

Keywords

Entrepreneurial Training, Participatory Approach, Incubation

Authors

¹Karen Debbie J. Cosrojas

Faculty, College of Agriculture, Central Mindanao University

Email: f.karendebbie.cosrojas@cmu.edu.ph

ORCID ID: <https://orcid.org/0009-0005-9017-1982>

²Sheila C. Poonon

Faculty, Agribusiness Management, Central Mindanao University, Dologon, Maramag Bukidnon, Philippines

Email: f.sheila.poonon@cmu.edu.ph

ORCID ID: <https://orcid.org/0000-0002-2241-9203>

Correspondence to:

¹Karen Debbie J. Cosrojas

Faculty, College of Agriculture, Central Mindanao University

Email: f.karendebbie.cosrojas@cmu.edu.ph

ORCID ID: <https://orcid.org/0009-0005-9017-1982>

The Role of Agri-Aqua Technology Business Incubator in Nurturing Women Entrepreneurs

Abstract

The Central Mindanao University–Agri-Aqua Technology Business Incubator (CMU-ATBI) supports the commercialization of research-based technologies and assists start-ups and community enterprises. This paper examines CMU-ATBI's role in empowering women through the San Nicolas Women's Livelihood Organization Inc. (SNWLOI). With CMU-ATBI's guidance in project proposal development, SNWLOI secured a PHP 1 million grant from the Philippine Business for Social Progress. The livelihood project applied a participatory approach, with CMU-ATBI providing design, implementation, and technical assistance focused on women's economic development. Capacity-building trainings enhanced entrepreneurial knowledge, improved access to microfinance, and facilitated government support, though challenges in formal banking and cooperative membership persisted. Household income increased notably after project implementation. Key success factors included strong institutional support, active participant engagement, and an efficient procurement system. However, the project faced organizational issues and limitations from its six-month duration. Extending the period to at least one year is recommended to ensure proper activity phasing, sustained mentorship, and lasting impact. Incorporating values formation sessions in training may also strengthen teamwork, accountability, and conflict resolution. The experience underscores CMU-ATBI's capacity to deliver impactful, community-based support services that foster women's empowerment and sustainable livelihoods.

Received: 15-06-2026

Revised: 19-07-2026

Accepted: 24-07-2026

Doi: 10.1922/ejprd.v34i6s.1628

1. INTRODUCTION

There has been a notable surge of interest in Technology Business Incubators (TBIs) in recent years, as evidenced by the increasing efforts to promote technology innovation and entrepreneurship (Alinsunod, et al., 2019). This momentum is reflected in the continued establishment of TBIs across the Philippines and around the world, positioning them as strategic platforms for addressing broader global challenges.

A Technology Business Incubator (TBI) serves as a vital catalyst for entrepreneurship by creating an enabling environment that nurtures the growth and development of startups and small enterprises, particularly those focused on innovation and technology (Chandra & Fealey, 2009). The Central Mindanao University – Agri-Aqua Technology Business Incubator (CMU-ATBI) was established in 2018 through funding support from the Department of Science and Technology – Philippine Council for Aquatic and Natural Resources Research and Development (DOST-PCAARRD). It is now in its third phase of implementation as part of the Regional Agri-Aqua Technology Business Incubator (ATBI) in Northern Mindanao, under the Regional Agri-Aqua Innovation System Enhancement (RAISE) Program, with continued funding from DOST-PCAARRD.

Since its inception, CMU-ATBI has supported 26 incubatees (TBI beneficiaries) by providing business incubation services focused on agri-aqua technologies.

These services have significantly contributed to enterprise growth, income enhancement, and employment generation in partner communities.

One of the incubatees of CMU-ATBI is the San Nicolas Women's Livelihood Organization, Incorporated (SNWLOI). It is a non-stock, non-profit women's organization with 38 active members who are committed to improving their social and economic well-being by enhancing entrepreneurial skills, strengthening individual and collective capabilities, and fostering values that encourage unity and active participation in community development.

Since joining the incubation program in 2019, SNWLOI has received various technical trainings, including soap making, food processing, and handicrafts production. While these interventions empowered members, not all income-generating initiatives were sustained due to persistent financial and social challenges. According to a needs assessment report by CMU-ATBI, 88.24% of SNWLOI members identified limited access to capital as the most critical constraint, affecting their ability to purchase materials, expand operations, and meet business demands. Moreover, 91.18% of respondents cited financial assistance as the most needed form of support, highlighting a pressing need for sustainable financing mechanisms.

To address these challenges, CMU-ATBI linked with the Philippine Business for Social Progress (PBSP) through the Women's Rights, Action, and Advocacy Project (WRAAP). Under this collaboration, CMU-ATBI prepared and submitted project proposals for two

women's organizations. Of these, only the proposal submitted on behalf of SNWLOI was approved for funding and implementation, marking a significant step forward in supporting women-led enterprises and promoting inclusive, sustainable livelihoods.

The project aimed to promote gender equality and empower women by providing sustainable livelihood opportunities to members of the San Nicolas Women's Association, Inc. Specifically, the project aimed to enhance the entrepreneurial skills and capacities of women through tailored training programs; increase women's access to microfinance services to support their business ventures and income-generating activities; and foster a supportive environment for women's economic empowerment through mentorship programs and networking opportunities.

The present paper aimed to present the collaborative efforts among support agencies that contributed to the successful implementation of the extension project. It highlights the key project activities, the outcomes achieved in empowering the target beneficiaries, and the implementation insights and lessons learned throughout the process that can inform future development initiatives.

2. CONCEPTUAL FRAMEWORK

Figure 1 illustrates the Support-Provider & Recipient Triad, a collaborative framework involving three organizations with two serving as enablers (providing resources, expertise, and facilitation) and one as the primary beneficiary. In this model, CMU-ATBI and PBSP act as support providers, while SNWLOI is the recipient. This model is supported by Ahrne & Brunsson (2008).

As an incubator, CMU-ATBI delivers business support services to its incubatees, including SNWLOI. Its role encompasses entrepreneurship training (e.g., technology, organizational development, marketing, and financial management) as well as tailored coaching and mentoring. While CMU-ATBI does not directly provide funding, it facilitates connections to financial institutions and grant providers, enabling incubatees to secure startup capital or business acceleration funds.

Meanwhile, one of CMU-ATBI's key objectives is to strengthen partnerships and linkages with agencies, NGOs, and private entities to advance agri-aqua technology commercialization. This led to its collaboration with PBSP, which identified funding opportunities aligned with incubatee needs especially women prompting the submission of this project proposal. According to Lundy et al. (2005), networks and linkages are essential in carrying out livelihood projects as they facilitate access to critical resources, technical expertise, markets, and institutional support, thereby enhancing the sustainability and overall impact of such initiatives.

Recognizing SNWLOI's limited capacity to draft such proposals, CMU-ATBI took the lead in conceptualizing and refining the project, incorporating SNWLOI's inputs until its approval in July 2024. Implementation ran from August 2024 to January 2025, with SNWLOI receiving a 1-million-peso project grant.

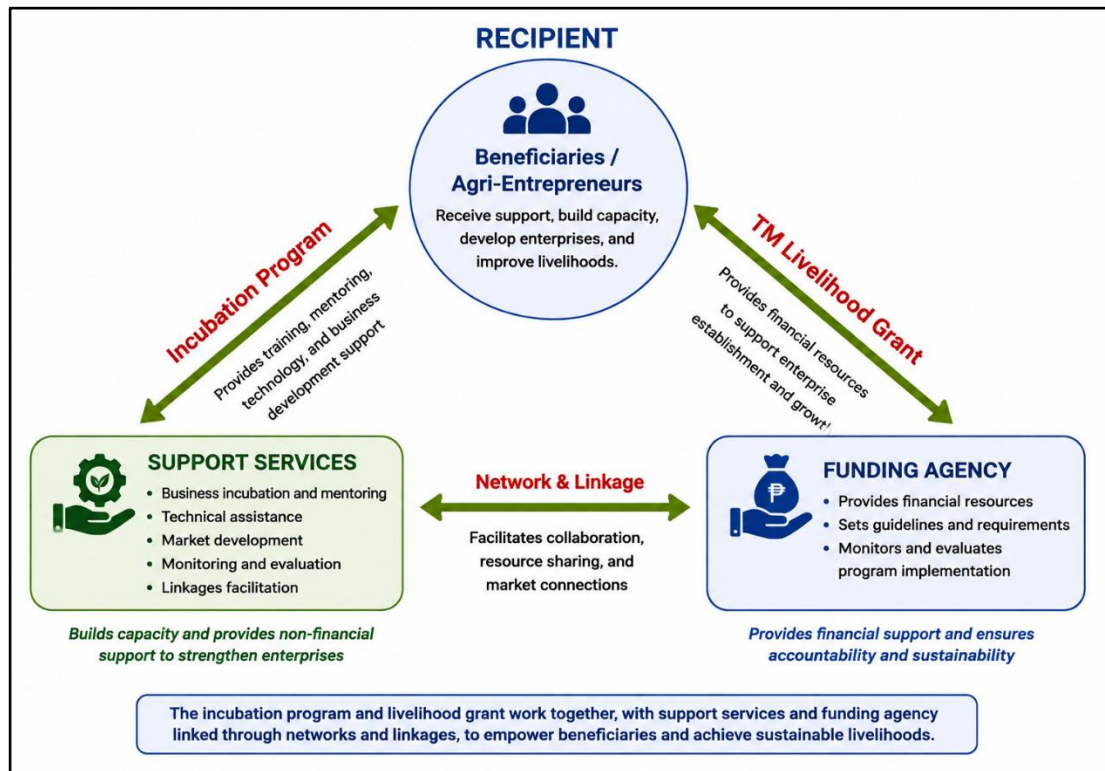


Figure 1. Support-Provider & Recipient Triad

3.METHODOLOGY

3.1.Project Approach

The livelihood project employed a participatory approach as its core methodology to empower rural women by actively involving them in all stages of the project, from needs assessment and planning to implementation, monitoring, and evaluation. Participatory Rural Appraisal (PRA) techniques were conducted to identify the specific needs, challenges, and aspirations of the women in the target community.

Singh and Dubey (2021) highlight the application of PRA tools like Key Informant Interviews (KIIs) and Focus Group Discussions (FGDs) to investigate and evaluate opportunities and constraints, enabling timely decisions by participating community members.

During the planning phase or the crafting of the proposal, the officials of SNWLOI were involved in co-designing the training modules and selecting the appropriate livelihood interventions. Involving the women in decision-making not only enhanced the responsiveness of the program but also fostered a sense of ownership and accountability among participants (Cornwall, 2003).

The project's activities were implemented using a participatory approach, with women members collaborating in groups to plan and manage the production and marketing of their enterprises. Additionally, the monitoring and evaluation process involved training the women to use simple tools to track their progress and provide feedback on their activities.

3.2.Site, Beneficiary and Project Description

The project was implemented in Barangay San Nicolas, Don Carlos Bukidnon among the women members of the San Nicolas Women's Livelihood Organization, Inc (SNWLOI).

SNWLOI is a non-stock and non-profit women's organization comprising 38 members. It was established on December 3, 2013, and registered with the Securities and Exchange Commission (SEC).

The project grant was awarded by the Philippine Business for Social Progress (PBSP) through the Women's Rights, Action, and Advocacy Project (WRAAP). The women's organization was engaged in three different enterprises, including pineapple processing, handicraft making, and detergent production. The organization has prior knowledge and training in these enterprises, but it lacks the capital to pursue them. The project aimed to enhance their skills and provide them with capital to pursue the said business ventures. The organization was equipped with training relevant to entrepreneurship, including technical (technology), organizational, marketing, financial, and risk management. The project was implemented in the period of six months from August 2024 to January 2025.

3.3.Implementation Activities

Figure 2 shows the project implementation procedure. The project implemented a dynamic approach, beginning with baseline survey to document beneficiaries' initial status. A comprehensive series of capacity-building activities followed, including technology training in handicraft production, pineapple processing, and detergent making, complemented by workshops on marketing, financial management, and organizational

development. The women's organization then applied these skills through actual production and marketing of their products, supported by coaching and mentoring from CMU-ATBI. Strategic partnerships were forged with the business sector (e.g., DAVCO) to expand resources and expertise. To boost market presence, the women's product

was displayed during linkage and partnership events of CMU including the Research and Development Extension (RDE) Week celebration and Regional Agri-aqua Innovations Systems Enhancement (RAISE) Summit. Throughout implementation, monitoring and evaluation was conducted to track business performance.



Figure 2. Project implementation procedure.

4.RESULTS AND DISCUSSION

The presentation of the results of the project follows the order of the project objectives outlined in the introduction.

Objective 1: Enhance the entrepreneurial skills and capacities of women through tailored training programs

Attendance to Trainings Conducted

Figure 1 illustrates the attendance of women beneficiaries across 14 training sessions conducted by the project, reflecting strong overall participation and a clear commitment to enhancing entrepreneurial and management skills. Attendance ranged from 18 to 31

participants, with the highest turnout in trainings related to product marketing and business development, such as Handcrafting Marketing and Pineapple Products Marketing. Sessions on financial literacy, organizational management, and gender awareness also drew substantial interest, indicating a holistic understanding of the skills needed for business success. Lower participation in specialized handcrafting workshops suggests a preference for more market-oriented or familiar activities. Overall, the high level of engagement demonstrates the women's dedication to self-improvement and sustainable livelihood development.

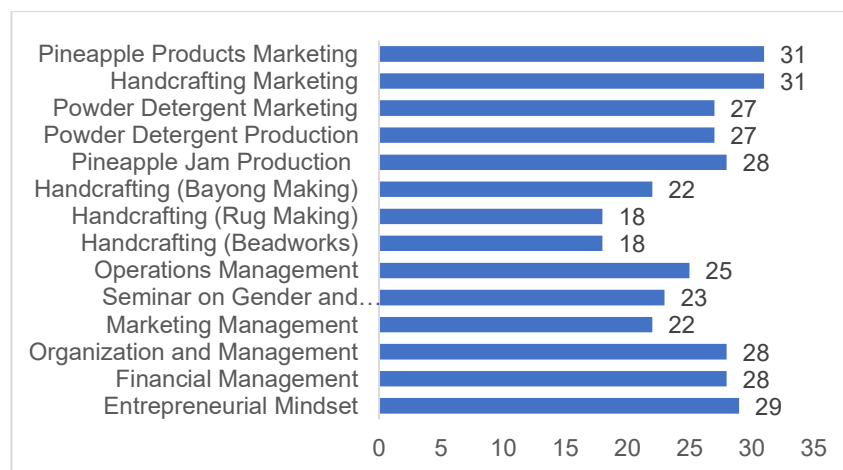


Figure 1. Women's Attendance to trainings conducted

Level of Knowledge in Business of Women Beneficiaries

Table 1 shows a significant improvement in the beneficiaries' business knowledge after the project, with participants shifting from lower to higher levels of understanding across key areas such as Entrepreneurial Mindset, Marketing, Operations, Organization, and

Financial Management. Initially, many had no understanding—particularly in Organization and Management—but by the end of the project, no one remained in this category. Notably, the number of beneficiaries with intermediate understanding increased substantially, especially in Entrepreneurial Mindset (from 7 to 17) and Marketing Management (from 6 to 22). These

results highlight the project's effectiveness in building the participants' confidence and competence in business management.

Table 1. Business Knowledge of the Beneficiaries before and After the Project

	1-No Understanding	2-Basic Understanding		3-Intermediate Understanding		
	Before (N=34)	After (N=32)	Before (N=34)	After (N=32)	Before (N=34)	After (N=32)
Entrepreneurial Mindset	13	0	14	15	7	17
Marketing Management	16	0	12	10	6	22
Operations Management	13	0	12	9	9	23
Organization and Management	17	0	11	9	6	21
Financial Management	14	0	10	10	9	22

Table 2 highlights a significant improvement in the business knowledge of women beneficiaries following the project, with mean scores rising uniformly from 1.82 to 2.5 across all areas, including Entrepreneurial Mindset, Marketing, Operations, Organization and Management, and Financial Management. The t-test results confirm that

these gains are statistically significant, indicating the improvements were not due to chance. This demonstrates the project's effectiveness in enhancing the participants' understanding of essential business concepts and reflects its broad and consistent impact on strengthening their overall business competencies.

Table 2. Mean Level of Knowledge of Women Beneficiaries and Statistical Test Result Before and After the Project

Training	Mean Score		Statistical Difference Using T-Test
	Before	After	
Entrepreneurial Mindset	1.82	2.5	Statistically Significant
Marketing Management	1.82	2.5	Statistically Significant
Operations Management	1.82	2.5	Statistically Significant
Organization and Management	1.82	2.5	Statistically Significant
Financial Management	1.82	2.5	Statistically Significant

Pre-Test and Post-Test Training Results

Table 3 shows that all training sessions resulted in statistically significant improvements in participants' knowledge, as evidenced by p-values of .000 across all pre-test and post-test comparisons. The Entrepreneurial Mindset and Marketing Management trainings showed the most notable gains, indicating strong learning outcomes in these areas. Other sessions, such as Financial Management, Operations Management, and Organization

and Management, also demonstrated moderate but meaningful increases in mean scores, confirming the effectiveness of the training interventions. Even sessions with smaller score changes, like Gender and Development, reflected positive learning reinforcement. Overall, the results affirm the success of the project in significantly enhancing participants' knowledge and skills across multiple business-related topics.

Table 3. Mean Score of the Pre and Post Test and T-test Result of the Trainings Conducted

Title of the Training	No. of Items	Mean Score		P-Value	Remarks
		Pre	Post		
1. Entrepreneurial Mindset	19	14.62	15.41	.000	Statistically Significant
2. Financial Management	10	5.96	6.61	.000	Statistically Significant
3. Operations Management	10	5.39	5.75	.000	Statistically Significant
4. Marketing Management	10	4.5	5.68	.000	Statistically Significant

5. Gender & Development	10	6.48	6.57	.000	Statistically Significant
6. Operation and Management	10	7.96	8.2	.000	Statistically Significant

Objective 2: Increase access to microfinance services for women to support their business ventures and income-generating activities

Access to Finance

Figure 2 illustrates a positive shift in financial inclusion among project beneficiaries, with increased access to microfinance institutions (from 7 to 12) and government financial programs (from 5 to 9), suggesting the project's success in enhancing financial literacy and facilitating

connections to these services. Although access to banks and cooperatives remained unchanged, the reduction in beneficiaries with no access to finance from 15 to 9, demonstrates progress in reducing financial exclusion. These findings highlight the project's effectiveness in improving access to small-scale and government-backed financial services, while also identifying the need for continued efforts to address barriers to bank and cooperative engagement.

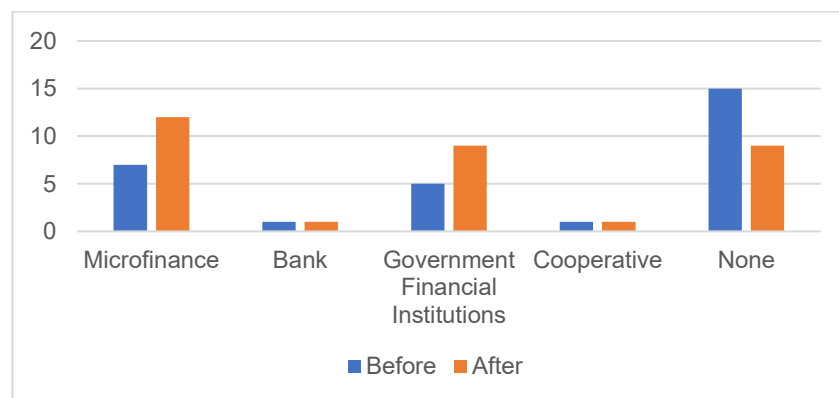


Figure 2. Access to financial institutions of women beneficiaries before and after the project

Monthly Income of Beneficiaries

Table 4 indicates that while the average monthly income of women beneficiaries rose from ₱4,822.71 to ₱7,845.00 after the project, the primary household income likely still comes from their husbands. Modest gains in employment and business activities among husbands, along with a decline in part-time work, suggest slight income stability.

The shift in households earning below ₱3,000 to the ₱6,001–₱9,000 bracket points to improved financial conditions, though not necessarily due to the women's own income. Since income from newly introduced women-led enterprises is not yet reflected, a follow-up evaluation is recommended to fully assess the project's long-term impact on women's economic contribution.

Table 4. Sources and Average Monthly Income of Women Beneficiaries Before and After the project

Main Sources of Income		Before	After
	Regular Employment	11	14
	Business	4	5
	Contractual/Part-time Work	19	15
		34	34
Average Monthly Income			
	3000 and below	14	5
	3001-6000	16	17
	6001-9000	0	7
	9001-12000	3	4
	12001 and above	1	1
	Total	34	34
	Highest	20,000	20,000
	Lowest	333	2,800
	Average	4,822.71	7,845.00

Implementation Reflections and Lessons Learned

The following enumerates the key insights in the project implementation:

Enabling Factors

1. **Active Participation of Women Beneficiaries.** The success of the project is largely attributed to the active participation of the members in its various activities, particularly the training sessions. A high level of engagement was evident, reflecting the women's enthusiasm and commitment to personal and collective growth. The provision of meals and snacks during training sessions served as a motivating factor, further encouraging attendance and sustained participation. Ultimately, the project's success was a result of the members' cooperation, timely involvement, and dedication. This experience underscores the importance of fostering a supportive and inclusive environment where collaboration and shared responsibility drive positive outcomes.
2. **CMU-ATBI Support in the Project Implementation.** The CMU-ATBI played an important role in ensuring the successful implementation of the project, from its initial conceptualization to the execution of various activities. Beyond its administrative responsibilities, CMU-ATBI served as a crucial mediator in addressing internal challenges within the organization, particularly concerning financial transparency. As questions and concerns emerged regarding the allocation and utilization of project funds, CMU-ATBI consistently provided clear and repeated explanations to reassure
- members and maintain trust. Through its commitment to transparent communication and collaborative problem-solving, CMU-ATBI contributed significantly to the project's progress and the strengthening of organizational cohesion.
3. **Support of other organization.** Another key success factor was the partnership with DAVCO, which provided essential logistical support and served as the venue for some training sessions. This collaboration contributed to the smooth conduct of activities, ensuring a conducive learning environment for participants.
4. **Seamless Collaboration with Resource Speakers.** The success of the project was significantly enhanced by the invaluable cooperation and understanding demonstrated by the guest speakers invited to train the members of SNWLOI. Their willingness to accommodate the administrative demands of the project, including the timely submission of essential documents such as training designs, played a crucial role in maintaining the project's smooth implementation.
5. **Ease of Procurement of Supplies.** The ease of procurement was a notable advantage in the project's implementation, largely due to the direct management of funds by the organization. Unlike the often-time-consuming processes associated with government institutions, where funds are subject to bureaucratic procedures and Commission on Audit (COA) regulations, the organization's control over the budget allowed for more efficient and flexible purchasing.

LIMITING FACTORS

1. **Organizational Challenges.** The women's organization, though already established, faced significant challenges upon becoming a first-time recipient of a livelihood project. The implementation process exposed gaps in leadership, communication, and financial management. Misunderstandings arose among members regarding the allocation of funds and the specific roles and responsibilities of officers. Additionally, the spread of unverified information
- and gossip created emotional strain and damaged relationships within the group.
2. **Time Constraint as a Challenge to Effective Implementation and Supervision.** A significant limiting factor in the project was the short 6-month implementation period, which proved insufficient to carry out the planned activities at an ideal pace. The compressed timeline forced the implementers to accelerate certain activities, compromising the opportunity for thorough planning and execution.

5. CONCLUSION

The project demonstrated that the Central Mindanao University–Agri-Aqua Technology Business Incubator (CMU-ATBI) plays a pivotal role in nurturing women entrepreneurs by significantly enhancing their business knowledge, skills, and access to livelihood opportunities. Tailored training programs led to statistically significant improvements across key business areas—entrepreneurial mindset, marketing, operations, organizational management, and financial management—reflecting the effectiveness of capacity-building interventions. Increased access to microfinance and government financial programs also indicated progress in reducing financial exclusion among participants.

While household incomes improved, the women's direct economic contributions may require a longer period to

materialize, highlighting the need for follow-up evaluations. The project's success was driven by active participant engagement, CMU-ATBI's institutional support, partnerships with external organizations, collaboration with resource speakers, and efficient procurement systems.

However, challenges such as organizational issues, internal conflicts, and a limited six-month implementation period constrained the project's potential. Extending the duration to at least one year, coupled with values formation and strengthened organizational management, is recommended to ensure sustainability, deeper mentorship, and greater economic impact. Overall, the initiative underscores CMU-ATBI's capacity to deliver impactful, community-based support that empowers women toward sustainable entrepreneurship.

6. RECOMMENDATIONS

1. **Extend Project Duration for Effective Implementation.** To ensure the successful execution

of activities and achieve sustainable outcomes, future livelihood projects should be implemented over a period of at least one year. A longer timeline allows for proper phasing of activities, ensuring that training, capacity building, and enterprise development are conducted at a manageable pace.

2. Incorporate Values Reformation in Training Programs. Beyond technical and entrepreneurial skills development, future livelihood projects should include values reformation sessions as part of the training curriculum. These sessions can focus on fostering positive attitudes, teamwork, accountability, and conflict resolution among

members. Topics such as leadership development, financial transparency, and ethical decision-making should also be incorporated to ensure a holistic approach to capacity building.

3. Conduct Comprehensive Impact Assessments. An impact assessment should be conducted at least one year after the project's completion to evaluate its long-term effects on the beneficiaries and their communities. This assessment should measure both tangible outcomes, such as income generation and business growth, and intangible changes, including improvements in self-confidence, leadership skills, and social networks.

REFERENCES

1. Ahrne, G., & Brunsson, N. (2008). *The organization of society: From social to institutional order*. Oxford University Press.
2. Alinsunod, J. P., Esponilla, F. D. II, Ignacio, H. T., de Guzman, H. C., Dela Cruz, K. C., & Valenzuela, I. C. (2019). Best practices of technology business incubators in the Philippines. *International Journal of Advanced Trends in Computer Science and Engineering*, 8(5), 2315–2321.
3. Chandra, A., & Fealey, T. (2009). Business incubation in the United States, China and Brazil: A comparison of role of government, incubator funding and financial services. *International Journal of Entrepreneurship*, 13, 67–86.
4. Cornwall, A. (2003). Whose voices? Whose choices? Reflections on gender and participatory development. *World Development*, 31(8), 1325–1342.
5. Lundy, M., Gottret, M. V., Cifuentes, W., & Ostertag, C. (2005). Participatory market chain analysis for smallholder producers. International Center for Tropical Agriculture (CIAT).
6. Singh, R., & Dubey, S. (2021). Farmer participatory research: Tools, policies and practices. This study highlights the use of PRA tools such as Key Informant Interviews (KIIs) and Focus Group Discussions (FGDs) to investigate and evaluate opportunities and constraints, facilitating timely decisions by participating community members.