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Adoption of value addition technologies: Bakery products and milk processing by KVK-trained farm women from Satara district of Maharashtra

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Abstract
The present study entitled "Impact of KVK Training Programme on Farm Women" was undertaken in Satara district of Maharashtra to assess the role of Krishi Vigyan Kendra (KVK), Borgaon in enhancing the knowledge and adoption of agricultural technologies among farm women. The investigation focused on two key training areas: processing of bakery products, milk processing, selected for their potential to promote skill development, self-employment, and improved farm productivity. A total of 150 farm women who had received training within the last five years were selected through purposive sampling from 15 villages across Satara, Jaoli, and Wai tehsils. The study employed an ex-post facto research design, using a structured interview schedule to collect data. Findings revealed that both processing of bakery products and milk processing trainings substantially increased the knowledge and adoption levels of farm women leading to nutritional security and income generation. The study also documented constraints faced and suggestions offered by the respondents to improve the effectiveness of training programmes.

Keywords: Krishi Vigyan Kendra, farm women, processing of bakery products, milk processing, training impact, adoption, skill development

Introduction
Across the world, agriculture is more than just a way to produce food it's the foundation of life and livelihoods, especially in developing countries. In many rural areas, it's women who are at the heart of this foundation. Whether it's planting crops, managing livestock, processing food, or selling produce at local markets, women do it all. In fact, according to the Food and Agriculture Organization (FAO, 2023), nearly 43 percent of the agricultural labor force in developing nations is made up of women.

In India, agriculture remains a major source of employment, with nearly 45 percent of the workforce engaged in the sector. Women form the backbone of agricultural and allied activities, contributing over 60 percent of the labor. Yet their work often goes unrecognized and unsupported. To address this gap, the Indian government has rolled out several initiatives like the National Rural Livelihood Mission (NRLM), the Mahila Kisan Sashaktikaran Pariyojana (MKSP), and programs under the Indian Council of Agricultural Research (ICAR). These aim to provide women farmers with the technical skills, entrepreneurial know-how, and tools they need to succeed.

This study matters because it shines a light on the everyday realities of farm women who are trying to improve their lives through training and skill development.

Objectives of the study
1. To find out the extent of adoption of processing of bakery products and milk processing technologies by the farm women as a result of training imparted through KVK.
2. To find out the constraints faced by farm women with respect to training programme and suggestions thereof.

Methodology
The present study was conducted in Satara district of Maharashtra to assess the impact of

Krishi Vigyan Kendra (KVK), Borgaon, on farm women. An ex-post facto research design was adopted for the study. A total of 150 farm women who had undergone training within the last five years were selected through purposive sampling from 15 villages across Satara, Jaoli, and Wai tehsils. The study focused on two major training areas conducted by KVK: processing of bakery products and milk processing. A structured and pre-tested interview schedule was used for data collection.

The 15 adoption statements were prepared for each training. Responses were categorized as complete adoption, partial adoption, and no adoption with scores of 2, 1, and 0 respectively. Frequencies were multiplied by their scores, summed to get the obtained score, and converted to percentage using:

Adoption (%) = (Obtained Adoption Score/Obtainable Score) × 100

Percentages were computed for both before and after training, and the increase in adoption was derived by subtracting the before training percentage from the after training percentage. Constraints encountered by the respondents and their suggestions for improvement of KVK training programmes were collected through a structured schedule. The responses were analyzed by calculating frequency and percentage, and both constraints and suggestions were ranked according to the magnitude of responses.

Extent of Adoption by Respondents in Processing of bakery products before and after Training

The data in below table 1 presents, a clear picture of the adoption levels of bakery practices by the respondents before and after receiving training. A remarkable increase in adoption was noted across all listed practices, indicating that the training effectively empowered the participants to apply the acquired knowledge in practical settings. Before the training, a significant number of respondents reported low adoption levels. For instance, only 10.67 percent of them regularly identified and used correct baking ingredients, while a mere 5.67 percent followed standard recipes and proportions. Practices such as proofing and fermentation 10.67 percent and using the oven correctly 12.67 percent also had low adoption rates.

However, after the training, the scenario improved dramatically. About 99.00 percent of the respondents reported following personal hygiene practices during baking, and 94.00 percent had implemented cost estimation and pricing methods. Similarly, adoption of dough mixing and kneading techniques rose to 85.33 percent, and the use of proofing and fermentation steps increased to 79.00 percent. Additionally, 80.67 percent of respondents were able to independently decorate and finish baked goods after the training. Overall, the training significantly enhanced the confidence and capability of farm women to adopt improved bakery practices, especially in areas such as ingredient measurement, hygiene, product presentation, and pricing.

Extent of Adoption by Respondents in Milk Processing before and after Training

The data presented in below table 2 indicates, a clear improvement in hygienic and value-added milk processing practices after KVK training. Hygienic milk collection increased from 30.33 percent to 91.67 percent, and proper boiling/filtering from 33.00 percent to 90.33 percent. Paneer-making rose from 20.67 percent to 81.33 percent, and ghee/butter production from 28.33 percent to 84.67 percent. Use of additives reached 98.33 percent, up 65.00 percent. Traditional curd preparation was already high at 90.00 percent but increased slightly to 99.33 percent. Technical areas like temperature monitoring, labelling, and marketing improved by 35.00 to 51.00 percent. Awareness of government schemes increased modestly from 38.33 percent to 47.00 percent. Overall, training significantly enhanced milk handling, processing, and market readiness.

Table 1: Extent of Adoption by Respondents in Processing of bakery products before and after Training

Sr. No	Statement	Before Training (n=150)				After Training (n=150)				
		Complete	Partial	No	%	Complete	Partial	No	%	Increase in Adoption%
1	Do you regularly identify and use correct baking ingredients?	05	22	123	10.67	52	98	0	67.33	56.66
2	Are you using accurate measuring techniques for ingredients?	03	19	128	08.33	70	80	0	73.33	65.00
3	Do you follow standard recipes and proportions?	03	11	136	05.67	65	85	0	71.67	66.00
4	Are dough mixing and kneading techniques followed at home/business?	12	15	123	13.00	106	44	0	85.33	72.33
5	Do you use proofing and fermentation steps in baking?	04	24	122	10.67	87	63	0	79.00	68.33
6	Are you able to correctly use the oven (temperature, timing)?	04	30	116	12.67	90	60	0	80.00	67.33
7	Are you making a variety of baked products (bread, cakes, etc.)?	05	17	128	09.00	91	59	0	80.33	71.33
8	Are you using preservatives to increase shelf life of products?	04	25	121	11.00	78	72	0	76.00	65.00
9	Are you decorating and finishing baked goods for sale?	05	16	129	08.67	92	58	0	80.67	72.00
10	Do you troubleshoot baking problems independently?	03	12	135	06.00	46	104	0	65.33	59.33
11	Do you follow personal hygiene and cleanliness while baking?	09	27	114	15.00	147	03	0	99.00	84.00
12	Are food safety and proper storage practiced?	06	23	121	11.67	122	28	0	90.67	79.00
13	Are baking tools and equipment used properly?	07	12	131	08.67	90	60	0	80.00	71.33
14	Do you label and package baked goods for sale?	04	28	118	12.00	66	84	0	72.00	60.00
15	Have you implemented cost estimation and pricing methods?	06	19	125	10.33	132	18	0	94.00	83.67

Table 2: Extent of Adoption by Respondents in Milk Processing before and after Training

Sr. No	Statement	Before Training (n=150)				After Training (n=150)				
		Complete	Partial	No	%	Complete	Partial	No	%	Increase in Adoption%
1	Are you practicing hygienic collection of milk?	12	67	71	30.33	125	25	0	91.67	61.34
2	Do you filter and boil milk properly before use/sale?	17	65	68	33.00	121	29	0	90.33	57.33
3	Are you regularly preparing curd (Dahi) at home/commercially?	120	30	0	90.00	148	02	0	99.33	09.33
4	Have you adopted the paneer making technique?	16	30	104	20.67	94	56	0	81.33	60.66
5	Are you producing ghee and butter using taught methods?	11	63	76	28.33	104	46	0	84.67	56.34
6	Are milk products stored and preserved properly?	13	53	84	26.33	92	58	0	80.67	54.34
7	Are you using additives/cultures as needed?	17	66	67	33.33	145	05	0	98.33	65.00
8	Do you monitor temperature during milk processing?	17	29	104	21.00	80	56	14	72.00	51.00
9	Is hygiene maintained in handling and processing?	25	51	74	33.67	102	48	0	84.00	50.33
10	Are milk processing equipment's used effectively?	21	41	88	27.67	82	55	13	73.00	45.33
11	Do you label and package products for sale?	20	69	61	36.33	107	43	0	85.67	49.34
12	Are shelf-life extension methods being used?	18	69	63	35.00	79	54	17	70.67	35.67
13	Are you calculating costs and pricing your products?	22	70	58	38.00	105	45	0	85.00	47.00
14	Are you accessing proper marketing channels for dairy sales?	24	70	56	39.33	84	66	0	78.00	38.67
15	Have you explored government schemes for dairy business?	29	57	64	38.33	30	81	39	47.00	08.67

Table 3: Distribution of respondents based on constraints faced in training programmes

Sr. No	Constraints	Frequency	Percentage	Rank
1	Farm women are burdened with household responsibilities, limiting time for attending training sessions.	120	80.00	I
2	Inflexible training timings; the sessions clash with household or farm duties.	110	73.33	II
3	Inability to invest in tools, inputs, or equipment needed for processing activities.	98	65.33	III
4	Family or community did not support participation.	90	60.00	IV
5	Lack of regular visits or assistance after training affects adoption of practices.	85	56.67	V
6	Women often lack collateral and face difficulties accessing institutional credit or loans.	78	52.00	VI
7	Lack of availability of market nearby for processed products discourages women from adopting enterprise-based training.	70	46.67	VII
8	Reluctance to adopt new methods due to fear of failure and economic risk.	64	42.67	VIII

The data in table 3 reveals that, the most common constraint in adopting technologies after KVK trainings was household responsibilities, reported by 80.00 percent of respondents, ranking first. This was followed by inflexible training timings, reported by 73.33 percent, and financial constraints related to tools or inputs, reported by 65.33 percent. Other important issues included lack of family or community support at 60.00 percent and absence of follow-up visits from experts at 56.67 percent. Additional challenges such as limited access to credit, unavailability of markets, and fear of adopting new methods were also mentioned, though these ranked lower.

Suggestions for improvement

The data in the table 4 reflects that, to enhance training effectiveness, respondents shared practical suggestions. The most common, from 83.33 percent, was to conduct trainings at the village level to reduce travel issues. Another 78.67 percent advised scheduling sessions during non-peak agricultural periods or convenient times. Post-training follow-up support was suggested by 73.33 percent to ensure proper implementation.

Providing starter kits such as bakery tools or bee boxes was recommended by 70.00 percent, while 66.67 percent stressed the need for direct market linkages. Strengthening ties with banks, input suppliers, and markets was supported by 61.33 percent. Additionally, 58.67 percent suggested including financial literacy and scheme awareness, and 53.33 percent proposed promoting Self-Help Groups for collective growth.

Table 4: Distribution of respondents based on suggestions to improve training programmes

Sr. No	Suggestions	Frequency	Percentage	Rank
1	On-site or village-level training should be organized to avoid travel-related challenges.	125	83.33	I
2	Trainings should be held during non-peak agricultural periods or convenient times (e.g., afternoons).	118	78.67	II
3	Ensure post-training follow-up and handholding support.	110	73.33	III
4	Give starter kits for bakery (e.g., bakery tools).	105	70.00	IV
5	Facilitate direct market linkages for processed products to ensure fair prices	100	66.67	V
6	Provide linkages with banks, input suppliers, and markets.	92	61.33	VI
7	Provide training on financial literacy and schemes etc.	88	58.67	VII
8	Promote Self-Help Groups (SHGs) for collective learning, production, marketing, and credit access.	80	53.33	VIII

Conclusion

The study highlighted that KVK training had a significant impact on the adoption of bakery and milk processing technologies by farm women. Adoption levels of hygienic practices, standardized methods, product diversification, packaging, and cost estimation improved remarkably after

training. These skills enhanced the women's ability to process, preserve, and market value-added products effectively, thereby contributing to income generation and self-employment opportunities. However, challenges such as household responsibilities, inconvenient training timings, limited financial resources, and lack of follow-up support restricted wider adoption. Respondents suggested conducting village-level training, ensuring post-training handholding, providing starter kits, and facilitating market linkages and financial literacy support. Overall, the findings reaffirm the crucial role of KVKs in empowering farm women by equipping them with practical, market-oriented skills for sustainable livelihood improvement.

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