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Comparative analysis of knowledge level in organic farming: A study of PKVY beneficiary and non-beneficiary farmers

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Abstract

Indian agriculture is at a critical juncture where increasing environmental degradation, excessive reliance on chemical inputs and unsustainable farming practices threaten long-term productivity and ecological balance. In this context, organic farming is emerging as a viable alternative, offering a holistic approach that restores soil fertility, enhances biodiversity, and ensures safer food. The Government of India launched the Paramparagat Krishi Vikas Yojana (PKVY) under the National Mission for Sustainable Agriculture to promote cluster-based organic farming. This study aims to evaluate the impact of PKVY and the factors influencing the knowledge of organic farming in the Narmadapuram district of Madhya Pradesh. The research adopted an ex-post-facto design, covering 100 respondents (50 PKVY beneficiaries and 50 non-beneficiaries) selected via simple random sampling. Data were collected using a structured interview schedule and analyzed using statistical tools including frequency, percentage, mean, standard deviation, Pearson's correlation and Z-test to assess differences between variables. The knowledge of beneficiaries was no doubtly found higher than non-beneficiaries. The results showed that variables such as age, family size, annual income, experience in organic farming, economic motivation, extension contact, market orientation, awareness of PKVY activities and attitude towards organic farming were positively and significantly correlated at the 5 per cent level, while area under organic farming, innovativeness and environment orientation were positively and significantly correlated at the 1 per cent level with knowledge of organic farming. In conclusion, while PKVY has had a substantial impact on improving knowledge among beneficiary farmers, overcoming practical challenges through policy reforms, infrastructure development, and farmer-centric support systems is essential for scaling up organic farming in India.

Keywords: Organic farming, Paramparagat Krishi Vikas Yojana (PKVY), Knowledge level

Introduction

Indian agriculture faces major challenges, including population pressure, shrinking land and water resources, environmental degradation, biodiversity loss, climate change, rising cultivation costs, and declining soil fertility. These problems have intensified due to the extensive dependence on chemical-based farming practices adopted during the Green Revolution. Although the Green Revolution enhanced crop productivity through high-yielding varieties and synthetic agrochemicals, their long-term use has caused ecological imbalance and potential human health concerns. In this context, organic amendments have emerged as sustainable alternatives for improving crop yield and enhancing resistance against pests and diseases without adverse environmental effects. Among these, vermicompost, rich in humic substances such as humic acid, has shown significant potential in promoting agricultural productivity and ecological sustainability (Sansei *et al.*, 2007) ^[8].

Sustainable agricultural development seeks to balance environmental protection, soil fertility, human health, economic viability, and social equity. To achieve this,

several alternative farming systems have been promoted, including integrated pest management, natural farming, precision agriculture, permaculture, natural farming, and organic farming. Among these, organic farming is regarded as a comprehensive and sustainable approach due to its emphasis on nutrient recycling, resource conservation, reduced environmental impact and ecological footprint of agriculture. Continuous innovation, however, remains essential to address food security and ecological challenges (Tiwari, 2023) ^[13].

Organic farming focuses on producing quality agricultural products while conserving natural resources and maintaining ecological balance (Sharma *et al.*, 2022) ^[10]. To encourage its adoption, the Government of India launched schemes such as Paramparagat Krishi Vikas Yojana (PKVY) and Mission Organic Value Chain Development for North Eastern Region (MOVCDNER) during 2015–16. These programs provide financial assistance, training, certification support, and market linkages to farmers. Under PKVY, farmers receive subsidies for the use of organic inputs, including biofertilizers and organic manures (Anonymous, 2024) ^[1]. Madhya Pradesh has the highest

area under organic cultivation through PKVY, covering 74,960 hectares with the participation of 1,16,360 farmers supported by government funding (APEDA, 2023–24) [2]. Therefore, the present study was undertaken with following objectives:

Objectives

1. To examine the knowledge impact of PKVY among beneficiary and non-beneficiary farmers
2. To analyze the relationship between the profile characteristics of beneficiary farmers and the impact of the scheme.

Material and Methods

The study was carried out in the Narmadapuram block of Narmadapuram, which reported the highest number of PKVY clusters in the state during 2024–25. Pahanbari

village, comprising two PKVY clusters of 50 farmers each, was selected for the investigation. One cluster with 50 beneficiary farmers was chosen randomly, while 50 non-beneficiary farmers were randomly selected from a nearby village, resulting in a total sample size of 100 respondents. An ex post facto and exploratory research design was adopted to assess variations in knowledge levels. Primary data were collected through a pre-tested structured interview schedule covering socio-personal, psychological, communicational, and PKVY-related knowledge variables. The data were analyzed using frequency, percentage, Z-test, correlation, and regression techniques to determine the relationship between independent variables and knowledge levels.

Results and Discussion

Table 1: Distribution of beneficiary and non beneficiary farmer according to Knowledge of organic farming

S. No.	Statement	Beneficiary	Non Beneficiary
		f	f
1	Knowledge about organic farming and its objectives	50 (100%)	45 (90%)
2	Information about organic farming under the Paramparagat Krishi Vikas Yojana (PKVY)	50 (100%)	4 (8%)
3	Complete knowledge about the various grants and technical assistance received under PKVY	49 (98%)	4 (8%)
4	Participation in training organized under PKVY and knowledge about organic farming from those trainings	50 (100%)	0 (0)
5	Knowledge about the crop rotation and mixed cropping systems encouraged under the Paramparagat Krishi Vikas Yojana	48 (96%)	5 (10%)
6	Knowledge of seed treatment methods under PKVY	47 (94%)	6 (12%)
7	Knowledge of use of Bio fertilizers (such as Rhizobium, Azotobacter etc.) under PKVY	50 (100%)	16 (32%)
8	Knowledge about the use of organic pesticides under PKVY	47 (94%)	14 (28%)
9	Knowledge of the organic certification process under PKVY	50 (100%)	0 (0)
10	Knowledge related to the marketing and selling of organic produce through PKVY	28 (56%)	5 (10%)

In Table 1. Majority of beneficiaries under PKVY possess sufficient knowledge regarding various practices in organic farming as compared to non-beneficiaries. It is due to the regular practice of organic farming that knowledge of organic farming practices is high in beneficiaries whereas non-beneficiaries’ observation from neighbouring PKVY beneficiaries wasn’t sufficient enough to have good knowledge in different practices under organic farming.

Table 2: Distribution of beneficiary and non beneficiary farmer according to over all Knowledge of organic farming

S. No.	Category	Range (Score)	Beneficiary (n=50)		Non Beneficiary (n=50)	
			f	%	f	%
1)	Low	10-13	0	0.00	48	96.00
2)	Medium	14-16	3	6.00	2	4.00
3)	High	17-20	47	94.00	0	0.00
	Total		50	100.00	50	100.00

Table 2 demonstrates a marked difference in organic farming knowledge between PKVY beneficiaries and non-beneficiaries. Most beneficiary farmers exhibited high knowledge levels, whereas the majority of non-beneficiaries belonged to the low knowledge category, while a smaller proportion possessed medium knowledge and none were categorized under low knowledge. Similar findings by Chaudhary *et al.* (2013) [3], Sharma *et al.* (2024) [11] and Laxmikant *et al.* (2016) [5] suggest that training, awareness programs, and extension support under PKVY significantly

improved farmers’ understanding and adoption of organic farming practices through continuous technical guidance and practical exposure.

Table 3: Z Test: Two Sample for Mean (Knowledge of organic farming)

z-Test: Two Sample for Means		
	Knowledge of Beneficiary	Knowledge of non-Beneficiary
Mean	19.52	11.64
Known Variance	0.37	0.56
Observations	50	50
Hypothesized Mean Difference	0	
z	57.77896332	
P(Z<=z) one-tail	0.000000000000024	
z Critical one-tail	1.644853627	
P(Z<=z) two-tail	0.000000000000032	
z Critical two-tail	1.959963985	

Z-Test Result for Knowledge of Organic Farming

To evaluate the impact of PKVY on farmers’ knowledge of organic farming, a z-test for two sample means was applied to compare the mean knowledge scores of beneficiary and non-beneficiary farmers. Beneficiary farmers recorded a higher mean score (19.52) than non-beneficiaries (11.64). The known variances for the two groups were 0.37 and 0.56, respectively. The calculated z-value (57.77) exceeded the critical values at both 5% and 1% significance levels, while

the p-value was nearly zero (0.000000000000032), indicating a highly significant difference between the two groups. Thus, the null hypothesis of no difference in knowledge levels was rejected, confirming the positive

influence of PKVY on farmers' knowledge regarding organic farming practices. Sharma *et al.* (2024) ^[11] found similar results.

Table 4: Difference in Two Sample Mean in profile attributes of Beneficiaries and Non-Beneficiaries of PKVY

S.no	Profile attributes	Mean value		Mean score difference	Z value
		PKVY Beneficiary	PKVY Non Beneficiary		
1.	Age	43.7	41.705	1.994	1.531 ^{NS}
2.	Education	2.42	2.647	-0.227	-1.094 ^{NS}
3.	Family size	5.66	5.745	-0.085	-0.417 ^{NS}
4.	Land holding	1.256	1.452	-0.196	-1.498 ^{NS}
5.	Area under organic farming	0.5176	0.0024	0.518	11.089 ^{**}
6.	Total Annual income	288000	250980.3922	37019.608	1.648 ^{NS}
7.	Experience in Organic farming	5.06	0.352	4.707	28.525 ^{**}
8.	Economic motivation	24.88	23.156	1.723	5.086 ^{**}
9.	Risk orientation	23.16	23.078	0.082	0.266 ^{NS}
10.	Innovativeness	22.54	21.215	1.324	3.396 ^{**}
11.	Environment Orientation	19.44	18.705	0.734	5.115 ^{**}
12.	Market Orientation	11.14	11.2156	-0.076	-0.392 ^{NS}
13.	Awareness of PKVY activity	18.8	11.294	7.506	34.390 ^{**}
14.	Extension contact	15.78	12.039	3.741	10.790 ^{**}
15.	Training on organic farming	3.34	0	3.340	18.997 ^{**}
16.	Attitude towards organic farming	27.44	25.196	2.244	5.158 ^{**}
17.	Knowledge of organic farming	18.7	12.6	6.1	24.00 ^{**}
18.	Adoption of organic farming	62.56	29.86	32.7	65.531 ^{**}

Table 4. Shows the comparison of PKVY beneficiaries and non-beneficiaries across a variables including age, education, family size, landholding, area under organic farming, total annual income, experience in organic farming, economic motivation, risk orientation, innovativeness, environment orientation, market orientation, awareness of PKVY activities, extension contact, training on organic farming, attitude towards organic farming, knowledge of organic farming, and adoption of organic farming. The Z-test values for each variable were analyzed to determine whether the differences between the two groups were statistically significant (Kumbhare *et al.* 2026). The results revealed that age, education, family size, landholding, total annual income, risk orientation, and market orientation showed non-significant differences, indicating that both groups were statistically similar across these general socio-economic characteristics. In contrast, a number of variables showed highly significant differences at the 1% level of significance ($p \leq 0.01$), clearly favoring PKVY beneficiaries. These included area under organic farming, experience in organic farming, economic motivation, innovativeness, environment orientation, awareness of PKVY activities, extension contact, training on organic farming, attitude towards organic farming, knowledge of organic farming and adoption of organic farming (Sharma *et al.*, 2024) ^[12]. The high Z-values of these variables demonstrate that PKVY beneficiaries possess greater exposure, Economic motivation, knowledge of organic farming, environmental orientation, and significantly greater adoption of organic farming practices compared to non-beneficiaries (Yadav *et al.*, 2025) ^[14]. Overall, the findings indicate that the PKVY scheme has made a substantial and positive impact on the PKVY beneficiaries.

Table 5: Coefficient correlation of independent variables and Knowledge of organic farming

Variable no.	Independent variable	Correlation coefficient "r" values
X ₁	Age	0.282*
X ₂	Education	0.240 ^{NS}
X ₃	Family size	0.330*
X ₄	Land holding	0.187 ^{NS}
X ₅	Area under organic farming	0.363 ^{**}
X ₆	Total Annual income	0.360*
X ₇	Experience of organic farming	0.290*
X ₈	Economic motivation	0.310*
X ₉	Risk orientation	0.025 ^{NS}
X ₁₀	Innovativeness	0.382 ^{**}
X ₁₁	Environment orientation	0.379 ^{**}
X ₁₂	Market orientation	0.286*
X ₁₃	Awareness of PKVY activities	0.295*
X ₁₄	Extension contact	0.296*
X ₁₅	Training on organic farming	0.282*
X ₁₆	Attitude towards organic farming	0.340*

“*” Significant at 5% level, “**” Significant at 1% level, NS = Not statistically significant

Pearson's correlation analysis showed that age and family size had significant negative relationships with organic farming knowledge, indicating that younger farmers and those with smaller families possessed higher knowledge levels. Education and landholding exhibited positive but non-significant associations. In contrast, annual income, farming experience, economic motivation, innovativeness, environmental orientation, market orientation, awareness of PKVY activities, extension contact, training exposure, and attitude toward organic farming showed significant positive correlations with knowledge. Area under organic farming also demonstrated a significant association, suggesting that

practical involvement in organic cultivation enhances learning and skill development. Risk orientation, however, had a weak and non-significant relationship.

These findings imply that knowledge of organic farming is influenced more by practical exposure, training, economic motivation, and extension support than by formal education or farm size. Farmers with innovative and environmentally oriented attitudes were more likely to acquire and adopt organic farming practices. Similarly, participation in PKVY activities, regular extension contact, and training programs significantly contributed to improving farmers' knowledge and adoption behavior (Naik *et al.*, 2016; Sharma *et al.*, 2022; Prasad, 2022) ^[6, 9, 7].

Conclusion

The study concluded that the Paramparagat Krishi Vikas Yojana (PKVY) significantly enhanced farmers' knowledge of organic farming practices. Beneficiary farmers recorded substantially higher knowledge levels than non-beneficiaries, indicating the positive impact of training, field demonstrations, extension support, and awareness programs conducted under the scheme. PKVY effectively improved farmers' understanding of key organic farming practices and promoted the adoption of sustainable and environmentally friendly agriculture.

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