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The Performance of Women's Empowerment in Moringa Processing Using the CIPP Model Evaluation

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Abstract

Moringa processing contributes significantly to public health, sustainable agriculture, and food security. This study evaluated the women's empowerment program implemented by KWT Roay Lestari in Tasikmalaya City using the Context–Input–Process–Product (CIPP) framework and a mixed-methods approach. Key informants—program leaders, members, and consumers—were selected through purposive sampling. Data were collected through observation, structured interviews, and documentation, and analyzed using OriginLab 2024, IBM SPSS Statistics 25, and Statistics 8.1. The findings reveal that the program had a positive influence on women's educational awareness, economic conditions, and household food security. Despite financial and time constraints, participants demonstrated a strong commitment to skill development and social interaction. Increased female participation enhanced technical skills, raised income levels, and expanded the use of moringa-based products in local diets. Growing consumer trust and demand further indicate the program's effectiveness. However, limited infrastructure, particularly the lack of adequate storage and grinding equipment, remains a significant challenge. While training has improved product quality and encouraged creativity, further innovation in food preservation is needed to ensure long-term market sustainability. Overall, the program demonstrates strong relevance and impact in promoting agricultural development and women's economic empowerment. Strengthening training, infrastructure, stakeholder collaboration, and investment in processing technology is essential for sustainable growth and scalability.

Keywords: Agricultural economy, sustainable growth, KWT Human Development.

1. Introduction

The empowerment of women has become a central focus in international development discourse, particularly within rural economies where gender inequalities persist. In many low- and middle-income countries, women play a critical role in agricultural production and value addition; however, their contributions are often undervalued and insufficiently supported. Empowerment initiatives

encompassing access to resources, participation in decision-making, and skill development are increasingly recognized as key drivers of economic resilience, food security, and overall community well-being. Women's empowerment in agriculture is a crucial determinant of sustainable development, food security, and economic resilience. In many rural communities, women play a vital role in agricultural production and value chains; however, they continue to face systemic barriers, including limited access to productive resources, technical training, financial services, and market opportunities. ([1]). Moringa ([2]), often referred to as the "Miracle Tree," has gained recognition for its nutritional, medicinal, and economic benefits ([3] [4]). Its cultivation and processing present an opportunity for women to engage in value-added agricultural activities, improving their livelihoods and contributing to local economies.

Economic instability has contributed to rising levels of unemployment and poverty in Indonesia [5]. Empowering women has become a key component of sustainable economic growth, especially in the agricultural and rural sectors [6]. Women contribute significantly to worldwide value-added businesses, food processing, and agricultural production. They frequently encounter socioeconomic obstacles that restrict their access to resources and their ability to participate in decision-making [7]. Addressing these challenges through targeted empowerment initiatives can lead to improved household welfare, enhanced community resilience, and more sustainable livelihoods [8]. Women's empowerment is an effort to achieve equality of roles, access, and control for women and men in all areas of development [9].

In a community development context, empowerment involves strengthening the ability of individuals and groups to recognize their capacities, identify challenges, and take collective action to address them [10]. Achieving the Sustainable Development Goals (SDGs), particularly those related to food security (SDG 2), economic growth (SDG 8), and gender equality (SDG 5), depends on empowering women in agriculture. Women become essential to social and economic change as they have greater access to resources [11]. The women's empowerment program implemented by the government and society today is an effort to continue understanding the creation and distribution of development benefits for women and men [12]. To create equality between men and women, or gender equality, various efforts were made, including developing family businesses to achieve gender equality between men and women in the family, to build and develop the family economy [13].

One such initiative is the empowerment of women through the processing of Moringa plants, which capitalizes on the plant's economic and nutritional potential to promote women's self-sufficiency and income generation. Supporting women in achieving financial independence through engagement in Moringa processing has a positive impact on overall community well-being, children's educational opportunities, and household nutritional outcomes [14] [15]. Women's participation in Moringa processing is still restricted despite its potential because of gender-based barriers [16]. It is commonly known that moringa (*Moringa oleifera*) has economic, medical, and nutritional benefits [17]. Empowerment provides residents with resources, opportunities, knowledge, and skills to increase their ability to determine their future and influence their communities' lives [18][19]. Empowerment is building power by encouraging, motivating, and raising awareness of their potential, and trying to imagine it [4].

The CIPP (Context, Input, Process, and Product) model provides a structured framework for evaluating empowerment programs, ensuring that interventions are assessed for their relevance, effectiveness, and sustainability [2]. Applying this model to women's empowerment in Moringa processing allows for a comprehensive analysis of how training, infrastructure, market access, and policy support influence women's economic independence and agricultural success.

Despite the growing recognition of Moringa's potential in economic development, there is limited research on its role in women's empowerment through agricultural processing [20]. Existing studies

primarily focus on Moringa's nutritional benefits and its cultivation techniques [4]. While some research has examined community empowerment through Moringa cultivation, there is a lack of systematic evaluation using established models like CIPP to assess the effectiveness of empowerment programs [4].

Despite increasing interest in moringa-related business initiatives, limited research has thoroughly assessed empowerment results utilizing strong frameworks such as the CIPP model. Current research typically emphasizes economic metrics while overlooking wider aspects like agency, leadership, and sustainability.

This study examines the contextual relevance, resource contributions, implementation procedures, and resulting outcomes of empowerment programs. It further provides practical recommendations for stakeholders involved in agricultural development, gender equity, and rural entrepreneurship.

To systematically evaluate the impact of women's empowerment in Moringa processing and to generate insights into its effectiveness and sustainability in fostering social and economic development at KWT Roay Lestari, Tawang District, Tasikmalaya, this study adopts the CIPP (Context, Input, Process, and Product) evaluation model (Figure 1)

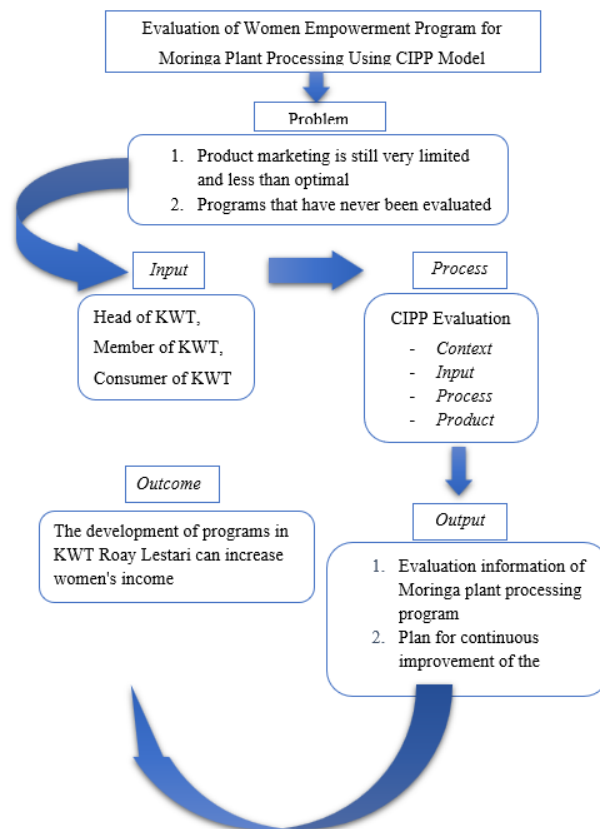


Figure 1. Research Framework

This research provides a scientific foundation for evaluating women's empowerment in Moringa processing using the CIPP model. By addressing existing gaps in infrastructure, policy support, and market accessibility, this study contributes to the advancement of gender-inclusive agricultural development. The findings are expected to inform future interventions, policy formulations, and

investment strategies, thereby ensuring that women farmers receive the necessary institutional and structural support to thrive within the Moringa value chain.

2. Methods

2.1 Research Type

This study employed a descriptive qualitative approach, aimed at systematically examining the research phenomenon without falsifying or manipulating the data related to the variables under investigation. Data were collected through direct interviews [21]. The study adopts a descriptive qualitative design to provide a comprehensive and in-depth analysis of the Women’s Empowerment Program in Moringa processing, utilizing the CIPP (Context, Input, Process, and Product) model as its evaluative framework.

2.2 Research Location

The research was conducted in KWT Roay Lestari in Kahuripan, Tawang District, Tasikmalaya City. The duration of this research is 3 months from February to May 2025.

2.3 Data and Data Resource

The primary object of this study is the outcome of the CIPP evaluation. The findings are intended to serve as a basis for reflection and improvement in future program implementation. In addition to individuals, the population encompasses all relevant attributes and characteristics of the subjects and context under investigation, rather than merely their numerical representation. Accordingly, this study focuses on evaluating the Women’s Empowerment Program in Moringa processing through the application of the CIPP (Context, Input, Process, and Product) model.

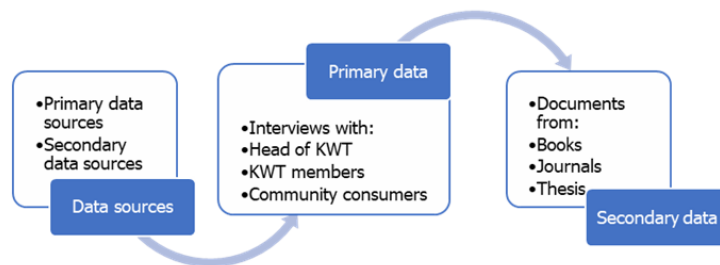


Figure 2. The CIPP (Context, Input, Process, and Product) model

2.4 Data Gathering Technique

The subjects of this study served as the primary sources of data for addressing the research problem. In this context, data sources refer to individuals, objects, or phenomena that provide relevant information during the data collection process. This study employed a purposive sampling technique, in which participants were selected based on specific, predefined criteria relevant to the research objectives [22]. Accordingly, the study participants included the Head of KWT, Tatun Qonitaton, members of the KWT management team, and representatives of KWT consumers.

Table 1. Research Informants assigned for activity progressions.

Name	Role	Code
Tatun Qonitaton	Head of KWT	TQ
Suryani	Member of KWT	SN

Cicin Cutyadin	Member of KWT	CC
Sumiyanti	Member of KWT	SM
Kintan Nurlaila	Consumer of KWT	KN
Ayi Sadiyah	Consumer of KWT	AS
Umi Sriwahyuni	Consumer of KWT	US

Table 2. Data collection techniques.

Data collection technique	Definition & Reference	Implementation in the study	Documentation
Observation	The process of observation involves several biological and psychological elements.	To document the execution of the moringa plant processing program, the researcher monitored KWT Roay Lestari.	- Activity locations
Interview	An interview is a discussion intended to gather information between an interviewer and an interviewee.	The researcher gathered information at KWT using structured interviews and a prepared guide sheet.	- Interviews with research informants
Documentation	Images and recordings that provide information are examples of documentation.	The researcher took photographs and recorded the informant interviews.	- Activity locations - Interviews - Program activities

2.5 Data Gathering Technique

A systematic checklist was employed to observe the KWT Royal Lestari moringa processing site for around 180 minutes across three sessions. Interviews were conducted with six informants, each lasting 30–45 minutes, using a structured guide and recorded with their permission. The documentation comprised images, recordings, and historical materials gathered during observation and interview processes to enhance triangulation and provide contextual richness [10].

2.6 Data Analysis

The data analysis process involved the systematic collection of information obtained from multiple sources. The analytical technique employed was thematic analysis, which is consistent with a descriptive qualitative approach. Thematic analysis was employed to identify, analyze, and interpret the significant patterns and recurring themes that emerged from the interview data. Through this method, the researchers gained an in-depth understanding of the processes and practices involved in Moringa leaf processing [22].

Pre-field stage: A field survey was conducted to identify the research focus and problems. Designing a field plan, selecting a research location, obtaining permits, exploring locations, selecting information, and preparing research equipment while considering ethical aspects [11]. **Fieldwork stage:** The researchers collect data through observations, interviews, and document studies with various parties involved. **Data analysis:** Data analysis begins immediately after data collection. Data analysis begins with problem formulation and continues through to the writing of the research report. The final output includes notes, interview results, documentation, and recordings, all compiled systematically [4].

Qualitative research involves the collection of data through observation, in-depth interviews, documentation, and the integration of these techniques through triangulation [10]. Data were gathered over an extended period, ranging from several days to several months, resulting in a rich and comprehensive dataset. In the initial phase of the study, the researchers explored the social context and

phenomena under investigation by systematically recording all relevant observations and information obtained from the field.

Data reduction involves selecting the most relevant information, focusing on key aspects, and identifying themes and patterns emerging from the informants' responses. The reduced data provide a clearer and more organized representation of the findings, thereby facilitating subsequent data collection and retrieval when necessary. This process aims to classify and refine the data into conceptual units, categories, or specific themes [22]. The organized data are then presented in a structured and easily interpretable format. At this stage, the researcher presents data related to women's empowerment programs, applying the CIPP model. Data obtained from various sources were further processed for analysis and visualization using OriginLab (2024), IBM SPSS Statistics 25, and Statistics 8.1.

3. Results and Discussion

3.1 Results

KWT Roay Lestari conducted a moringa cultivation activity that consisted of maintenance, planting/cultivation, seeding/seedling, and preparing the planting medium (Figure 3 and Figure 4).

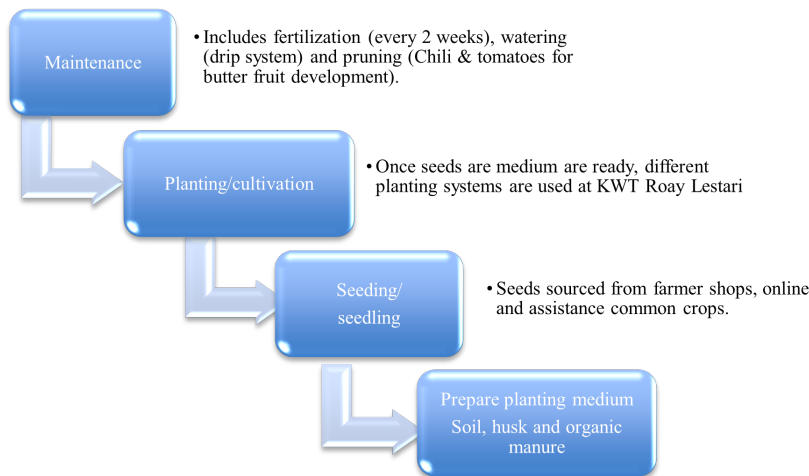


Figure 3. Activities outline among selected groups.



Figure 4. Internal group activities regarding the initiation of cultivation processing.

3.2 Evaluating Women's Empowerment in Moringa Processing Using the CIPP Model

3.2.1 Identification of needs

An assessment of the needs of KWT members reveals key challenges, motivations for participation, and levels of awareness regarding the benefits of Moringa. The first figure indicates that the most critical constraints faced by members are limited financial resources (36.36%) and time constraints (36.06%), while lower levels of public awareness of Moringa (18.01%) and communication barriers (9.03%) represent less significant challenges. The second figure demonstrates that the primary motivation for joining KWT is the opportunity to acquire new knowledge and skills (41.8%), followed by the desire to expand social networks (28.2%), overcome inactivity or a lack of engagement (17.3%), and obtain economic benefits through product sales (12.7%). The third set of data shows that all respondents (100%) have recently become aware of the benefits and food-processing potential of Moringa, while 66.67% specifically identified its high nutritional value.

These findings suggest that while financial and time constraints are significant impediments for KWT members, their primary motivation is learning and social involvement. Economic benefits are prioritized less, implying that improved financial assistance and time management strategies are needed. While awareness of Moringa's benefits is growing, there is still a need for further information on its nutritional value. Addressing these needs through focused training, financial aid, and promotional initiatives may increase participation and affect (Figure 5).

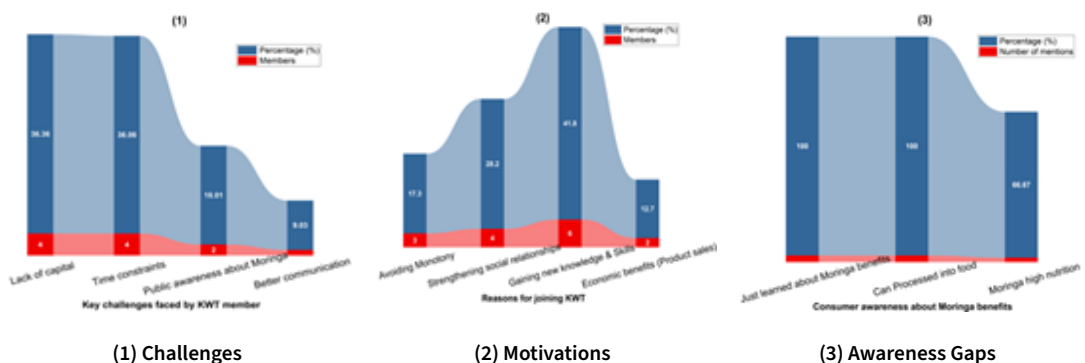


Figure 5. Identifying Challenges, Motivations, and Awareness Gaps in KWT Participation and Moringa Utilization.

Women’s participation in KWT and its benefits

First, it concerns the Impact of KWT Participation on Women’s Empowerment. The participation of women in the KWT program has generated substantial social and economic benefits, as illustrated in the first figure. A significant majority of women (89.4%) are actively involved in KWT activities, with 80.3% reporting improvements in their skills and competencies and 73.1% experiencing an increase in income. In addition, 76.5% of participants have incorporated Moringa into their daily diet, indicating that the program has contributed not only to economic empowerment but also to enhanced nutritional practices. These findings suggest that KWT plays a pivotal role in strengthening women’s capacities, promoting financial resilience, and improving household nutrition through the sustainable use of Moringa. Secondly, it concerns the Consumer Perceptions and Operational Challenges of the KWT Initiative. As illustrated in Figure 6c, consumer perceptions of the KWT Moringa initiative are largely positive. Approximately 85% of respondents acknowledged the health and functional benefits of Moringa, and 80.8% expressed support for expanding the program. Furthermore, 75.3% perceived benefits from Moringa-based products, and 67.3% reported using these products within their households. This reflects a high level of consumer trust and a growing demand for products related to Moringa. However, as shown in Figure 6a, the analysis of processing needs highlights notable limitations in critical equipment and facilities required for efficient processing, including shortages of storage containers (25 units), packaging machines (3 units), and grinding machines (4 units). Addressing these material and infrastructural gaps is essential to enhance the effectiveness, scalability, and long-term sustainability of the KWT initiative, as comprehensively visualized in Figure 6 which integrates all three analytical perspectives.

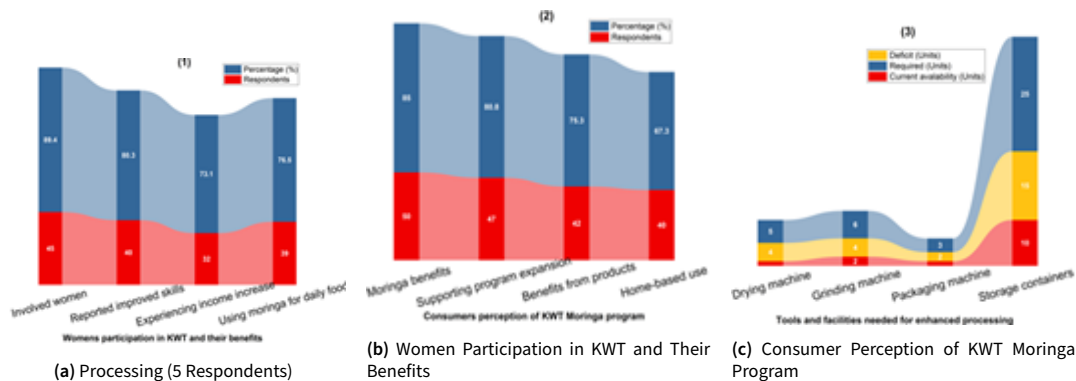


Figure 6. Empowering women through KWT: Participation, Benefits, Consumer Perception, and Processing Needs.

3.2.2 Key themes of the respondents

Table 3. Key themes were discovered after scheduled interview sessions during the activities

Economic empowerment	Knowledge enhancement	Food security/self-sufficiency	Area of improvement
Make money by selling goods from moringa at bazaars and social service events.	Learning how to process moringa in ways other than the conventional cooking methods (preparing roulade and pudding).	Direct access to fresh vegetables from the KWT garden helps members become less reliant on market purchases.	The requirement for improved machinery is to increase manufacturing efficiency.

Lack of current tools limits the amount of money that can be made, which impacts the quantity and quality of output.	One significant result has been a greater understanding of moringa's advantages, especially in avoiding stunting.	Beneficial when food prices are rising.	More training programs to improve members' capabilities and product variety.
Customers understand how crucial this initiative is to enhancing women's financial security.	Experience in cultivating various crops (chilies, tomatoes, shallots, etc.) has boosted agricultural skills.	Increasing affordability and food diversification, nutrients.	Increased consumer awareness efforts to boost demand for moringa-based products.

3.2.3 Program objectives and suitability to existing problems

Table 4. Outcomes of the interview sessions.

Program objectives & suitability	The program's two main objectives are enhancing moringa processing abilities and boosting KWT Roay Lestari members' economies. Members have no prior experience turning moringa into valuable items. The program contributes to revenue growth.
Skills improvement	Members acquired the skills necessary to turn moringa into pudding and roulade. Participants learned about various methods for processing moringa.
Economic impact	More potential for revenue generation and productivity. Participants believed that there were financial advantages to the program.
Challenges faced	Before the program, nothing was known about how moringa is processed, due to the absence of contemporary equipment for effective output. More training and product diversification are required.
External & internal support	The government provided seed houses, fertilizer, and other supplies to KWT Roay Lestari. Processing moringa has not yet received direct government assistance, such as support for moringa training from university instructors.
Community & consumer perception	Customers believe the initiative makes women more financially independent. They recognize the possibilities with further government assistance.
Future development needs	There is a desire for government assistance to broaden product offerings (such as frozen moringa nuggets) and for greater awareness and market access.

3.2.4 Evaluating the Input of Women's Empowerment in Moringa Processing Using the CIPP Model

Human resources and training enhancement

Activities evaluation

Table 5. Significant outcomes of the capacity-building trainings in the activities.

Theme	Key findings	Supporting statements
Importance	Training is essential for improving product quality, driving innovation, and generating economic benefits.	"Individuals with knowledge and abilities must process moringa plants effectively and efficiently."
Training adequacy	Members believe that existing training is good but insufficient for creativity.	"A lecturer only provided training once; more in-depth training is required."
Advanced training needs	Food preservation and technology training are in high demand for products with a longer shelf life.	"He intends to receive expertise in processing technologies to create long-lasting or frozen moringa goods."

Collaboration	Members complement each other in various areas (production, marketing, and publishing).	"Members of KWT Roay Lestari have varying potentials but complement one another."
Emotional & Psychological Support	Strong motivation and support from leadership and family promote involvement.	"Throughout the program, they received considerable emotional and psychological support."
Consumer preference	Consumers report that the program works smoothly based on product availability and trade continuity.	"Trading activity continues, indicating that the program is functioning correctly."
Future development	Continuous training and program sustainability are required for a higher market share.	"If they continue with this moringa processing technique, they can improve the quality of their products."

Evaluation of moringa processing

The Moringa processing program evaluation assessed various factors, including its efficacy, efficiency, relevance, sustainability, and impact. The program aims to increase value addition and improve farmers' livelihood

oods through Moringa farming. Key findings demonstrated that the effort successfully increased farmer income and market access while promoting sustainable agriculture practices. However, issues such as limited technical expertise, processing infrastructure, and market competitiveness have been discovered. The study emphasized the importance of capacity-building initiatives, enhanced processing facilities, and more stakeholder participation. The initiative had a positive impact, but required strategic adjustments to ensure long-term viability and widespread acceptance.

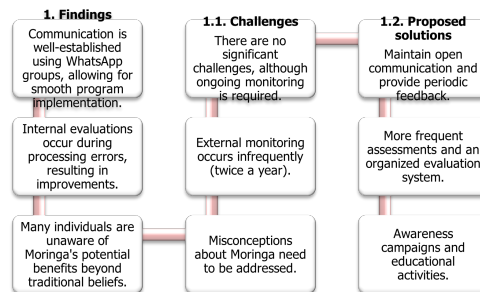


Figure 7. Monitoring of the activities addressing challenges and proposed solutions.

The Moringa processing program evaluation assessed various factors, including its efficacy, efficiency, relevance, sustainability, and impact. The program aims to increase value addition and improve farmers' livelihoods through Moringa farming. Key findings demonstrated that the effort successfully increased farmer income and market access while promoting sustainable agriculture practices. However, issues such as limited technical expertise, processing infrastructure, and market competitiveness have been discovered. The study emphasized the importance of capacity-building initiatives, enhanced processing facilities, and more stakeholder participation. The initiative had a positive impact, but required strategic adjustments to ensure long-term viability and widespread acceptance. The graphs depict the obstacles, benefits, and potential improvements in Moringa processing

The primary challenges include a lack of technical knowledge, limited market access, high initial investment, and quality control issues, with technical knowledge being the most significant concern. Moringa processing offers increased revenue, health and nutrition benefits, local economic

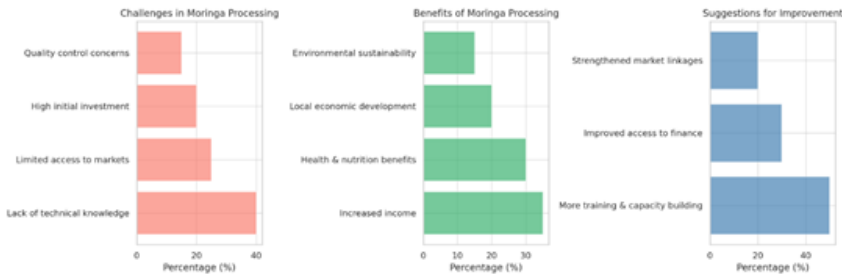


Figure 8. Challenges, Benefits, and Suggested Improvements in Moringa Processing, as derived from the study's evaluation.

growth, and environmental sustainability, with income being the most significant advantage. Suggested improvements include increased training and capacity building, enhanced financial access, and strengthened market linkages, with training and capacity building being the highest priority. The data indicate that, while Moringa processing offers significant benefits, overcoming technical and financial constraints is critical to enhancing its impact and sustainability (Figure 7 and Figure 8).

3.3 Discussion

The women's empowerment in moringa plant processing revealed significant accomplishments and obstacles in improving the economic possibilities, knowledge, and food security of women farmers. Members continue to seek further instruction in food preservation and product diversification, demonstrating the need for sustainability training [10, 22]. Emotional and psychological support and strong member collaboration improve program engagement and effectiveness [7]. A woman-centered education and empowerment paradigm is recommended to achieve long-term and sustainable benefits for the community due to women's increased involvement in child-rearing and reliance on food production and off-farm income-generating activities [21]. [23]

All technical abilities are required for Moringa oleifera planting and maintenance. These include seedlings or stem-cutting propagation, obtaining seeds from trusted sources, and ensuring that seeds are viable, clean, and disease-free [19]. Acceptance of moringa as a nutritional supplement or food additive for undernourished individuals is consistent with cultures that already incorporate green leafy plant sources into traditional meals [19]. Rural communities, particularly those that rely primarily on subsistence farming, may find that consuming moringa leaves is preferable to purchasing non-locally produced food [22]. These activities can encourage men and women to have equal access, benefits, involvement, control, and enjoyment of development outcomes. Gender equality is a right for everyone, regardless of socioeconomic background, gender, or sex [24].

Moringa trees have long been utilized for a wide range of purposes, including human consumption, household applications, animal feed, organic fertilizer, bio-insecticides, and ornamental cultivation. Their edibility, coupled with extensive evidence of their significance for human health and nutrition, has contributed to their widespread cultivation and popularity in many communities [25]. In the study conducted by [26], the average age of respondents was around 50. The study also discovered respondents were aware of and willing to pay for Moringa. Most responders were housewives, which could be related to their role in deciding what the family consumes. These findings are consistent with the current investigation [3].

The program effectively promotes women's agricultural expertise and financial independence by reporting improved capacities and seeing income growth. Essential constraints include limited access to critical processing equipment such as storage containers, packing machines, and grinding units, which reduces production and profitability. Addressing difficulties through more government

assistance, technical training, and enhanced market access may boost the program's impact and sustainability [27]. The findings highlight technical knowledge shortages as the most significant issue, emphasizing the importance of focused capacity-building programs to improve processing abilities and product quality [28, 29]. Financial constraints, such as high initial investment costs and limited financial availability, limit the development of moringa-based businesses [30]. Quality control concerns impact market competitiveness, necessitating higher processing standards and certification systems to boost consumer trust and product value. Studies worldwide show how wild resources are frequently used to support a living. These resources are commonly linked with hunting and gathering communities, which hold specific cultural value but also play significant roles in intensive or specialized agricultural systems [31, 32].

Processing Moringa effectively requires specialized knowledge of drying techniques, extraction methods, and quality preservation. Poor understanding can lead to nutrient degradation, contamination, and inefficient processing. Scientific studies emphasize the importance of controlled drying temperatures to maintain Moringa's high nutritional value. Despite its benefits, Moringa products often struggle with market penetration due to issues with supply chains and limited consumer awareness. Scientific research highlights that bioavailability and formulation impact consumer preference [30]. Additionally, inadequate distribution networks restrict access, reducing profitability. Establishing a Moringa processing unit involves significant capital for equipment like drying machines, oil extractors, and packaging facilities [32]. Scientific advancements, such as low-cost solar drying, aim to reduce expenses, but investment remains a significant barrier. The quality of Moringa powder, oil, or extracts can be compromised due to poor processing conditions, microbial contamination, or incorrect storage. Scientific methods, such as spectroscopy or chromatography, are required to ensure product purity and efficacy. Without strict quality monitoring, products may lose potency or fail to meet regulatory standards [26].

The CIPP evaluation of the Women's Empowerment Program in Moringa plant processing provides valuable insights into the factors that influence women's participation in agricultural initiatives, as well as the broader implications for policy, market development, and food security. This study highlights key areas where further research and intervention can enhance the program's effectiveness and sustainability.

4. Conclusion

The Women's Empowerment Program has made a significant contribution to enhancing agricultural skills, promoting financial independence, and increasing awareness of the nutritional value of Moringa among its participants. The findings indicate that the program has had a positive influence on both the economic and social well-being of women involved in Moringa processing. Nevertheless, in order to maximize its overall potential, greater institutional support is required, particularly from government agencies, to facilitate production scaling, improve access to broader markets, and expand the scope of capacity-building initiatives. Strengthened collaboration between local government bodies, non-governmental organizations, and private-sector stakeholders would provide essential resources, foster knowledge exchange, and ensure the long-term sustainability of the program.

An evaluation of the program's efficiency, relevance, sustainability, and overall impact reveals that, although income levels and market access for participating women have improved, several technical and financial constraints continue to limit more substantial progress. These challenges highlight the need for more intensive and targeted training, upgrades to processing facilities, and increased engagement from key stakeholders. Strengthening partnerships with research institutions, agricultural extension services, and business development networks could further enhance access to technical

expertise, innovation, and market opportunities, thereby strengthening participants' capacity to expand and sustain their enterprises.

Investing in advanced processing technologies and modern equipment is crucial for enhancing productivity and product quality. Current shortages of essential tools, such as grinding machines and adequate storage facilities, have negatively affected production efficiency, product preservation, and profitability. The strategic allocation of resources toward appropriate processing infrastructure would support higher output, longer shelf life, and increased market competitiveness. Furthermore, the establishment of structured cooperatives or women-led enterprises would enhance coordination among members, strengthen supply chains, and improve collective bargaining power. Such organizational structures provide a vital platform for accessing financial support, technical assistance, and market intelligence, ultimately contributing to greater economic resilience and long-term business sustainability.

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