

## From Root to Resource: Enhancing Farmers' Capacities through the TRAIL Project

Elmee Joy D. Oraiz<sup>1\*</sup>, Kristoper Rex B. Oraiz<sup>2</sup>  
Southern Leyte State University

**Corresponding Author:** Elmee Joy D. Oraiz [eoraz@southernleytestateu.edu.ph](mailto:eoraz@southernleytestateu.edu.ph)

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### ABSTRACT

The TRAIL (Transformed and Resilient Community through Alternative Indigenous Livelihoods) project, implemented in 2022 in Barangay Lonoy, Maasin City, aimed to strengthen the capacities of 45 members of the local Farmers' Association through a series of targeted training sessions. Key activities included leadership development, gender and development, financial literacy, cooperative systems, and *karlang* (*Xanthosoma sagittifolium*) utilization for value-added production. Participants learned to process *karlang* into flour, chips, brownies, and meatballs, supported by training in costing, marketing, and packaging. Using participatory and gender-inclusive approaches, the project fostered high engagement and practical skill application. Overall, TRAIL contributed to increased livelihood awareness, improved organizational functions, and strong potential for sustaining inclusive, community-led economic initiatives in rural settings.

## **INTRODUCTION**

In April 2022, the proponent of the Transformed and Resilient Community through Alternative Indigenous Livelihoods (TRAIL) project responded to the farmers' association's request to explore viable alternative livelihood sources in Brgy. Lonoy a remote upland village in Maasin City, Southern Leyte, Philippines. Initial consultations with community members revealed that recurrent typhoons and other natural disasters frequently damaged or destroyed crops, severely affecting household food security and income. This pattern reflects broader findings across rural Southeast Asia, where climate-induced disasters have increasingly disrupted agricultural productivity and household resilience (Islam, 2023; Cruz et al., 2023). In the Philippines, studies show that upland communities face compounded vulnerabilities due to limited access to infrastructure and markets, making recovery from crop loss especially difficult (Cruz & Colting-Pulumbarit, 2023; Islam et al., 2025). Moreover, food insecurity in rural areas is often exacerbated by low income, poor infrastructure, and inadequate livelihood diversification strategies (Koroma et al., 2024; Woodhill et al., 2022). These challenges underscore the urgency of community-based interventions that promote sustainable and disaster-resilient livelihoods.

Against this backdrop of vulnerability and the need for resilient livelihood solutions, the TRAIL project adopted an asset-based community livelihood approach by harnessing a valuable yet economically overlooked local asset: karlang (*Xanthosoma sagittifolium*). Cultivated for generations in Brgy. Lonoy primarily for household consumption, karlang is deeply embedded in the community's food culture and is known for its resilience to extreme weather conditions. It often serves as a crucial food source during and after typhoons. However, despite its abundance and cultural significance, its potential for economic development remained largely untapped. This scenario reflects a broader trend observed in many rural communities, where indigenous crops are underutilized despite their capacity to bolster food security and climate adaptation. For instance, Mgwenya et al. (2025) emphasize how crops such as taro and cowpea support nutritional and ecological resilience in Southern Africa. Likewise, Qwabe, Munialo, and Swanepoel (2025) illustrate the important role that indigenous crops play in improving rural livelihoods. In the Philippine context, Narvaez (2019) documented climate-responsive indigenous farming strategies including the cultivation of karlang—that have helped communities adapt to environmental stressors. These findings are reinforced by broader scholarly studies recognizing that indigenous crops are not only climate-resilient, but also culturally rooted and nutritionally beneficial (Kunene et al., 2022; Chanza & Musakwa, 2022).

Building on this foundation, the TRAIL project drew further justification from localized evidence of karlang's market potential. A study by Abamo, Babilonia, and Cavite (2020) conducted in nearby Sogod, Southern Leyte, found a 46% excess demand for karlang-based products and identified opportunities for value addition through community-level processing. While karlang is a different species from taro (*Colocasia esculenta*), similar success stories abroad underscore its promise. In Ethiopia, Zeleke, Erchafo, and Tesfaye (2016) demonstrated how the introduction of improved taro varieties led to increased food and income security, reduced migration, and greater participation of women in farming. These outcomes mirror global evidence that women's involvement in agriculture and enterprise development plays a critical role in enhancing household resilience and promoting inclusive economic growth (Islam et al., 2024; Vuciterna et al., 2024).

Informed by these insights and grounded in local realities, the TRAIL project equipped selected farmer-beneficiaries with practical skills to transform karlang into value-added products such as flour, chips, brownies, and desserts. These capacity-building efforts aimed to reframe karlang from a subsistence crop into a viable source of income, promoting food security and economic resilience. To support this shift, participants also underwent complementary training in entrepreneurship, marketing, costing, and product development—key competencies for sustaining and scaling rural livelihood initiatives. The use of participatory and inclusive approaches ensured active engagement, particularly from women, who played central roles in training sessions and product innovation.

Although the project was implemented over just one year, it generated encouraging outcomes. Farmers began exploring product diversification, applying their newly acquired knowledge and identifying potential market opportunities. The association also showed readiness to pursue formal cooperative development, indicating growing organizational capacity. While the limited duration constrained the full realization of long-term impacts, the TRAIL project demonstrated the strong potential of karlang-based enterprises to contribute to disaster-resilient and diversified livelihoods. As a pilot initiative, it laid a solid foundation for future interventions that harness indigenous crops and community assets an approach that could be replicated across similarly vulnerable upland and disaster-prone communities.

## IMPLEMENTATION AND METHODS

The community extension project was implemented in Barangay Lonoy, Maasin City during the year 2022, in response to the capacity development needs of the Farmers' Association of Barangay Lonoy, which comprises 45 members 26 men and 19 women. The participants, primarily engaged in small-scale farming and community-based agriculture, were identified as key stakeholders in promoting inclusive local development and sustainable livelihood initiatives.

### *Implementation of Activities*

The project unfolded through a series of structured trainings and workshops designed to enhance the association's organizational capacity, socio-economic resilience, and self-reliance. Activities were conducted in coordination with barangay officials and local facilitators familiar with the community's context. The beneficiaries actively participated in each session, contributing to discussions, group activities, and hands-on demonstrations.

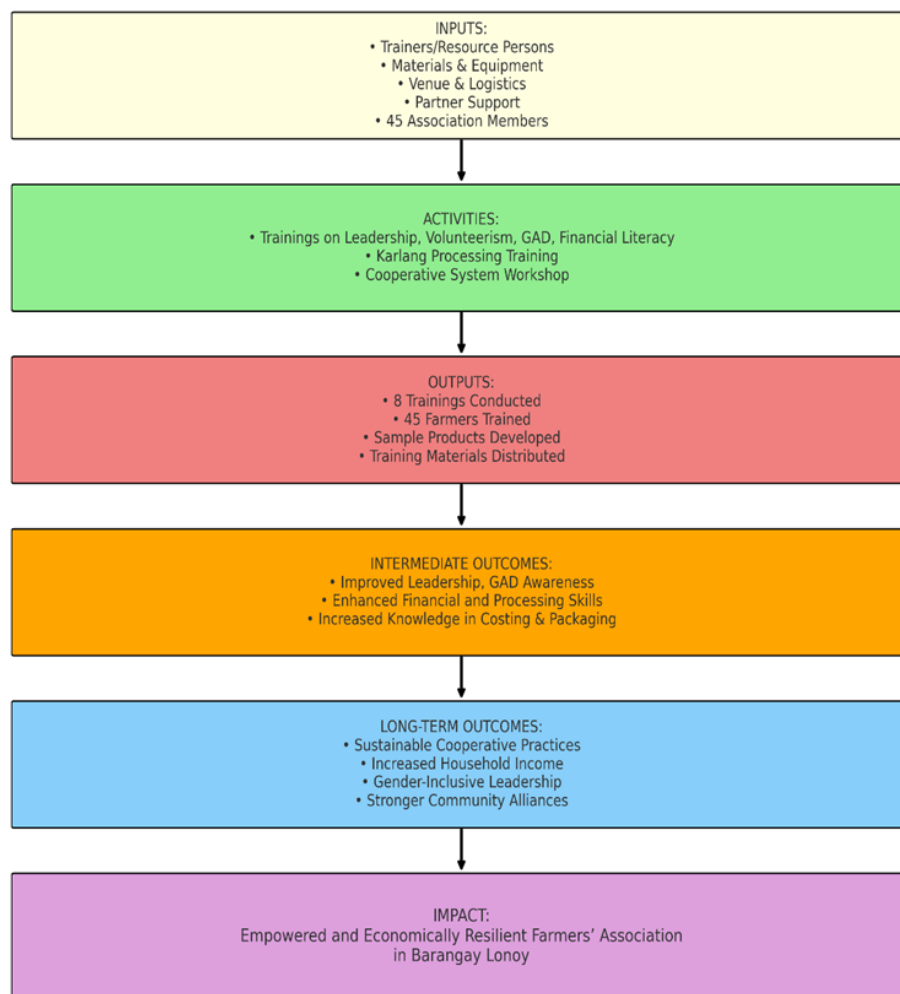
The core activities implemented were:

1. Training in Volunteerism and Alliance-Building, which fostered a sense of community responsibility and strengthened linkages with other support institutions.
2. A Training-Workshop on Leadership Development to equip association leaders with basic skills in communication, conflict resolution, and participatory decision-making.
3. Training on Gender and Development (GAD) that addressed the role of both men and women in community leadership and livelihood, ensuring inclusivity and equal participation.
4. Skills training on karlang utilization, where participants were taught how to process the locally available root crop into value-added products such as flour, chips, brownies, and meatballs.
5. Training on Simple Recording and Bookkeeping provided basic knowledge on maintaining financial records, essential for tracking income and expenses of livelihood ventures.
6. Training on Basic Financial Literacy and Management, which introduced concepts like savings, budgeting, and responsible borrowing.
7. A focused session on Costing, Marketing, and Packaging to help participants understand product pricing, develop attractive packaging, and strategize for local market entry.
8. Lastly, the Training on Cooperative-Type System introduced the members to collective business models and how cooperation could improve their access to markets and capital.

### Methods and Materials

The project used a participatory and adult-learning approach throughout its implementation. Each session was designed to be interactive, with lectures, group discussions, hands-on product demonstrations, and practical exercises. Materials used included printed handouts, illustrated guides, flip charts, sample packaging materials, karlang processing equipment, and audio-visual presentations. Trainers and resource persons included social work faculties and local experts in food processing and packaging and costing.

The project emphasized real-life application and community ownership by encouraging participants to reflect on their experiences, apply learned skills in their home and association settings, and develop small group plans for sustaining the initiatives introduced.



**Figure 1. Theory of Change: Empowerment and Capacity Development of Farmers' Association in Barangay Lonoy, Maasin City**

## RESULTS AND DISCUSSION

The implementation of the TRAIL project for the Farmers' Association of Barangay Lonoy was carried out through a systematic and participatory process, ensuring that each activity was context-specific, relevant, and responsive to the needs of the 45 association members (26 men and 19 women).

### *Step-by-Step Dedication Process*

#### 1. Initial Coordination and Needs Identification

The process began with community coordination meetings involving barangay leaders and representatives from the farmers' association. This stage helped surface training needs related to leadership, financial literacy, gender sensitivity, and value-adding techniques for local crops like *karlang*.

#### 2. Training Design and Material Development

Based on the results of the community dialogue, customized training modules and visual aids were developed. These included:

- a. GAD visual guides
- b. Financial literacy handouts (illustrated budgets, savings trackers)
- c. Illustrated recipe sheets for *karlang* products
- d. Sample ledgers for bookkeeping practice
- e. Packaging prototypes for practice during the costing and marketing session

#### 3. Sequential Training Implementation

The training sessions were conducted progressively across several weeks in 2022, with each session building upon the previous one. Table 1 below provides a summary of the training activities and participation levels.

#### 4. Facilitated Discussions and Hands-On Application

Each session combined interactive lectures, group work, and practical demonstrations. During the *karlang* processing training, participants not only learned recipes but also practiced flour milling, food preparation, and product packaging. In the cooperative system training, role-playing and simulation were used to help farmers understand shared capital, profit-sharing, and collective decision-making.

#### 5. Reflection and Community Planning

After each session, participants engaged in small group reflections to discuss key learnings and ways to apply these in their daily lives and association activities. As a qualitative result of the discussion processes, participants expressed increased confidence in leading their group and expressed plans to register a community-based enterprise using their improved knowledge and skills.

**Table 1. Summary of Training Sessions Conducted in Barangay Lonoy (2022)**

<b>Title of Training Activity</b>	<b>Key Topics Covered</b>	<b>Method Used</b>
Volunteerism and Alliance-Building	Civic duty, community partnerships	Lecture, small group work
Leadership Development Workshop	Leadership styles, decision-making	Role-play, case studies
Gender and Development (GAD) Training	Gender roles, inclusivity	Discussion, scenario mapping
Karlang Utilization Training	Processing, product diversification	Demo, hands-on cooking
Bookkeeping and Recording	Ledger maintenance, tracking income/expenses	Practical exercises, mock entries
Basic Financial Literacy and Management	Budgeting, saving, borrowing/loans	Illustrated examples, small group plans
Costing, Marketing, and Packaging	Pricing, label design, market strategy	Workshop, feedbacking
Cooperative-Type System Training	Group capital, profit-sharing	Simulation, group planning

To assess the effectiveness of the project implementation, a comparison between the targeted and actual outputs and outcomes was conducted. This comparison provides insight into how well the activities met their intended objectives and highlights areas where expectations were exceeded or partially achieved. Table 2 below summarizes the planned targets alongside actual accomplishments during the 2022 implementation period in Barangay Lonoy.

**Table 2. Target vs. Actual Output and Outcome Matrix**

Indicator	Target	Actual
<b>OUTPUTS</b>		
No. of participants trained	45 members (26 men, 19 women)	90% of all activities implemented were attended by all 45 members
No. of training sessions conducted	8 training sessions	8 training sessions completed
Development of IEC materials	At least 5 training modules	6 modules developed (GAD, financial literacy, karlang, coop, leadership)
Sample <i>karlang</i> -based products developed	3 product prototypes	4 products developed (flour, chips, brownies, meatballs)
<b>OUTCOMES</b>		
Improved knowledge on leadership and volunteerism	80% of participants demonstrate increased understanding in group activities	90% reported better confidence in group roles and facilitation
Adoption of gender-sensitive practices	GAD concepts integrated in association decisions	Women assigned co-lead roles in activity planning
Application of financial literacy concepts	Participants able to prepare basic budget or savings plan	All groups submitted draft budgets and savings goals
Increase in product-based livelihood interest	At least 60% of participants interested in starting <i>karlang</i> enterprise	75% expressed willingness to engage in small-scale production
Understanding of basic costing principles	At least 60% of participants can explain the concept of product costing	67% of participants correctly explained and applied costing in exercises
Application of packaging techniques	Participants able to create a basic product label and packaging	Trained participants were able to develop simple packaging and labeling for <i>karlang</i> products
Awareness of marketing strategies	Identified at least 3 potential local markets for <i>karlang</i> -based products	5 potential markets identified

Initiation of cooperative-type planning	Basic understanding and draft model of cooperative-type structure	Draft bylaws and cooperative principles discussed in final session
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**Figure 2. Karlant Utilization Training**



Figure 3. Karlang Utilization Training Outputs

## CONCLUSIONS AND RECOMMENDATIONS

The capacity-building activities conducted in Barangay Lonoy in 2022 successfully met—and in many areas exceeded their intended outputs and outcomes. Among the highlights was the training on *karlang* (*Xanthosoma sagittifolium*) utilization, which proved to be both relevant and well-received. It showcased *karlang*'s potential as a versatile, income-generating crop, with participants successfully creating value-added products such as flour, chips, brownies, and meatballs—demonstrating creativity and practical skills. Complementing this was the training on Costing, Marketing, and Packaging, where participants gained a clear understanding of pricing, developed basic product labels, and identified feasible local market opportunities. These results reflect the association's growing readiness to pursue livelihood initiatives and enhance their organizational capacity. The integration of gender-inclusive and participatory approaches further fostered confidence and equitable involvement among members. Lastly, the application of skills in bookkeeping, costing, and

cooperative planning signals strong potential for sustaining group-led economic activities.

1. Provide Ongoing Mentoring and Market Linkage Support  
To sustain the gains from the *karlang* training, continuous technical assistance and market linkage facilitation are recommended, particularly in refining product quality and navigating local regulations.
2. Formalize the Cooperative Structure  
With the initial understanding of cooperative-type systems already introduced, it is advisable to guide the association through the formal registration process, including legal documentation, by-laws, and operational planning.
3. Support Women's Leadership Roles  
Given the active participation of women in the sessions, the association may benefit from leadership mentoring programs that promote gender balance in key positions.

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### REFERENCES

- Abamo, A. P., Babilonia, G. M. M., & Cavite, H. J. M. (2020). Value chain analysis for *karlang* (*Xanthosoma sagittifolium* L. Schott) in selected aquatic and agricultural systems communities in Sogod, Southern Leyte, Philippines. *Journal of Educational and Human Resource Development*, 8, 94-110.
- Chanza, N., & Musakwa, W. (2022). Revitalizing indigenous ways of maintaining food security in a changing climate: Review of the evidence base from Africa. *International Journal of Climate Change Strategies and Management*, 14(3), 252-271. <https://doi.org/10.1108/IJCCSM-06-2021-0065>.
- Cruz, A. M., Hamidazada, M., & Islam, M. R. (2023). Disaster vulnerability, displacement and resilient livelihoods among Afghan urban women. In M. R. Islam (Ed.), *Disaster, Displacement and Resilient Livelihoods: Perspectives from South Asia* (pp. 55-80). Emerald Publishing. <https://doi.org/10.1108/978-1-80455-448-720231004>.
- Cruz, N. A. H., & Colting-Pulumbarit, C. (2023). Building back better after disasters: Enhancing community resilience through in-city resettlement in Valenzuela City, Philippines. *Climate, Disaster and Development Journal*, 5(2). <https://doi.org/10.18783/cddj.v005.i02.a01>.
- Islam, M. M., Jannat, A., & Rafi, D. A. A. (2024). Women participation in South Asian agriculture: A comprehensive systematic review. *Discover Sustainability*, 5, 490. <https://doi.org/10.1007/s43621-024-00649-w>.

- Islam, M. R. (2023). Introduction: Disaster, displacement and resilient livelihoods in South Asia. In M. R. Islam (Ed.), *Disaster, Displacement and Resilient Livelihoods: Perspectives from South Asia* (pp. 1–15). Emerald Publishing. <https://doi.org/10.1108/978-1-80455-448-720231001>.
- Islam, S., Magnaye, D. C., Encarnacion, R. H., & Esguerra, P. S. P. (2025). Influencing factors for resilient livelihood development in local government unit-administered resettled communities. *City and Built Environment*, 3, Article 9.
- Koroma, I., Sawi, M. K., Sheriff, F., & Smith, A. (2024). Factors associated with food security in rural communities across the globe. *International Journal of Science and Research Archive*, 11(2), 1735–1743.
- Kunene, T., Hlophe-Ginindza, S., Chimonyo, V. G. P., Modi, A. T., Mpandeli, S., Nhamo, L., & Mabhaudhi, T. (2022). Contribution of underutilised indigenous crops to enhanced food and nutrition security in the advent of climate change. In *Food Security for African Smallholder Farmers* (pp. 295–310). Springer. [https://doi.org/10.1007/978-981-16-6771-8\\_18](https://doi.org/10.1007/978-981-16-6771-8_18).
- Mgwenya, L. I., Agholor, I. A., Ludidi, N., Morepje, M. T., Sithole, M. Z., Msweli, N. S., & Thabane, V. N. (2025). Unpacking the multifaceted benefits of indigenous crops for food security: A review of nutritional, economic and environmental impacts in Southern Africa. *World*, 6(1), 16.
- Narvaez, L. M. (2019). Climate change responsive indigenous knowledge systems in crop farming in Albay Province, Philippines. *BU R&D Journal*, 22(2), 12–20.
- Qwabe, Q. N., Munialo, S., & Swanepoel, F. (2025). The role of underutilized indigenous and traditional food crops in enhancing rural livelihoods and food security in South Africa. *Frontiers in Sustainable Food Systems*, 9, Article 1605773. <https://doi.org/10.3389/fsufs.2025.1605773>.
- Vuciterna, R., Ruggeri, G., Mazzocchi, C., Manzella, S., & Corsi, S. (2024). Women's entrepreneurial journey in developed and developing countries: A bibliometric review. *Agricultural and Food Economics*, 12, 36.
- Woodhill, J., Kishore, A., Njuki, J., Jones, K., & Hasnain, S. (2022). Food systems and rural wellbeing: Challenges and opportunities. *Food Security*, 14, 1099–1121. <https://doi.org/10.1007/s12571-021-01217-0>.
- Zelege, B., Erchafo, T., & Tesfaye, A. (2016). Impact of Boloso-1 taro production on livelihood security of farming communities in Kindo Koyisha and Duguna Fango Woredas, Wolaita Zone. *Global Journal of Human-Social Science: Agriculture and Veterinary*, 16(2), 1–10.