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INTEGRATED FARMING SYSTEMS FOR SUSTAINABLE LIVELIHOODS: IMPACT OF KVK AMBAJOGAI'S VOCATIONAL TRAINING PROGRAMS

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ABSTRACT: Beed district, situated in drought prone Marathwada region in Maharashtra, faces significant agrarian challenges due to irregular rainfall, arid conditions, and inadequate irrigation infrastructure, rendering traditional agriculture unsustainable. In response, the Deendayal Research Institute's Krishi Vigyan Kendra (KVK) in Ambajogai organized vocational training programs for rural youth between 2023 and 2025, focusing on poultry, goatry, and dairy farming. These programs were anchored in the Integrated Farming Systems (IFS) framework proposed by Bharat Ratna Nanaji Deshmukh to enhance food security, diversify income, and bolster economic resilience. A robust mixed-method evaluation was conducted, incorporating baseline and endline surveys, pre–post knowledge assessments, and telephonic follow-ups. Findings revealed substantial learning outcomes: participants improved their technical knowledge significantly poultry scores rose from 18per cent to 84per cent (a ~66per cent gain), goatry from 21per cent to 78 per cent (57 per cent), and dairy from 26 per cent to 81 per cent (~55per cent). The training also translated into tangible livelihood gains: 13per cent of poultry, 16per cent of goatry, and 8per cent of dairy trainees initiated new enterprises, while 19per cent, 20per cent, and 12per cent respectively expanded existing operations. Despite these positive outcomes, disparities persist women—though central to livestock labour remain underrepresented in training, especially in poultry and dairy sectors, with only modest representation in goatry. Caste-wise, male trainees predominantly hail from OBC and General categories, while SC is underrepresented, and ST are absent. In conclusion, the KVK's integrated training model demonstrates clear potential to enhance technical capacity and livelihood diversification among rural youth. However, future initiatives should prioritize inclusivity through proactive outreach to women and marginalized communities, complemented by strategic policy and extension support to ensure equitable access and broader agricultural resilience.

KEY WORDS: Vocational training; Evaluation; Impact; income; Maharashtra; goatary; poultry.

India has become the largest milk producer in the world. The dairy sector now contributes around 5 per cent to India's GDP and employs over 80 million rural households, many of which are smallholders or landless farmers. Dairy provides day-to-day income, unlike seasonal crops, offering a critical safety net that supports food security, reduces poverty, and empowers women. The dairy industry contributes significantly to state GDP, employing over 10 million people and providing 5per cent of Maharashtra's economy. Maharashtra stands fifth among the top milk producing states in India, with a production of 1.60 million tonnes in 2023-24. This state accounted for 6.70per cent of the country's milk output. The per capita milk availability in Maharashtra is 347 grams per day.[1]

In semi-arid regions like Maharashtra, the small ruminants like goats will be highly helpful in protecting Southern India's rural livelihoods prone to drought. Regarding problems of the climate, such as market volatility or agricultural collapse, they react rapidly and serve as financial shields ready for quick liquidation during crises.[2] Goat farming has grown by 6.15 per cent, while sheep farming exploded at a 20.-25 per cent growth rate, far exceeding national averages. The poultry industry employs over 5 million people directly and indirectly across rural and urban India. It contributes approximately 1per cent of India's GDP, with considerable multiplier effects across the economy.[3] Sector revenues have surged to around ₹2,500 billion (~US$ 31.4 billion) in FY 2022–23 a growth of over 30per cent primarily propelled by increased demand, pricing, and expanding capacity.

The Beed district, located in Maharashtra's drought prone Marathwada region, grapples with harsh climatic conditions and inadequate irrigation infrastructure. These challenges marked by scarce, irregular rainfall and persistent water shortages consistently undermine agricultural productivity and threaten farmers' livelihoods.[4] Recognizing these vulnerabilities, Bahuratna Nanaji Deshmukh proposed the adoption of integrated farming systems. This holistic approach aims to enhance food security, diversify income streams, and promote rural economic resilience and self-reliance. In response, the Deendayal Research Institute's Krishi Vigyan Kendra in Ambajogai has been conducting ongoing vocational training programs focused on poultry, goatry, and dairy farming tailored for rural youth—offering sustainable livelihood alternatives amid environmental adversity.

KVK vocational training consistently improves farmer knowledge, skill development and the adoption of improved agricultural techniques. As noted, training improved knowledge dramatically and led to enterprise growth among rural youths. Farmers responded positively, expressing optimism about increased productivity and profitability. KVK training enabled

rural youths and women to develop additional livelihoods. KVK skill training enables supplementary rural income in the sector like poultry, goatry and dairy.

The objectives of pre- and post-vocational training evaluations and impact studies are:

1. Establishing a Clear Starting Point (Baseline):- A baseline survey is critical because it documents participants' initial conditions such as their knowledge, skills, and agricultural practices before the training begins. This benchmark enables realistic comparisons afterwards and better-informed program design.
2. Measuring Real Change Over Time (Endline): Administering a post-training (endline) survey using the same tools as the baseline allows accurate measurement of knowledge gains, behaviour changes, and adoption of new practices—providing clear evidence of impact.
3. Quantifying Knowledge Gain and Adoption: - In contexts like agricultural training, pre-post assessments reveal the extent of learning through statistical measures (e.g. Paired t-tests showing significant increases in correct responses after training).
4. Demonstrating Real-World Outcomes via Follow-Up: Beyond immediate learning, telephonic follow-ups or other field-level surveys help assess whether trainees have started enterprises, improved incomes, or overcome constraints providing a deeper view of sustained impact.
5. Informing Adaptive Program Management: Continuous feedback from evaluations and follow-ups equips program staff with insights to address challenges like financial constraints or technical gaps and adapt training content or delivery strategies accordingly.

MATERIAL AND METHODS

Between 2023 and 2025, the Deendayal Research Institute's Krishi Vigyan Kendra (KVK) in Ambajogai, Beed District, Maharashtra, conducted 10 vocational training programs in poultry, goatry, and dairy farming, enrolling 193 rural youth. These programs aimed to enhance technical knowledge and promote sustainable livelihoods among participants.

Training Design and Evaluation Process

1. **Baseline Assessment (Pre-Training Survey):-** Participants completed a comprehensive questionnaire capturing demographic data (age, education, landholding size, income level, family structure) and assessed their prior knowledge in poultry, goatry, and dairy practices.
2. **Hands-On Training Delivery:** The training was practical and experiential, covering areas such as setting up backyard poultry units and planning goatry enterprises. Participants received expert-led guidance on enterprise planning, resource management, and real-world operation challenges.
3. **Endline Evaluation (Post-Training Survey):-**After completing the training, participants retook the same questionnaire to evaluate improvements in their technical knowledge, confidence, and clarity of understanding.
4. **Telephonic Impact Follow-Up:** Weeks or months later, trainers conducted personal follow-up calls to track: Whether trainees started or expanded their farming ventures (e.g., setting up a poultry shed or purchasing goats/cows). Any income improvements since training. Obstacles encountered, such as access to finance, veterinary support, or market challenges. Ongoing motivation or preparedness stemming from training.

Statistical Analysis: Descriptive statistical methods were employed to analyse the data.

Demographic Analysis: Frequencies and percentages were calculated to understand the distribution of participants across various categories such as age, education level, income, and caste.

Knowledge Assessment: - Mean knowledge scores before and after the training were computed to gauge the extent of knowledge gain in poultry, goatry, and dairy sectors. This structured, multi-stage evaluation allowed for a clear picture of how well participants absorbed the training and applied new skills in real-life settings.

RESULTS AND DISCUSSION

The table no. 1 revealed profound gender gaps across all training types. In Poultry, men constitute 98.8per cent of participants, while women represent only 1.2per cent. In Goatry, men account for 90.6 per cent and women 9.4per cent, showing a somewhat higher female presence. Dairy showed a similar pattern to Poultry men at 97.7 per cent and women just 2.-3 per cent.[5]

Female Participation Skewed Toward OBC: Female trainees are almost exclusively from the OBC category. They account for 1.2per cent of Poultry, 9.4per cent of Goatry, and 2.3per cent of Dairy participants, all in the OBC category. Neither General, SC, nor ST categories had female participants—pointing to a significant intersectional divide vastly out number female counterparts.

Relative Advantage in Goatry for Women: Goatry stands out as the only domain where female participation reaches nearly 10per cent, significantly higher than in other fields. This might imply that Goatry training is more accessible or socially acceptable for women, perhaps due to its manageable scale or proximity to home an insight worth exploring for designing more inclusive programs.[6]

Caste-Based Patterns Within Male Participation: Among male trainees, the OBC category dominates across all programs: Poultry (47.6per cent), Goatry (32.8per cent), and Dairy (52.3per cent). General category participation is also substantial: Poultry (45.2per cent), Goatry (51.6per cent), and Dairy (38.6per cent). The SC category contributes moderately ranging from 6 to 7 per cent while ST participation sits at zero in all cases,

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highlighting possible exclusion or underrepresentation.

Broader Context: Women's Role vs. Visibility: Despite being critically involved in livestock-related chores feeding, milking, processing, and more Indian women remain underrepresented in formal training programs. Women constitute a major share of agricultural labour (up to 84per cent) and in dairy production (up to 94per cent)

Structural Barriers Remain Unaddressed: Women limited formal training representation can stem from multiple constraints—restricted mobility, domestic responsibilities, lack of tailored outreach, and educational gaps. Structural factors such as caste, gender norms, and education levels persist in shaping who gains access to these development opportunities.

It is depicted in Table-2, demographic Distribution of participant by Education, Family Structure, and Age Group in rural youth training program.

1. Education Levels: The dominant share of individuals holds secondary (47.2per cent) and graduation-level qualifications (45.1per cent), while only a small minority (7.8per cent) have completed only primary education.[7] Nationally, India's literacy rate stands at 80.9per cent, with rural literacy lagging at 77.5per cent and gender disparities remaining notable male literacy at 87.2per cent versus female literacy at 74.6per cent. Your data reflects a community where educational attainment is well above rural norms, especially at the tertiary (graduate) level.
2. Family Size Distribution: Most families are small (66.3per cent), with medium (27.5per cent) and large (6.2per cent) households being less common. Comparative studies indicate that the average Indian household size ranges between 5.2 and 5.5 members. A predominance of small households may signal urban familiarity, nuclear family orientation, or lower fertility highlighting shifting family structures.
3. Family Type: A strong majority (70.5per cent) reside in single (nuclear) family setups, while 29.5per cent belong to joint families. This aligns with broader trends: increasing nuclear family prevalence reflects socio-economic modernization and changing cultural norms.[8]
4. Age Demographics: The bulk of individuals are in the 31–45-year group (60.6per cent), followed by 20–30 years (27.5per cent), and above 45 years (11.9%). This indicates a remarkably young and potentially active-domestic segment, ideal for community programs, skill development, or workforce planning.
5. Annual income: - Majority are low-income: Nearly 41per cent of participants earn less than ₹1 lakh/year, placing them firmly in the lower-income rural group. Middle-income majority: The largest segment, at 45per cent, earns between ₹1–2 lakh/year—indicative of modest yet potentially improving livelihoods.[9] Small high-income cohort: Only 14per cent exceed ₹2 lakh/year—suggesting limited representation from better-off groups, possibly due to selection focus or outreach practices.

Most participants (70.5per cent) are marginal or small landholders, consistent with the national trend where between 80–86per cent of all agricultural holdings are under 2 ha Textbook Agriculture Institute. These smallholders own a disproportionate share of cultivated land, often just 35–47 per cent despite being the majority, highlighting unequal land distribution mint Agriculture Institute. Landlessness in your program (7.8per cent) closely mirrors the rural average (7–8per cent).

Table-.3 represented analysis of Knowledge Gain in Training Programs. The training programs across Poultry, Goatry, and Dairy demonstrate substantial impacts, with pre-evaluation knowledge levels improving markedly from 18per cent to 84per cent in Poultry, 21 per cent to 78per cent in Goatry, and 26 per cent to 81 per cent in Dairy indicating increases of approximately 66per cent, 57per cent, and 55 per cent, respectively.[10] These gains align closely with empirical results in similar contexts: for instance, a Tamil Nadu biosecurity training intervention in poultry yielded statistically significant knowledge gains immediately post-training and Krishi Vigyan Kendra-led dairy trainings in Punjab significantly boosted knowledge and adoption of scientific dairy practices Goat-farming training in Punjab also reported considerable improvements, with high-level knowledge surging from 2.4 per cent pre-training to 76.8 per cent post-training. Collectively, these findings underscore the effectiveness of structured vocational training in rapidly enhancing farmers' technical knowledge across livestock sectors.

Table no. 4 showed impact of vocational training program. Poultry Training (84 participants): 13per cent began new occupation post-training, while 19per cent experienced growth in an existing poultry-related livelihood.[11] Goatry Training (64 participants): 16per cent initiated new activities, and 20per cent enhanced their current goatry operations. Dairy Training (44 participants): Though the smallest cohort, 8per cent started a new dairy enterprise, and 12per cent expanded or improved their existing one.

CONCLUSIONS

This study validates the effectiveness of the vocational training programs offered by the Deendayal Research Institute's KVK in Ambajogai in enhancing rural resilience in Maharashtra's drought-prone Beed district. By providing hands-on training in poultry, goatry, and dairy, the KVK equips youth with the knowledge and confidence to diversify their livelihoods. Pre- and post-training assessments reveal significant technical capacity improvement, while follow-up calls demonstrate real-world outcomes—entrepreneurial engagement, increased income, and enhanced optimism

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Table-1: Farmer Participation in Vocational Training Programs

Training Type	Gender	Social category				Total (n / per cent)	Total (male + female)
		General (n / per cent)	OBC (n/per cent)	SC (n/per cent)	ST (n/per cent)		
Poultry (4)	Male	38 (45.23)	40 (47.62)	5 (5.95)	0 (0)	83 (98.8)	84
	Female	0 (0)	1 (1.2)	0 (0)	0 (0)	1 (1.2)	
Goatry (3)	Male	33 (51.56)	21 (32.81)	4 (6.25)	0 (0)	58(90.62)	64
	Female	0 (0)	6 (9.38)	0 (0)	0 (0)	6 (9.38)	
Dairy (2)	Male	17 (38.63)	23 (52.27)	3 (6.81)	0 (0)	43(97.72)	44
	Female	0 (0)	1 (2.28)	0 (0)	0 (0)	1 (2.28)	
Total	—	88 (45.59)	92 (47.66)	12 (6.21)	0 (0)	193(100per cent)	193

Figures given in parentheses indicate percentages.

Table-2: Demographic Distribution of the respondents in rural youth training program

Attribute	Category	Number
Education	Primary	15 (7.8per cent)
	Secondary	91 (47.2per cent)
	Graduation	87 (45.1per cent)
Family Size	Small	128 (66.3per cent)
	Medium	53 (27.5per cent)
	Large	12 (6.2per cent)
Family Type	Single	136 (70.5per cent)
	Joint	57 (29.5per cent)
Age Group	20–30 years	53 (27.5per cent)
	31–45 years	117 (60.6per cent)
	Above 45 years	23 (11.9per cent)
Land Holding	Marginal (≤1 ha)	50 (25.9per cent)
	Small (1–2 ha)	86 (44.55per cent)
	Semi-medium (2–4 ha)	25 (12.95per cent)
	Medium (4–10 ha)	17 (8.8per cent)
	Large (>10 ha)	0 (0per cent)
	Landless	15 (7.8per cent)
Annual Income	Upto 1 lakhs	79 (40.94per cent)
	1 to 2 lakhs	87 (45.07per cent)
	Above 2 lakhs	27 (13.99per cent)

Figures given in parentheses indicate percentages.

Table-3: Knowledge Gain in Training Programs

Type of Training	Pre-Evaluation (per cent)	Post-Evaluation (per cent)	Per cent Knowledge Increased (per cent)
Poultry (4)	18	84	66.0
Goatry (3)	21	78	57.0
Dairy (2)	26	81	55.0

Table-4: Impact of KVK Vocational Training on Rural Youth

Training Type	Number of Participants	New Occupation Started After Training	Growth in Pre-existing Occupation
Poultry	84	11 (13 per cent)	16 (19 per cent)
Goatry	64	10 (16 per cent)	13 (20 per cent)
Dairy	44	4 (8 per cent)	5 (12 per cent)

Figures given in parentheses indicate percentages.

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