**Learning to Livelihood: Youth Training in Food Processing Technologies**

**Abstract**

This research paper is about the impact of food processing skill development training programmes conducted by Krishi Vigyan Kendra (KVK), Kota, aiming at empowering rural youth in the Hadoti region of Rajasthan. A total of 250 trainees participated in 15-days programmes held between 2021 to 2025, covering practical and theoretical knowledge in food preservation, processing, packaging, FSSAI registration and regulatory compliance. Results showed that 80% of participants rated the training as very good, and 76% felt well equipped to start their own enterprises. This training programmes enhances confidence, improved technical skills, and created awareness about government schemes such as MSME, PMKY, PM-FME, NABARD and entrepreneurial opportunities. This study highlights the importance of context-based, hands-on training in generating rural employment, reducing post-harvest losses, and promoting sustainable livelihoods.

*Keywords: - MSME, PMKY, PMFME, NABARD, skill development, Food processing*

**Introduction**

The food processing sector currently employs approximately 70.44 lakhs of the workforce in registered and unregistered food processing units **(MOFPI, 2022)**, of which majority of workers have not gone under any formal or informal skill training **(Ganguly *et al.,* 2019)**. Skill development through training has become increasingly critical in recent years, especially considering the growing shortage of skilled manpower across various sectors. Effective training initiatives play a key role in equipping individuals with the competencies required for emerging industries **(Kapila, 2015; Mehrotra *et al.,* 2014)**. The food processing sector in India is no exception to the need for skill development. As a predominantly agrarian nation, over 50% of India’s population relies on agriculture for their livelihood. Owing to diverse climatic conditions, Indian farmers cultivate a wide variety of crops across different seasons namely Rabi, Kharif, and Zaid. These crops are typically marketed and sold through government-regulated mandis

Most farmers lack adequate knowledge of food processing, preservation, and value addition techniques for their harvested grains, legumes, vegetables, and fruits. The processing level is around 2.2% in the case of fruits and vegetables, and 21% in meat and poultry products. For agricultural operations to be more diverse, chances for value addition to increase, and surplus to be created for exporting agro-food products, a strong and thriving food processing sector is necessary (Ministry of Food Processing Industries, 2022). This gap highlights the urgent need to equip them with practical skills in food processing to enhance the shelf life, market value, and profitability of their produce.

The food processing industry is the location where all food processing activities take place; it can be a large-scale industry or a small-scale home-based industry (Singh *et al.,* 2012)

Training is a planned and systematic effort to impart knowledge, improve skills, and develop the attitude of individuals, enabling them to perform specific jobs effectively and efficiently, **(Reddy, A.A., 2010)**

Training is a structured process involving a sequence of experiences and learning opportunities, where trainees are systematically exposed to specific materials, practices, or events to develop skills and knowledge. In the Hadoti region of Rajasthan, major crops include soybean, rice, garlic, coriander, amla, and orange. Processing these crops holds significant potential to enhance their value and extend their shelf life **(Tiwari *et al.,* 2016)** Apart from enhancing shelf life, processed products can be made available throughout the year, providing consistent access to consumers and economic benefits to producers. Comprehensive knowledge of food processing and value addition, along with packaging, labelling, FSSAI regulations, and food licensing, is crucial for emerging start-ups. Additionally, understanding trademark registration, SWOT analysis, market research, food safety standards, and various government schemes such as those offered by NABARD, DST, DIC, and RFC along with the ability to calculate cost-benefit ratios, plays a vital role in establishing and sustaining a successful enterprise.

Training plays a pivotal role in imparting food processing skills to youth, enabling them to establish their own enterprises and contribute to the nation’s GDP. In pursuit of youth skill development and self-empowerment, the Krishi Vigyan Kendra (KVK), Kota under Agriculture University, Kota, has conducted various training programmes focused on food processing. Feedback from these on

going trainings serves as a valuable tool to identify gaps and improve the quality and relevance of future sessions. The present study, therefore, aims to assess the extent of skill development achieved among youth through food processing training programmes

The main objectives of the study are: to understand the trainees’ opinions regarding the quality of the training programme to assess the level of skill

development achieved through demonstrations and practical training; and to evaluate the knowledge gained in food processing based on the subjects covered during the programme.

Picture

1: Hands on Training on Soya- Tofu



**Methodology**

A cross-sectional trial was conducted from February 2021 to February 2025, targeting trainees from the Kota, Baran, Jhalawar and Bundi districts of Rajasthan. During this period, 10 food processing training programmes were organized, each lasting 15 days. A total of 25 participants were enrolled in each programme, resulting in a sample size of 250 trainees. The training sessions included both theoretical lectures and daily hands-on demonstrations on local and regional crops like coriander, soyabean, garlic, amla, onion, orange, rice, and millets etc processed products. At the conclusion of each training programme, a structured questionnaire was administered to assess the participants' knowledge. Throughout the training, trainees developed various food products. The organoleptic properties such as appearance, colour, taste, texture, and mouthfeel of these products were evaluated and used as indicators of the trainees' skill acquisition. The collected data was analysed to determine the overall level of skill development achieved during the training.

**Result and Discussion**

Skill development was assessed using two key approaches:

1. Feedback from trainees on various aspects of the training programme, including the availability of equipment, machinery, and raw materials; the methods and steps followed during demonstrations; the expertise of the subject matter specialists; and the relevance and coverage of topics discussed during the training; and
2. Feedback from the master trainer regarding the trainee’s regularity, sincerity, discipline, involvement, concentration, and overall learning throughout the training period.

Table 1 the quality of the food processing training programmes was found to be highly effective, with 80% of the trainees rating them in the 'very good' category. The dedication of the staff, the quality of training materials, and the expertise of the master trainer and subject matter specialist were highly appreciated by the participants. Trainees also reported a noticeable increase in their confidence levels and work efficiency because of the training. There is a wide gap between skills needed and available. If India is to make its presence in the world market, then there is a need to bridge this gap as soon as possible. There is a huge gap in demand and supply market. A study conducted by Davis, Babu & Ragasa, 2020 observed that large proportion of participants in this study who rated the training quality as "very good" and reported improved confidence is consistent with these earlier findings. Addressing this skill gap is essential not only for individual empowerment but also for enhancing India's potential in agri-based exports and sustainable rural development.

**Table.1** Opinion of trainees regarding quality of food processing training

|  |  |  |
| --- | --- | --- |
| **n=250 Categories** | **Frequency** | **Percentage** |
| Very good | 200 | 80 |
| Good | 40 | 16 |
| Average | 10 | 4 |

Table 2the findings reveal that the food processing laboratory was well-equipped to conduct training sessions, featuring essential machinery such as a garlic peeler, garlic flakes machine, ginger peeler, mixer, amla juicer, dehydrator, oven, packaging machine, sealing machine, solar dryer, coriander processing machineries, Dough maker, Dough sheeter and a soya milk and Tofu manufacturing unit. As a result, 92.8% of the trainees expressed satisfaction with the availability of equipment and machinery. However, more than 7.2% of the participants reported that despite the presence of these machines, they lacked the confidence to operate them independently. According to **Kumar *et al.* (2021)**, the availability of machinery such as dehydrators, packaging units, and juicers not only improves the scope of practical demonstrations but also enhances the real-world relevance of training sessions. However, mere access to equipment is not sufficient; confidence in using these tools independently is equally important. Dixit & Ravichandran **(2023)** emphasize food processing industry is majorly composed of unorganized sector. Unorganized sector relies or engages local workforce. The local workforce is generally lacking in technical knowhow in basic hygiene and sanitary practices, storage of raw ingredients, food safety, product development, operational skills etc This finding supports our observation that 7.2% of participants lacked confidence despite equipment availability. According to **FAO (2020)**, confidence and competency in operating food processing machinery can be significantly improved through interactive, repetitive, and modular training approaches rather than lecture-based formats. The integration of skill-based learning models and mentorship in training programmes ensures that trainees not only understand operational procedures but also feel empowered to use modern equipment for enterprise development.

**Table 2** Availability of equipment’s, machineries, and furniture in food processing lab

|  |  |  |
| --- | --- | --- |
| **n=250 Categories** | **Frequency** | **Percentage** |
| Yes | 232 | 92.8 |
| No | 18 | 7.2 |

Table 3More than 88% of the trainees appreciated the methods and procedural steps used during the demonstrations in the training programme, while only 6% rated them as merely satisfactory. Trainees reported that the skill development programme was systematically organized, with timely availability of ingredients and well-prepared demonstrations conducted by the master trainers. As reported by **Ali & Thomas (2021)**, well-structured, hands-on demonstrations enhance skill retention and practical application, especially in food processing sectors where tactile learning is critical. The high appreciation (88%) of demonstrations in this study aligns with the findings of Singh**, K., & Kalra, R. K. (2021)**, Over 80% of rural trainees were satisfied with training timing, content, lecture-cum-discussion methods, distribution of literature, model farm visits, and use of audio‑visual aids. **(Rana *et al,* 2024)**. The economic potential of gastronomic agri-ecotourism in various traditional agricultural landscapes of different agroecosystems of India has also been investigated. Gastronomic agri-ecotourism has the potential to provide economic beneﬁts to traditional agricultural landscapes and agroecosystems while also promoting sustainable tourism practices. The results of an exploratory study on rural youth participation in nature-friendly agroecological regenerative farming and culinary agri-ecotourism initiatives are presented in this paper to increase the sustainability of conventional farming and food systems. This study, which was carried out in four different agroecological settings in India, sheds light on the opportunities and problems faced by rural youth, as well as their motivations.

**Table.3** Methods and steps of demonstrations and practical training

|  |  |  |
| --- | --- | --- |
| **n=250 Categories** | **Frequency** | **Percentage** |
| Good | 220 | 88 |
| Satisfactory | 15 | 6 |
| Poor | 15 | 6 |

Table 4Only 6% of the participants felt that the trainers needed to be more confidence in delivering their skills. In contrast, nearly 84% of the trainees rated the knowledge of the master trainers as 'very good' (Table 4). They acknowledged that the trainers demonstrated confidence and possessed appropriate skills for effective instruction. Most trainees reported that the knowledge and guidance provided by the master trainers significantly enhanced their own confidence, knowledge, and practical skills empowering them to consider starting their own business ventures. The food processing sector employs the highest number of people, with 20.05 million workers, accounting for 12.32% of the total employment share in the country (Annual Survey of Industries, 2018–19). So, this may be boosting the business venture attitudes of trainees. **Jamie and Oliver, (2020)** The agri entrepreneurship is in a nascent enterprise. Entrepreneurship has been recognized stage, which is influenced not only by technical as a critical driver of economic growth, job creation, factors, but also by whole lot of social and personal and overall social development. Therefore, India has dimensions. Business performance is determined by started entrepreneurship promotion rigorously, entrepreneurial competencies of the entrepreneurs through the “Self-reliant India” drive and launched According to **Kalyani, Dr. (2024).** knowledgeable and confident trainers significantly influence the learning environment, trainee satisfaction, and entrepreneurial intentions of participants. Trainees are more likely to retain knowledge and apply it practically when guided by well-prepared and skilled instructors.

|  |  |  |
| --- | --- | --- |
| **n=250 Categories** | **Frequency** | **Percentage** |
| Very good | 210 | 84 |
| Good | 25 | 10 |
| Average | 15 | 6 |

**Table 4. Master Trainer’s knowledge/ skills/ confidence throughout training**

Table 5Indicates that approximately 76% of the trainees believed they had acquired the essential prerequisites for initiating a start-up. This included knowledge of FSSAI registration, Packaging and marketing, branding, Cost calculation financial institutions, government schemes offering subsidies for establishing food processing units, as well as practical skills in various preservation techniques. Additionally, trainees learned to develop a wide range of products such as soy-based items, fruit squashes, jams, jellies, pickles, chutneys, vatis, Murabba, dehydrated powders, and more. **Sharma and Gill (2018)** The training was conducted to help rural women learn the techniques of preparing ready-to-serve beverage, pickles, squash, jam, leather etc. These were prepared from different fruits and vegetables which were grown in the local area or were seasonal like mango, apple, litchi, tomato, plum etc.

**Table.5** Impact of training through subject covered during training

|  |  |  |
| --- | --- | --- |
| **n=250 Categories** | **Frequency** | **Percentage** |
| Appropriate | 190 | 76 |
| Little appropriate | 35 | 14 |
| Not appropriate | 25 | 10 |

Training in agricultural extension refers to a planned and systematic process designed to impart knowledge, develop specific skills, and shape attitudes among participants—such as farmers and rural youth enable them to adopt new practices and technologies effectively( Davis, Babu & Ragasa (2020) Food processing training serves as a structured approach to facilitate learning among individuals, enabling them to acquire essential knowledge, practical skills, and the right mindset for enterprise development. The human resource requirement in the agriculture and food processing sectors is estimated to be about 37 percent of the total requirement in 2022 as compared to 47 percent in 2017 Asif (2000) emphasized that such training must address the real and practical needs of the trainees to be truly effective. Vocational education and skill development in food processing can significantly enhance rural livelihoods by improving household productivity, increasing income-generating opportunities, and boosting employability. These efforts not only empower individuals but also support food security and promote sustainable rural development

Skill development training in food processing was perceived as highly beneficial by the participants, particularly for income generation and self-empowerment. These trainings played a vital role in building the confidence of rural youth and enhancing their competencies in advanced techniques of food preservation, hygienic processing, value addition, modern packaging technologies, and compliance with food safety standards. The practical, hands-on approach fostered self-employment opportunities, which can significantly contribute to the socio-economic upliftment of individuals and communities. The training programmes were systematically organized, sequentially structured, and well-received by the participants. The curriculum was need-based and competency-driven, ensuring that trainees not only acquired technical skills but also achieved proficiency and entrepreneurial readiness. Active participation and engagement were observed throughout, with all trainees gaining substantial knowledge and hands-on expertise that could potentially transform their livelihoods and improve their overall quality of life.

These training initiatives were contextually designed to address the specific needs of the Hadoti region’s residents and farming communities, incorporating local crop-based processing technologies such as dehydration, fermentation, vacuum packaging, cold chain management, and value-added product development (e.g., fruit preserves, spice powders, soy-based products).To foster sustainable rural development and address post-harvest losses in the agriculture sector, such demand-driven, skill-oriented training programmes should be institutionalized and conducted regularly. The key challenges in food processing sector include inadequate infrastructural facilities, lack of comprehensive national level policy on FPI, ambiguous food safety laws, unavailability of trained manpower, inconsistency in central and state government policies (FICCI, 2010). By equipping rural youth with employable skills and entrepreneurial capabilities, these initiatives contribute not only to individual income security but also to national economic growth by reducing agricultural wastage, generating rural employment, and enhancing the Gross Domestic Product (GDP) through agri-based value chains.

**Conclusion and Recommendations**

The food processing skill development training conducted in the Hadoti region has proven to be highly impactful in fostering income generation, self-reliance, and socio-economic advancement among rural youth. The training effectively enhanced participants’ confidence and equipped them with practical, hands-on experience in food preservation, processing technologies, modern packaging methods, and regulatory compliance, including FSSAI norms. The structured and sequential nature of the training, coupled with a curriculum tailored to local needs, ensured that trainees not only learned essential techniques but also reached a level of operational efficiency and entrepreneurial readiness.

By addressing regional crop-specific value addition—such as the processing of soy products, dehydrated powders, fruit preserves, and spice blends—the programme demonstrated its alignment with real-world applications and market opportunities. The active participation and enthusiasm of the trainees reflected the relevance and practical utility of the training.

Krishi Vigyan Kendra’s (KVKs) play a vital role in rural development by empowering rural women through the dissemination of new knowledge, up-to-date information, and the development of practical skills essential for adopting modern agricultural technologies. These centres act as catalysts for change by conducting need-based vocational training programmes that significantly contribute to enhancing the confidence, self-reliance, and economic independence of rural women. By equipping them with hands-on experience in areas such as food processing, organic farming, livestock rearing, and value addition, KVKs enable women to become active participants in income-generating activities, thereby fostering sustainable rural livelihoods and socio-economic development. These initiatives have the potential to reduce post-harvest losses, create rural employment, and strengthen local food systems—ultimately contributing to the broader goal of rural industrialization and national economic growth through value-added agriculture.

**Technology Upgradation & Infrastructure Support**

Investments should be made to upgrade training infrastructure with modern food processing technologies (e.g., vacuum dryers, freeze dryers, food-grade packaging units) and digital tools (e.g., mobile-based training modules, AR demonstrations).

**Entrepreneurship & Market Linkages**

Post-training support in the form of incubation, mentorship, branding, and marketing should be provided to help youth transition from trainees to entrepreneurs. Linkages with e-marketplaces, FPOs, and agri-export zones will further enhance sustainability.

**Financial & Policy Incentives**

Access to credit, subsidy, and startup grants can accelerate the creation of agri-based micro-enterprises.

**Monitoring, Evaluation & Feedback Loop**

A robust monitoring system using mobile apps, feedback surveys, and periodic follow-ups should be established to assess the long-term impact on livelihoods, income levels, and business sustainability.

Disclaimer (Artificial intelligence)

Option 2:

Author(s) hereby declare that generative AI technologies such as Large Language Models, etc. have been used during the writing or editing of manuscripts. This explanation will include the name, version, model, and source of the generative AI technology and as well as all input prompts provided to the generative AI technology

Details of the AI usage are given below:

1. Chat gpt

2. Google

3.

**References:**

1. Ali, Syed Irfan1; Begum, Jarina1; Badusha, Mohammad2; Reddy, E. Srikaanth3; Rali, Padmavathi4; Lalitha, D. Lakshmi5 Journal of Family Medicine and Primary Care 11(11):p 7101-7105, November 2022. | DOI: 10.4103/jfmpc.jfmpc\_998\_22.
2. Annual Survey of Industries (2019), Unit level data collected from registered factories by Central Statistics office, Industrial Statistics Wing - Ministry of Statistics &Programme Implementation, Govt. of India.
3. Rana, Jai & Bisht, Ishwari & Mathur, Prem & Fadda, Carlo & Mittra, Sarika & Ahlawat, Sudhir & Vishwakarma, Harinder & Yadav, Rashmi. (2024). Involving Rural Youth in Agroecological Nature-Positive Farming and Culinary Agri-Ecotourism for Sustainable Development: The Indian Scenario. Sustainability. 16. 9417. 10.3390/su16219417.
4. Davis, K., Babu, S. C., & Ragasa, C. (2020). Agricultural Extension: Global Status and Performance in the 21st Century. Academic Press.
5. Davis, K., Babu, S. C., & Ragasa, C. (2020). *Agricultural Extension: Global Status and Performance in the 21st Century*. Academic Press.
6. FAO. (2020). Developing the knowledge, skills, and talent of youth to further food security and nutrition. Food and Agriculture Organization of the United Nations. <https://www.fao.org/3/ca7612en/CA7612EN.pdf>
7. FICCI. (2010), ‘Bottlenecks in Indian Food Processing Industry: Survey on Challenges in food processing industry’, Retrieved from: http://ficci.in/ Sedocument/20073/Food-Processing-Bottlenecks-study.pdf.
8. Ganguly, K., Gulati, A., & Von Braun, J. (2019), ‘Skill Development in Indian Agriculture and Food Processing Sectors: A Scoping Exercise’, 5-48. ZEF - Working Paper 183.
9. Kalyani, Dr. (2024). The Role of Technology in Education: Enhancing Learning Outcomes and 21st Century Skills. International Journal of Scientific Research in Modern Science and Technology. 3. 05-10. 10.59828/ijsrmst.v3i4.199.
10. Kapila, U. (2015). Indian Economy: Performance and Policies (15th ed.). Academic Foundation.
11. Prathibha, Surkanti & Prashanthi, Alam & Yadav, Khushboo & Reddy, R. Geetha. (2023). CHAPTER: 1 ROLE OF AGRICULTURE EXTENSION IN SUSTAINABLE RURAL DEVELOPMENT
12. Meena MS, Singh R, Meena HR, Meena BK. Impact assessment of training on food processing and preservation. Indian Journal of Social Research. 2012; 53(2):117-122.
13. Mehrotra, S., Gandhi, A., Saha, P., & Sahoo, B. K. (2014). Skills Development in India: The Vocational Education and Training System. Cambridge University Press.
14. Ministry of Food Processing Industries (MOFPI) (2022), Annual Report:2021-22, Government of India. 21-24. Retrieved from: https://www.mofpi.gov.in/sites/ default/files/mofpi\_annual\_report\_for\_web\_english.pdf
15. Ministry of Skill Development and Entrepreneurship (2022), Annual Report 2021-22, pg. 10.
16. Reddy, A. A. (2010). Training and Capacity Building for Farmers in India: An Evaluation. Indian Journal of Agricultural Economics, 65(3), 504–519.
17. Dixit-Bajpai, Preeti & Ravichandran, R. (2023). Bridging the Skill Gap in the Indian Food Processing Sector: A Review. International Journal of Manpower. 56. 25-52. 10.15613/fijrfn/2022/v9i2/217902.
18. Singh, S. P., Tegegne, F., & Ekanem, E. P. (2012), ‘The food processing industry in India: challenges and opportunities’, Journal of Food Distribution Research, 43(1): 81-89.
19. Tiwari M, Singh DK, Tripathi NN, Singh M. Post-harvest management and food processing. New Delhi: Himanshu Publications. 2016.
20. Singh, K., & Kalra, R. K. (2021). Satisfaction Level of Rural Youth Regarding Trainings on Practical Education in Agriculture. Indian Journal of Extension Education, 57(3), 77–80.
21. Jamie, P.G. & Oliver, E.R. (2020). Entrepreneurial competencies: A required skill for business performance. European Journal of Business and Innovation Research, 8 (3),50
22. Sharma, Surabhi & Gill, Jagjeet. (2018). Empowering rural women through food processing training: A case study..VOL. VIII, ISSUE SPECIAL(C) AUGUST 2018 An International Refereed, Peer Reviewed & Indexed Quarterly Journal in Science, Agriculture & Engineering
23. Ministry of Skill Development and Entrepreneurship (MSDE) (2022). *Annual Report 2021–22.* Government of India. <https://www.msde.gov.in>