farming practices. In the final stage, a list of farmers from each selected village was prepared, and from this, 20 farmers were randomly selected in each village, leading to a total sample size of 100 respondents for the study.

Both primary and secondary data were used. Primary data were collected from the selected farmers through pre-structured questionnaires, personal interviews, and focused group discussions. Secondary data were gathered from published reports, journals, government publications, and reliable online databases. The data collected were both qualitative and quantitative in nature. Quantitative data were analyzed using percentage analysis, chi-square tests, and Likert scale ratings, while qualitative data were tabulated and categorized as per the objectives of the study. The chi-square test was employed to assess significant differences between observed and expected frequencies. Percentage analysis was used to present the responses clearly in terms of ratios and proportions, while the Likert scale was applied to measure the attitudes, perceptions, and preferences of farmers regarding organic fertilizer use.

Results and discussion

The socio-economic characteristics of the respondents revealed that farming in Muzaffarpur district is dominated by younger and middle-aged farmers, with 37% in the 15-35 year age group and 53% between 35-55 years (Table 1). Most farmers had at least basic schooling, with 42% having completed higher secondary education, while 29% were graduates. Landholding data indicated that half of the respondents were marginal and small farmers (<2 ha), 40% were medium farmers, and only 10% were large landholders. Annual income distribution showed that the majority (52%) earned between ₹1-2 lakh per year, reflecting a predominance of medium-income households. These findings are in line with previous research highlighting the socio-economic vulnerability of smallholders in Bihar, which influences their adoption behaviour (Kumar *et al.*, 2021) [6].

Table 1: Socio-economic profile and adoption behaviour of farmers in Muzaffarpur district

Variable	Category	% of respondents
Age group	15-25 years	18
	25-35 years	19
	35-55 years	53
	>55 years	10
Education	Illiterate	12
	Primary	17
	Higher secondary	42
	Graduate and above	29
Landholding size	Marginal & Small (<2 ha)	50
	Medium (2-10 ha)	40
	Large (>10 ha)	10
Annual income	< ₹1 lakh	28
	₹1-2 lakh	52
	> ₹2 lakh	20
Motivating factors for adoption	Productivity	22
	Environmental concern	24
	Peer influence	16
	Cost	15
	Availability	19
	Institutional support	4

Farmers ranked environmental concern (24%) and productivity improvement (22%) as the primary reasons for preferring organic fertilizers. Peer influence and cost considerations were also relevant, but institutional support was found to play only a marginal role (4%), indicating

weak extension and awareness mechanisms in the region. These observations are consistent with Singh and Meena (2020) [11], who found that yield performance and ecological benefits strongly influenced organic input adoption in eastern India.

Despite the positive outlook, several constraints hindered adoption of organic fertilizers (Table 2). Lack of awareness (28%) and poor livestock management (20%) were the most frequently reported issues, followed by non-availability of quality seeds (18%) and labour-intensive practices (14%). Vermicomposting was less common due to high costs and inadequate technical knowledge (10%). A smaller proportion (10%) of farmers also reported limited access to extension services. Farmers suggested that timely supply of seeds, training through Krishi Vigyan Kendras (KVKs), provision of subsidized structures, and efficient earthworm availability could help overcome these barriers. These results support the findings of Mishra *et al.* (2019) [8], who emphasized the role of infrastructural and knowledge support in improving organic adoption in Bihar.

Table 2: Major constraints in adoption of organic fertilizers

Constraints reported
Lack of awareness/training
Poor livestock management
Non-availability of quality seeds
Labour-intensive practices
High cost of vermicomposting
Lack of technical know-how

Overall, the findings indicate that although farmers recognize the productivity and environmental benefits of organic fertilizers, structural and informational barriers limit their adoption. Enhancing institutional support, capacity-building through training, and strengthening input supply chains could accelerate the transition towards sustainable organic farming in Muzaffarpur district.

Conclusion

The study revealed that most farmers are young to middle-aged with small to medium landholdings and good irrigation. Organic fertilizer use is influenced by productivity, environment, and peer advice. Key constraints include lack of awareness, training, and inputs. Improved adoption requires awareness programs, technical support, and infrastructural assistance.

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