



Impact of Organic Farming Training on the Knowledge of Farm Women: A Pre-Post Analysis

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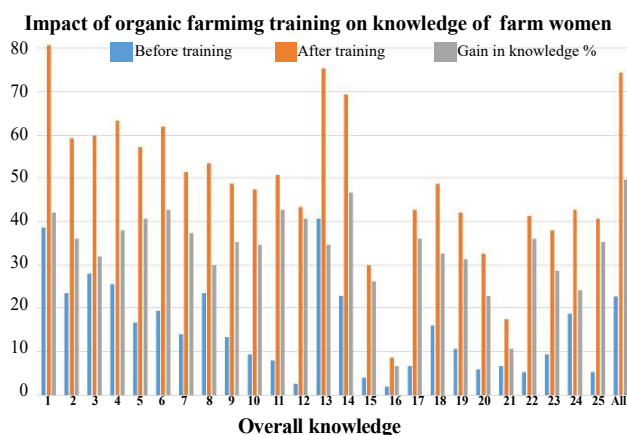
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HIGHLIGHTS

- NABARD promote organic farming among women farmers and sanction a project LEDP for the promotion of organic farming among women farmers.
- The study highlight that the knowledge levels were low (63.33%) before training programme and it significantly increased after the (74.40%). The knowledge index score indicating a substantial gain of 49.64% among women farmers.
- The study revealed a significant difference in mean knowledge scores before (10.28) and after (16.44) the training program, affirming the effectiveness of the training in elevating knowledge levels.

GRAPHICAL ABSTRACT



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ABSTRACT

Context: People are awakened now a day about of the detrimental effects of the over adoption of the green revolution. Our country has achieved food security self-sufficiency, and it is high time to prioritize the quality of food grain production above its quantity. Government of India has given focus on the adoption of traditional farming systems i.e., organic and natural farming systems through launching various schemes on the promotion of the production of quality food grain.

Objective: The existing enquiry was taken under a NABARD-sponsored LEDP project to evaluating the impact of training programme on trainees.

Methods: Quasi experimental i.e. Before and after was used to conduct the research. Sample consisting of 150 women farmers were selected randomly from five villages of KVK Jodhpur II jurisdiction areas for a ten-day intensive training program for practicing organic farming. A knowledge test and interview schedule was developed to collect the data from respondents (pre and post training).

Results & Discussion: The study's reported that before training the level of knowledge of the women farmers towards organic farming practices was low i.e. 63.33 per cent followed by 30.00 per cent and 6.66 per cent medium and high respectively. The average knowledge index score before training was 25.56 per cent and after training was 74.40 per cent. The gain in knowledge index after the training program is 49.64 per cent. Additionally, the study revealed that there was a significant difference in mean knowledge score before (10.28) and after (16.44) training program.

Significance: This indicated that training has a significant effect on the knowledge level of the woman farmer. The in-depth areas based training should be carried out for skill development particular for women farmers will help to adoption of organic farming.

India achieved tremendous growth in production and productivity of agricultural sector after green revolution. The country is the third largest producer of cereals globally and in the case of important cereals, second largest producer of rice and wheat and the top producer of pulses (FAO, 2022). In addition, India is the world's top producer of milk and ranks second in terms of production of fruits, vegetables, groundnuts, cotton, and sugarcane (FAO, 2022). India launched a series of programs and schemes for agricultural reforms and initiatives introduced in the mid-1960s that aimed to increase agricultural productivity and improve food security in the country. India achieved this position with the help of the technologies developed, policy support, and technologies adopted by farmers during the green revolution era. But in the long-term negative effect of green revolution also occurred due to over-adoption of technologies *i.e.*, prolonged and injudicious application of synthetic fertilizers and pesticides. The demerits of chemical agriculture farming in India include soil degradation, water pollution, health risks, loss of biodiversity, reduced nutritional value of crops, and an increase in input costs (Malik N., *et al*, 2023). These problems affect human and environmental health and well-being, as well as the sustainability of agriculture. Therefore, the promotion of sustainable and organic farming practices can help mitigate these demerits and promote healthier and more environmentally-friendly agriculture in India. In India, the organic farming movement was initiated in 2001 with the launch of the National Programme on Organic Production (NPOP) by the Ministry of Commerce, Government of India, which defined the National Standard for Organic Production (NSOP) and procedure for accreditation and certification. Subsequently, in 2015-16, to give domestic organic agriculture a push, the Ministry of Agriculture launched a new scheme under National Mission for Sustainable Agriculture (NMSA) entitled 'Parampragat Krishi Vikash Yojna' (PKVY) (APEDA, 2018). The Rajasthan Government have also put their efforts into the promotion of organic farming particularly in the western Thar Desert of Rajasthan. Because, there are still several areas in Western Rajasthan where farmers continue to practice traditional farming for centuries, using traditional irrigation systems such as baoris and khadins to conserve water and maintain soil health. This part of the state has the potential to become a hub for organic farming, given its unique

ecological conditions and long-standing tradition of sustainable agriculture (GoR, 2007). In an effort to promote organic agricultural techniques among farmers, the state established the Rajasthan Organic Certification Agency (ROCA) in 2018. In addition, the government has offered farmers financial incentives to convert to organic farming, with the goal of achieving 20 per cent organic farming in the state by 2025. At present organic farming is being promoted as a way of balancing nature with human needs, predominantly for conserving natural resources and avoiding the negative effects of indiscriminate use of inputs in agriculture. For policymakers and managers, organic farming is about making better earth for sustained living, for the consumer, it is about health and wellness while for farmers sustaining the family and maximizing farm income are the primary concerns. In this situation, KVK Jodhpur II submitted a project to NABARD, Jodhpur under the LEDP scheme to the empowerment of women through organic farming. The present study is designed to assess the knowledge of farm women before and after the training program on organic farming practices.

METHODOLOGY

Locale of the study: The research was carried out during the year 2022-23 in the Phalodi block of Jodhpur district (26.23890 N latitudes; 73.02430 E longitudes) under the LEDP project (Livelihood and Enterprise Development Program) on the empowerment of women through organic farming sponsored by NABARD, Jodhpur.

Population and sampling: A pre-post quasi experimental design (before-after) was applied study to evaluate the proficiency of women engaged in



Figure 1. Map of study area in Jodhpur disstt. of Rajasthan, India

farming with respect to organic farming methods. The five villages of the Phalodi block were selected randomly under LEDP project. From each village thirty women farmers who are members of SHGs were selected randomly based on their needs and interest. Thus, 150 farm women made up the whole sample size for the research and study. For every batch, a ten-day intensive training program focused on organic farming was conducted, using the learning-by-doing technique.

Data collection and analysis: A comprehensive knowledge assessment was devised to gauge understanding of enhanced organic farming practices. Statements reflecting insights from literature reviews and secondary documents on farming studies (Malik *et al.*, (2023); Pandey, *et al.* (2022); Naik, *et al.* (2009); Hundal, *et al.* (2016); Priyadarshni, *et al.* (2020) were initially formulated. Collaborating with experts and certified farmers knowledgeable in organic farming, these statements were then refined to align more closely with the local context. Twenty-five questions were carefully selected for further exploration, taking into consideration the findings from the pilot study. The characteristics of the items, including indices for item difficulty and discrimination, were meticulously calculated. Moreover, the reliability and validity of the knowledge test were assessed. Each correct response was assigned a score of one, while incorrect answers received a score of zero, resulting in a scoring range of 0-25. Pre- and post-training data were collected through individual interviews utilizing a pre-structured interview schedule. Statistical analyses, including frequency, per centages, correlation coefficients, and z-tests, were employed to compare the knowledge levels of farm women before and after the training program. This rigorous methodology ensures a scientifically robust and insightful evaluation of the impact of the training on organic farming knowledge.

RESULTS

Comparison of farm women's knowledge levels before and after the training program: The adoption of an invention necessitates knowledge. Farmers' ultimate decision to utilize a new practice is typically the outcome of their knowledge level of the practice. The farm women of Phalodi block of Jodhpur district were exposed to ten days of organic farming training by Krishi Vigyan Kendra, Phalodi under the LEDP project sponsored by NABARD. The purpose of the

Table1. Categorization of the women farmers based on their knowledge level (N=150)

Category	Before	After
	No. (%)	No. (%)
Low (0-10)	95 (63.33)	34(22.66)
Medium (11-20)	45 (30.00)	91(60.66)
High (>20)	10(06.66)	25 (25.00)

pre- and post-training evaluation was to see how farm women's level of knowledge had changed. Before and after the training program, farm women were classified as having low, medium, or high knowledge levels. Table 1 revealed that before organic farming training the knowledge level of farm women toward organic farming practices was low i.e. 63.33 per cent followed by 30.00 and 6.66 per cent medium and high respectively. Table 1 shows that farm women's knowledge level had increased following training; of these, 60.66 per cent fell into the medium category of knowledge about organic farming practices, followed by 25.00 per cent in the high category and 22.66 per cent in the low category.

Knowledge of the farm women about organic farming: Table 2 presents statistics on the knowledge level of women farmers, showing a considerable improvement in their understanding about organic farming both before and after the training session. The statement wise per cent gain in knowledge before and after training programme i.e. organic farming is a type of farming system in which crops are grown without the use of chemical inputs (38.66% to 42.00%), helps in improving the soil health and crop productivity (23.33% to 36.00%), decrease the cost of cultivation (25.33% to 38.00%), results in the production of healthy and nutritionally superior products (16.66% to 40.66%), products grown organically fetch more price (19.33% to 42.66%), manure can be prepared from kitchen wastes, plant wastes and animal wastes to fertile soil and plants (14.00% to 37.33%), organically weeds, pests and diseases can be controlled (13.33% to 35.33%), rotate crops to control weed, pest and also to improve soil fertility (9.33% to 42.66%), Knowledge about preparation and use of vermi-compost, vermi wash (8.00% to 40.66%), knowledge about preparation and use of neem, garlic, chilli, onion, tobacco, aak, dhatura, tumba etc. based pesticides (2.66% to 26.00%), knowledge about preparation and use of jeevamrit, beejamrit, ghan jeevamrit etc. (4.00%

Table 2. Knowledge of the farm women about organic farming (N=150)

Statements	Before training	After training	Knowledge gain No. (%)
	No. (%)	No. (%)	
Crops cultivated organically are produced without the use of chemical inputs in farming practices.	58 (38.66)	121 (80.66)	63 (42.00)
Helps in improving the soil health and crop productivity	35 (23.33)	89 (59.33)	54 (36.00)
Protects the environment and thus prevents the risk to humans and animals	42 (28.00)	90 (60.00)	48 (32.00)
Decrease the cost of cultivation	38 (25.33)	95 (63.33)	57 (38.00)
Results in the production of healthy and nutritionally superior products	25 (16.66)	86 (57.33)	61 (40.66)
Products grown organically fetch more price	29 (19.33)	93 (62.00)	64 (42.66)
Manure can be prepared from kitchen wastes, plant wastes, and animal wastes to fertile soil and plants	21 (14.00)	77 (51.33)	56 (37.33)
Benefits of summer ploughing	35 (23.33)	80 (53.33)	45 (30.00)
Organically weeds, pests, and diseases can be controlled	20 (13.33)	73 (48.66)	53 (35.33)
Rotate crops to control weeds and pests and also to improve soil fertility	14 (9.33)	71 (47.33)	52 (34.66)
Knowledge about preparation and use of vermicompost, vermin wash	12 (8.00)	76 (50.66)	64 (42.66)
Knowledge about preparation and use of neem, garlic, chili, onion, tobacco, aak, datura, tumba, etc. based pesticides	4 (2.66)	65 (43.33)	61 (40.66)
Knowledge about preparation and use of Farm Yard Manure and various compost at the farm level.	61 (40.66)	113 (75.33)	52 (34.66)
Knowledge about seed treatment before sowing and seed treatment methods	34 (22.66)	104 (69.33)	70 (46.66)
Knowledge about preparation and use of jeevamrit, beejamrit, ghan jeevamrit, etc.	6 (4.00)	45 (30.00)	39 (26.00)
Usage of bio-agents for seed treatment	3 (2.00)	13 (8.66)	10 (06.66)
Knowledge of organic disease and pest control methods	10 (6.66)	64 (42.66)	54 (36.00)
Knowledge of proper selection of suitable crops and their varieties based on soil type	24 (16.00)	73 (48.66)	49 (32.66)
Improvement in crop yields after the adoption of organic farming practices	16 (10.66)	63 (42.00)	47 (31.33)
Soil type and characteristics of soil/ maintaining soil health card	9 (6.00)	49 (32.66)	40 (22.66)
Use trap methods to control pests and diseases	10 (6.66)	26 (17.33)	16 (10.66)
Meaning and uses of Azolla	8 (5.33)	62 (41.33)	54 (36.00)
Knowledge about green manure crops	14 (9.33)	57 (38.00)	43 (28.66)
Organic grain storage	28 (18.66)	64 (42.66)	36 (24.00)
Information about the incentives and subsidies given for practicing organic farming	8 (5.33)	61 (40.66)	53 (35.33)
Overall, Knowledge	22.56	74.40	49.64

to 28.66%), knowledge of organic disease and pest control methods (6.66% to 36.00%), meaning and uses of Azolla (5.33% to 36.00%), knowledge about green manure crops (9.33% to 28.66%), organic grain storage (18.66% to 35.33%) and information about the incentives and subsidy given for practicing organic farming (5.33% to 35.33%) had improved significantly after training programme. The overall knowledge index score before training was 25.56 and after training were 74.40. The gain in knowledge after the training program is 49.64.

The difference in knowledge level before and after the training program : Table 3 distinctly illustrates a noteworthy disparity in the mean knowledge

Table 3. Difference in knowledge level among farm women before and after training (N=150)

Before	Mean (SD)	After	Mean (SD)	'z' Value
10.28	(1.57)	16.44	(1.82)	1.9 ^{NS}

scores among farm women prior to and following the training program. The initial mean knowledge score for farm women before the training program was 10.28. Subsequent to the training program, the knowledge level was reassessed, revealing a mean score of 16.44. This denotes a substantial increase in knowledge levels among farm women.

Relationship between independent variables and knowledge about organic practices : Table 4 presents

Table 4. Relationship between independent variables and knowledge about organic practices (N= 150)

Independent variables	'r'
Age	0.340**
Education	0.615**
Family Size	0.156 ^{NS}
Land holdings	0.341**
Annual income	0.353**
Livestock possession	0.296**
Organic farming experience	0.278**
Mass media contact	0.234*
Extension contact	0.215**
Training received	0.220*
Market orientation of farmers	0.275*

* Significant at 1 % level of probability, ** Significant at 5 % level of probability, NS = non-significant

the relationship between independent variables and knowledge about organic practices based on a sample size of 150. Positive correlations are observed for several variables: age (0.340**), education (0.615**), land holdings (0.341**), annual income (0.353**), livestock possession (0.296**), organic farming experience (0.278**), mass media contact (0.234*), extension contact (0.215**), training received (0.220*), and market orientation of farmers (0.275*). These correlation coefficients suggest varying degrees of positive associations between these factors and knowledge about organic practices. Notably, family size (0.156 NS) exhibits a non-significant correlation. The significance levels, denoted by asterisks, indicate the strength and statistical significance of these relationships, with higher values implying stronger associations. Overall, the table provides insights into the factors influencing knowledge levels regarding organic practices within the studied sample.

DISCUSSION

The outcomes of the current study underscore the effectiveness of the organic farming training course in enhancing the understanding of participants. Notably, a substantial proportion of respondents demonstrated a medium to high level of comprehension regarding organic farming techniques following the training. This indicates a noteworthy positive impact on the knowledge levels of farm women as a result of the training intervention. The findings align with previous research, as reported by Kumar S. *et al.*, (2013), Sharma, M. *et al.*, (2014), and Sahu R.P. *et al.*, (2010), which highlights the significant contribution of

training programs in elevating the knowledge levels of participants. The present study's results are further supported by the congruent observations of Devi S. *et al.*, (2019), Jaganathan D. *et al.*, (2012), and Huria A., *et al.*, (2023) reinforcing the notion that training initiatives contribute substantially to the improvement of knowledge levels among female participants. This consistency across studies strengthens the credibility of the observed enhancement in understanding attributed to the implemented training program.

In the examination of farm women's knowledge about organic farming practices, as presented in Table 2, a notable observation emerges prior to the commencement of the training program, only a limited number of respondents possessed information about certain common practices of organic farming. However, following an intensive ten-day training program, a substantial improvement in knowledge was observed across specified parameters. The heightened knowledge levels among farm women can be attributed to several factors, including the relevance of the covered subject matter to the respondents' needs, the practical training environment facilitated at Krishi Vigyan Kendra, Jodhpur II by experienced experts, and exposure visits to model organic farms. The increased interest of the trainees, coupled with the opportunity to engage with subject matter specialists to clarify doubts, likely contributed to the observed enhancement in knowledge. These findings align with previous research, including studies conducted by Ghosh M. K. *et al.*, (2019), Raghvendra P. *et al.*, (2020), and Sahu R.P. *et al.*, (2010), which similarly emphasized the positive impact of intensive training programs and practical exposure on participants' knowledge and motivation. The reported increased adoption of organic farming practices among farmers following such training programs further supports the efficacy of these interventions, as indicated by Devi S. *et. al.*, (2019) and Kumar S. *et al.* (2014). Statistical analysis revealed a significantly higher total knowledge score ($p < 0.01$) among respondents after the training program compared to before. This underscores the substantial impact of the KVK Phalodi organic farming training program on enhancing participants' knowledge levels. Consistent with prior studies by Jaganathan D. (2012), Kumar A. and Ismail (2011), Kumar S. *et al.*, (2013), Kalita RR. *et al.*, (2017), and Naik M.H. *et al.*, (2009), the present study underscores the transformative effect of field-based training in bridging the knowledge

gap before and after the training period. The study highlights the effectiveness of an intensive training program in significantly improving the knowledge of farm women regarding organic farming practices. The multifaceted approach, including relevant subject matter, practical training, and exposure visits, contributed to the observed positive outcomes. The findings align with existing literature, emphasizing the pivotal role of targeted training interventions in promoting knowledge acquisition and subsequent adoption of sustainable agricultural practices.

Relationship between independent variables and knowledge about organic practices : Table 4 demonstrates that, at the 1 per cent probability level, independent factors including age, education, land holdings, yearly income, ownership of animals, training received, and market orientation exhibited a very significant association with knowledge. It's possible that factors like a high level of education, a sizable land holding, a stable economic situation, the viability of animals, appropriate training for organic farming, and adequate marketing facilities contributed to the increase in farmers' knowledge and enthusiasm for organic farming. A related type of discovery was also documented by (Das M. K., 2019). Organic farming expertise, mass media exposure, and extension contact were determined to be statistically significant at a 5 per cent level of probability. It is due to the factor that farmers having higher extension contact were likely to have lower levels of the problem which enhances the adoption of organic farming. The size of the family does not affect the amount of awareness regarding organic practices. Because of the enormous land holding in the research region, the non-significant results might be explained by the fact that family size has little effect on organic farming practices. Another possible cause is that increased education instilled a desire for more information, while larger land holdings and higher yearly revenue motivated farmers to explore new places. The findings conform to the results of Sihare A. *et al*, (2017), Biswas S. *et al*, (2018), Borhade S. M. *et al*, (2015), Joshi D. *et al*, (2021) and Kalita RR. *et al*, (2017),

CONCLUSION

It may be inferred that farming in western Rajasthan, where farmers employ conventional agriculture techniques and use fewer pesticides and fertilizers, is already organic. This area has

natural habitats useful for organic farming and the engagement of almost all the farmers in animal husbandry is the already existing supporting ground for organic farming. However, there is still a dearth of information regarding value addition, marketing, and appropriate scientific organic agricultural techniques. The study's conclusions indicate that farm women lack understanding of scientific organic agriculture techniques. It's also crucial to comprehend some of the recent technical developments in organic farming, such the usage of bioagents and trap crops. Moreover, institutional support is largely required to guarantee the availability of off-farm organic supplies and to lessen the cost and complexity of the certification process. Because of this, there is a great deal of space for raising the current standard of knowledge through skill-based training initiatives, talks on radio and television, field trips, exhibitions, camps, and social media. Extension agents also need to provide organic farmers with timely information and support. Therefore, in order to fulfil its goal of doubling farmers' income, the government ought to give farmers' issues more consideration.

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Data availability: Data would be made available on request. You can contact to corresponding author to obtain.

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Authors' contribution: The first and second authors are part of research project and author contribute in carry out project activities, data collection, analysis, writing, theoretical framework, methodology. The third author and fourth author help in data methodology, curation, resources, review and editing. All authors have read and agreed to the published version of the manuscript.

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