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Measuring the Impact of Agri-Value Addition Training through a Training Effectiveness Index (TEI): Evidence from Self-Help Group Women in the Nimar Region of Madhya Pradesh

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Abstract

Women's empowerment through skill development and entrepreneurship is essential for achieving sustainable rural livelihoods. This study evaluated the impact of an agri-value addition training programme on technical skill development, psychological empowerment, and entrepreneurial readiness among Self-Help Group (SHG) women in Khandwa District, Madhya Pradesh. The programme was implemented under a project funded by the **Madhya Pradesh State Rural Livelihoods Mission (MPSRLM), District Khandwa**, and conducted jointly by **Dr. C. V. Raman University, Khandwa (CVRUK)** and the **Raman Incubation Centre for Food Processing** to enhance livelihood opportunities through value-added food processing and entrepreneurship.

A quasi-experimental pre-test–post-test research design was adopted with a purposive sample of 40 SHG women. The five-day training programme covered the production of onion powder, tomato powder, and taro powder, along with food safety, packaging, branding, and enterprise development. Data were collected using structured scales measuring technical skills, psychological empowerment, and entrepreneurial readiness before and after the intervention.

The findings revealed significant improvements across all dimensions. The mean technical skill score increased from 23.68 to 31.05, psychological empowerment from 29.21 to 35.42, and entrepreneurial readiness from 19.47 to 22.61. Paired sample t-test results confirmed that these improvements were statistically significant ($p < 0.001$). Correlation and regression analyses further indicated that technical skills and psychological empowerment positively influenced entrepreneurial readiness.

The study proposes a **Training-to-Enterprise Empowerment Model**, demonstrating how skill acquisition contributes to entrepreneurial orientation and livelihood enhancement. The findings suggest that government–university collaborative agri-value addition programmes can effectively promote women's empowerment, micro-enterprise development, and sustainable rural livelihoods through SHG-based interventions.

Keywords: Women Empowerment, SHGs, Agri-Value Addition, Entrepreneurship, Rural Livelihoods, MPSRLM.

Introduction

Women's empowerment through skill development and entrepreneurship has become a key priority in rural development initiatives across India. Self-Help Groups (SHGs) play a vital role in enhancing livelihood opportunities, financial inclusion, and socio-economic empowerment among rural women. Agri-value addition, particularly the processing of locally available agricultural produce into marketable products, offers significant potential for income generation and enterprise development. However, the effectiveness of such training programmes is often assessed through participation rather than measurable outcomes.

The present study evaluates the impact of a five-day agri-value addition training programme conducted for SHG women in the Nimar region of Madhya Pradesh. Using a Training Effectiveness Index (TEI), the study examines changes in technical skills, psychological empowerment, and entrepreneurial readiness before and after the intervention. By quantifying training outcomes and exploring their contribution to enterprise development, the study provides empirical evidence on how skill-based interventions can support sustainable livelihoods and women-led rural entrepreneurship.

Literature Review

Kabeer (1999) conceptualized women's empowerment as the process through which individuals gain the ability to make strategic life choices. The study emphasized that access to resources, agency, and achievements are fundamental dimensions of empowerment, particularly for rural women participating in livelihood activities.

Swain and Wallentin (2009) examined the role of Self-Help Groups (SHGs) in women's empowerment and reported that participation in SHGs significantly enhanced women's confidence, decision-making ability, and economic independence. Their findings highlighted SHGs as effective platforms for social and economic transformation.

Agarwal (2018) reported that skill development programmes contribute significantly to livelihood enhancement by improving technical competencies and income-generating opportunities among rural women. The study emphasized the importance of practical and market-oriented training interventions.

Rao and Singh (2020) investigated agri-value addition initiatives among rural women and found that processing agricultural products into value-added commodities increased household income and reduced post-harvest losses. The authors suggested that training in food processing and packaging can strengthen rural entrepreneurship.

Sharma et al. (2021) observed that entrepreneurship training programmes positively influence entrepreneurial intention and business readiness among women beneficiaries. The study revealed that technical knowledge alone is insufficient and should be complemented by confidence-building and motivational components.

Patel and Verma (2022) examined the relationship between psychological empowerment and entrepreneurial behaviour among women entrepreneurs. Their findings indicated that self-efficacy, confidence, and decision-making ability significantly predict entrepreneurial readiness and enterprise development.

Kumar and Mishra (2023) highlighted the importance of integrated training models that combine technical skills, enterprise development, and market linkage support. The study concluded that such interventions create sustainable livelihood opportunities and enhance women's participation in local economies.

Collectively, the reviewed literature indicates that skill development, psychological empowerment, and entrepreneurial readiness are closely interconnected determinants of women's economic empowerment. However, limited studies have quantitatively measured the effectiveness of agri-value addition training using a Training Effectiveness Index (TEI), particularly among SHG women in the Nimar region of Madhya Pradesh. The present study attempts to address this gap by examining the impact of a structured agri-value addition training programme on technical skills, psychological empowerment, and entrepreneurial readiness through a pre-test–post-test evaluation framework.

RESEARCH GAP

- Most studies on SHG women focus on skill training outcomes but do not systematically measure training effectiveness using a composite **Training Effectiveness Index (TEI)**.
- Existing research primarily emphasizes economic empowerment, while the role of **psychological empowerment** in entrepreneurial development remains underexplored.
- Limited studies have simultaneously examined **technical skills, psychological empowerment, and entrepreneurial readiness** within a single analytical framework.
- Few studies have employed a **pre-test–post-test quasi-experimental design** to assess the actual impact of agri-value addition training interventions.
- Research on value-added processing of locally available crops such as **onion, tomato, and taro (Colocasia)** among SHG women is scarce.
- There is a lack of evidence on how improvements in technical skills translate into **entrepreneurial intention and enterprise readiness** among rural women.
- Most training programmes are evaluated based on participation and attendance rather than measurable behavioural and entrepreneurial outcomes.
- Limited empirical studies have proposed a **Training-to-Enterprise Empowerment Model** linking skill development, psychological empowerment, and entrepreneurial readiness.
- Research specific to the **Nimar region of Madhya Pradesh** on agri-value addition and women-led rural entrepreneurship remains inadequate.
- There is a need for evidence-based frameworks that can guide policymakers in designing integrated livelihood and entrepreneurship programmes for SHG women.

OBJECTIVES OF THE STUDY

- To evaluate the impact of agri-value addition training on technical skill development among SHG women.
- To assess changes in psychological empowerment after training.
- To determine entrepreneurial readiness among participants.
- To examine the relationship between skill development and entrepreneurial intention.
- To develop a Training-to-Enterprise Empowerment Model for rural women.

HYPOTHESES

H1: Agri-value addition training significantly improves technical skills among SHG women.
H2: Agri-value addition training significantly enhances psychological empowerment.
H3: Psychological empowerment positively influences entrepreneurial readiness.
H4: Skill development significantly predicts entrepreneurial intention.
H5: Entrepreneurial readiness positively contributes to enterprise formation and income generation.

METHODOLOGY

Research Design

The study adopted a **Quasi-Experimental One Group Pre-test–Post-test Design** to evaluate the effectiveness of a five-day Agri-Value Addition Training Programme conducted for women Self-Help Group (SHG) members. The design enabled the assessment of changes in technical skills, psychological empowerment, and entrepreneurial readiness before and after the intervention.

Research Design Structure

Group	Pre-Test	Training Intervention	Post-Test
SHG Women	O_1	X	O_2

Where:

- O_1 = Baseline Assessment
- X = Five-Day Training Programme
- O_2 = Post-Training Assessment

Sample Design

Table1. Research Methodology Framework

Particulars	Description
Research Design	Quasi-Experimental One Group Pre-test–Post-test Design
Study Area	Khandwa District, Madhya Pradesh, India
Target Population	Women Self-Help Group (SHG) Members
Sample Size	40 SHG Women
Sampling Technique	Purposive Sampling
Training Duration	5 Days
Training Hours	30 Hours (6 Hours per Day)

Assessment Points	Pre-test (Day 1) and Post-test (Day 5)
Data Collection Method	Structured Questionnaire and Observation
Total Variables Assessed	3 Major Variables
Statistical Software	SPSS Version 26

Inclusion Criteria

- Active SHG membership
- Interest in food processing activities
- Availability during the entire training period
- Consent to participate in the study

Training Intervention

The intervention consisted of a structured five-day training programme.

Module	**Hours**
Onion Powder Production	5
Tomato Powder Production	5
Taro Powder Production	5
Food Safety & Hygiene	4
Packaging & Branding	4
Marketing & Enterprise Development	5
Practical Assessment	2
Total	**30 Hours**

Research Instruments

A. Technical Skill Assessment Scale

The Technical Skill Assessment Scale consisted of 7 statements related to food processing knowledge, raw material selection, hygiene practices, drying processes, machine handling, and packaging awareness.

- Possible Score Range: 7–35
- Observed Pre-test Range: 17–31
- Observed Post-test Range: 25–36

Higher scores indicate better technical competency.

B. Psychological Empowerment Scale

This scale included 8 statements measuring self-confidence, self-efficacy, decision-making ability, motivation, risk-taking attitude, and financial participation. Responses were measured on a 5-point Likert scale.

- Possible Score Range: 8–40
- Observed Pre-test Range: 19–38
- Observed Post-test Range: 29–40

Higher scores indicate greater psychological empowerment.

Table 2 Structure of Measurement Scales

Construct	No. of Items	Maximum Score
Technical Skill Development	7	35
Psychological Empowerment	8	40
Entrepreneurial Readiness	5	25
Total	20	100

Statistical Results

1. Paired Sample t-test (Pre vs Post Comparison)

Table 3 Pre-test and Post-test Comparison

Variable	Pre Mean	Post Mean	Mean Difference	t-value	p-value	Result
Technical Skill	23.68	31.05	+7.37	13.84	< 0.001	Significant
Psychological Empowerment	29.21	35.42	+6.21	11.27	< 0.001	Significant
Entrepreneurial Readiness	19.47	22.61	+3.14	6.52	< 0.001	Significant

Interpretation

- Technical Skill scores showed a significant increase after training, indicating improved food processing and operational competencies.
- Psychological Empowerment also improved significantly, reflecting higher confidence, decision-making ability, and self-efficacy among SHG women.
- Entrepreneurial Readiness increased significantly, suggesting greater preparedness to start and manage micro-enterprises.

Correlation Analysis (Skill vs Entrepreneurial Readiness)

Table 4 Pearson Correlation Matrix

Variables	Technical Skill	Psychological Empowerment	Entrepreneurial Readiness
Technical Skill	1.000	0.71**	0.64**
Psychological Empowerment	0.71**	1.000	0.68**
Entrepreneurial Readiness	0.64**	0.68**	1.000
**** p < 0.01**			

Interpretation

- Technical Skill had a strong positive correlation with Entrepreneurial Readiness ($r = 0.64$, $p < 0.01$).
- Psychological Empowerment also showed a strong positive relationship with Entrepreneurial Readiness ($r = 0.68$, $p < 0.01$).
- The findings indicate that higher skill levels and greater psychological empowerment are associated with stronger entrepreneurial intention among SHG women.

Regression Analysis (Training → Skill → Entrepreneurial Readiness)

Table 5 Multiple Regression Analysis

Predictor	Beta (β)	t-value	p-value
Technical Skill	0.43	3.92	< 0.001
Psychological Empowerment	0.51	4.37	< 0.001

Model Summary

- $R^2 = 0.58$
- $F = 24.16$, $p < 0.001$

Interpretation

- The regression model explained 58% of the variance in Entrepreneurial Readiness.
- Both Technical Skill and Psychological Empowerment significantly predicted entrepreneurial readiness.
- Psychological Empowerment emerged as the stronger predictor ($\beta = 0.51$), followed by Technical Skill ($\beta = 0.43$).

Training Effectiveness Index (TEI)

Using the formula:

$$TEI = \frac{Post - Pre}{Maximum\ Score} imes 100$$

Table 6 Training Effectiveness Index

Variable	Pre Mean	Post Mean	Maximum Score	TEI (%)	Impact Level
Technical Skill	23.68	31.05	35	21.06%	Moderate Impact
Psychological Empowerment	29.21	35.42	40	15.53%	Moderate Impact
Entrepreneurial Readiness	19.47	22.61	25	12.56%	Low–Moderate Impact
Overall TEI				16.38%	Moderate Impact

Overall Interpretation

The five-day agri-value addition training programme had a statistically significant and practically meaningful impact on SHG women. The training substantially improved technical skills, psychological empowerment, and entrepreneurial readiness. Strong positive relationships among these variables indicate that skill enhancement and psychological strengthening together contribute to entrepreneurial development among rural women.

Results and Findings

Objective 1: To evaluate the impact of agri-value addition training on technical skill development among SHG women

The findings revealed a substantial improvement in the technical skills of SHG women following participation in the five-day agri-value addition training programme. The mean technical skill score increased from **23.68 (Pre-test)** to **31.05 (Post-test)**, indicating enhanced knowledge and practical competencies related to onion powder, tomato powder, and taro powder production, food safety, packaging, storage, and marketing practices.

The paired sample t-test demonstrated a statistically significant difference between pre-test and post-test technical skill scores (**$p < 0.001$**). The results confirm that the training programme effectively strengthened the technical capabilities of the participants and improved their readiness to undertake value-added food processing activities.

Hypothesis H1 was accepted, indicating that agri-value addition training significantly improves technical skills among SHG women.

Objective 2: To assess changes in psychological empowerment after training

The study observed a notable improvement in the psychological empowerment of SHG women after the training intervention. The mean psychological empowerment score increased from **29.21 (Pre-test)** to

35.42 (Post-test), reflecting enhanced self-confidence, self-efficacy, motivation, decision-making ability, and willingness to engage in economic activities.

The paired sample t-test revealed a statistically significant difference between pre-training and post-training psychological empowerment scores (**$p < 0.001$**). These findings suggest that the training programme not only enhanced technical competencies but also strengthened the psychological and social dimensions of empowerment among the participants.

Hypothesis H2 was accepted, confirming that agri-value addition training significantly enhances psychological empowerment among SHG women.

Objective 3: To determine entrepreneurial readiness among participants

The results indicated a significant increase in entrepreneurial readiness among the trained SHG women. The mean entrepreneurial readiness score increased from **19.47 (Pre-test)** to **22.61 (Post-test)**. The participants demonstrated greater confidence in starting micro-enterprises, marketing processed products, identifying business opportunities, and generating additional income through value-added agricultural products.

The statistical analysis confirmed that the observed improvement was significant (**$p < 0.001$**), indicating that the training programme successfully fostered an entrepreneurial mindset among the participants.

The findings demonstrate that the training intervention positively contributed to entrepreneurial readiness among SHG women.

Objective 4: To examine the relationship between skill development and entrepreneurial intention

Correlation analysis revealed a strong positive relationship between technical skill development and entrepreneurial readiness. The Pearson correlation coefficient indicated that participants with higher technical skill scores were more likely to exhibit stronger entrepreneurial intentions and greater readiness to establish income-generating enterprises.

Furthermore, regression analysis demonstrated that technical skill development significantly predicted entrepreneurial readiness (**$\beta = 0.43$, $p < 0.001$**). These findings suggest that the acquisition of technical competencies plays a critical role in motivating SHG women to explore entrepreneurial opportunities and engage in enterprise development activities.

Hypothesis H4 was accepted, indicating that skill development significantly predicts entrepreneurial intention among SHG women.

Objective 5: To develop a Training-to-Enterprise Empowerment Model for rural women

Based on the empirical findings, a Training-to-Enterprise Empowerment Model was developed to explain the pathway through which training contributes to women's empowerment. The model demonstrates that agri-value addition training enhances technical skills, which subsequently improve psychological empowerment and entrepreneurial readiness. These factors collectively increase the likelihood of enterprise formation and income-generation opportunities among rural women.

The model highlights the transformative role of capacity-building programmes in converting SHG women from passive beneficiaries into active economic participants and potential entrepreneurs.

Proposed Training-to-Enterprise Empowerment Model

Training → Technical Skill Development → Psychological Empowerment → Entrepreneurial Readiness → Enterprise Formation → Income Generation → Women Empowerment

Hypothesis H3: Psychological empowerment positively influences entrepreneurial readiness

The analysis revealed a significant positive association between psychological empowerment and entrepreneurial readiness. Women who reported higher levels of self-confidence, decision-making

ability, and self-efficacy also demonstrated greater readiness to initiate entrepreneurial activities. The correlation coefficient indicated a strong positive relationship (**r = 0.68, p < 0.01**), suggesting that psychological empowerment is an important determinant of entrepreneurial behaviour.

Hypothesis H3 was accepted, indicating that psychological empowerment positively influences entrepreneurial readiness among SHG women.

Hypothesis H5: Entrepreneurial readiness positively contributes to enterprise formation and income generation

The findings suggest that entrepreneurial readiness serves as a critical precursor to enterprise formation and income-generation potential. Participants who exhibited higher entrepreneurial readiness scores expressed greater willingness to establish micro-enterprises, market value-added products, and diversify household income sources. Although long-term enterprise outcomes require follow-up assessment, the present results indicate a strong foundation for future entrepreneurial engagement.

Hypothesis H5 was supported, suggesting that entrepreneurial readiness positively contributes to enterprise formation and income generation potential among rural women.

Policy Implications (One-Line Points)

1. Skill development programmes should be integrated with entrepreneurship training to facilitate enterprise creation among SHG women.
2. Government agencies should promote SHG-based agri-value addition enterprises for sustainable rural livelihoods.
3. Market linkage, branding, packaging, and digital marketing support should be provided to enhance product competitiveness.
4. Easy access to microcredit, startup grants, and financial assistance should be ensured for women entrepreneurs.
5. Training programmes should incorporate psychological empowerment components such as confidence building and leadership development.
6. Rural processing and incubation centers should be established to provide technical and business support to SHG women.
7. The Training-to-Enterprise Empowerment Model can be adopted as a framework for women-centric livelihood development programmes.
8. Scaling up agri-value addition training can contribute to women empowerment, income generation, and sustainable rural development.

CONCLUSION

The study concludes that the five-day agri-value addition training programme significantly improved the technical skills, psychological empowerment, and entrepreneurial readiness of SHG women in Khandwa district. The findings indicate that training in value-added food processing not only enhances practical competencies but also strengthens self-confidence and entrepreneurial motivation among rural women. The proposed Training-to-Enterprise Empowerment Model highlights the pathway through which skill development can lead to enterprise creation and income-generation opportunities. Therefore, agri-value addition training can serve as an effective strategy for promoting women empowerment, rural entrepreneurship, and sustainable livelihood development.

FUTURE RESEARCH DIRECTIONS

- Conduct longitudinal studies to examine the long-term impact of training on enterprise establishment and income generation.
- Include larger sample sizes and participants from multiple districts or states to improve the generalizability of findings.
- Compare trained and untrained SHG women using a control-group research design.
- Investigate the role of market linkages and supply chain support in sustaining women-led enterprises.
- Assess the effectiveness of digital marketing and e-commerce platforms in promoting SHG products.
- Examine the influence of financial literacy, credit access, and government support schemes on entrepreneurial success.
- Evaluate the economic viability and profitability of value-added products such as onion, tomato, and taro powder.
- Study consumer acceptance, product quality, shelf life, and branding strategies for agri-value-added products.
- Explore the mediating role of psychological empowerment in transforming skills into entrepreneurial outcomes.
- Develop and validate comprehensive women entrepreneurship and empowerment models for rural livelihood promotion.

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