



## STRENGTHENING AGRICULTURAL CAPACITY THROUGH TRAINING: AN ASSESSMENT OF EFFECTIVENESS AND FARMER EMPOWERMENT IN MAJAYJAY, LAGUNA, PHILIPPINES

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### ABSTRACT

*Agriculture is vital for the Philippines, especially vegetable farming in Majayjay, Laguna, which is often constrained by limited technical knowledge, resource access, and market challenges. One specific constraint is the dependency of farmers on “bukis” or intermediaries, a relationship that often places them at a disadvantage due to their limited knowledge and skills in pricing, negotiation, and market access. This study evaluated the effectiveness of a tailored capacity-building program in enhancing the knowledge, practical skills, and empowerment of smallholder vegetable farmers in the municipality. A descriptive evaluative research design was employed, involving 35 purposively sampled smallholder farmers from three local associations. The training modules were developed based on a comprehensive needs assessment using focus group discussions (FGDs) and key informant interviews (KIIs). Post-training evaluation utilized a structured survey and*

*follow-up KIIs to assess impact. Results demonstrated that the program was highly effective: 97% of participants reported significant improvement in technical knowledge and farming skills (e.g., pest management, post-harvest handling). Furthermore, 88.6% indicated that the training fully met their expectations, and 100% reported applying at least one learned technique in their operations. A key finding was the enhanced sense of empowerment, with 97% expressing high confidence in their decision-making ability and leadership roles within their farm enterprises and associations. The findings confirm that context-specific, participatory capacity-building programs are a potent tool for promoting sustainable agricultural practices and fostering farmer empowerment in localized settings. The study recommends multi-stakeholder support to scale and replicate these targeted programs across similar farming communities.*

**Keywords:** *capacity-building; vegetable farming, farmer empowerment, sustainable agriculture; training effectiveness; majayjay; laguna.*

## INTRODUCTION

### **The Role of Agriculture and Vegetable Farming in Rural Development**

In the Philippines, agriculture continues to be a vital component of economic growth, employment, and food security. It also makes a substantial contribution to rural livelihoods and national stability. Approximately 25% of Filipino workers are employed in the agriculture industry, which is essential to maintaining regional economies. Vegetable farming is one of its subsectors, and many rural households rely on it as their main source of income. Vegetable production boosts food availability and promotes smallholder farmers' livelihoods in Majayjay, Laguna, a municipality renowned for its ideal climate and fertile soils.

Despite its importance, smallholder vegetable farmers in Majayjay face persistent challenges that constrain productivity and income generation. These include limited access to modern production technologies, inadequate financial capital, more technical knowledge, and growing vulnerability to climate change impacts. A specific issue is the longstanding dependence of farmers on “bukis” or intermediaries, a relationship that often places them at a disadvantage due to their limited knowledge and skills in pricing, negotiation, and market access. Local farmer associations such as the Majayjay Organic Farmers Association (MOFA), Brgy. Bucal Vegetable Planters' Association, and Malinao Farmers' Association play a very important role in facilitating collective action, knowledge sharing, and access to resources. However, these organizations often lack the capacity to fully support their members due to gaps in technical, managerial, and social competencies.

According to Rivera and Qamar (2003), capacity-building initiatives are essential for empowering rural communities, especially in agriculture.

Such programs can significantly improve farm productivity, business acumen, and resilience against environmental and market risks. Yet, there remains limited empirical evidence on how such programs influence the knowledge, skills, and empowerment of smallholder vegetable farmers in Majayjay, Laguna. Addressing this gap is essential to improve agricultural extension systems and promote sustainable rural development.

Therefore, this study aims to evaluate the effectiveness of capacity-building trainings in enhancing the knowledge, skills, and empowerment of smallholder vegetable farmers in Majayjay, Laguna. Specifically, it investigates how these trainings address farmers' technical, managerial, and social development needs, and examines the relationship between training participation (independent variable) and empowerment outcomes (dependent variables). The central research question guiding this study is: *How effective are capacity-building trainings in improving the technical knowledge, business management skills, and empowerment of smallholder vegetable farmers in Majayjay, Laguna*

## **REVIEW OF RELATED LITERATURE**

### **Capacity-Building in Agriculture**

Capacity-building plays a central role in strengthening agricultural systems, particularly in rural communities where farmers often face constraints in knowledge, resources, and market access. Rivera and Qamar (2003) describe capacity-building as a process of enhancing the technical, managerial, and organizational competencies of farmers to enable them to adopt innovations and improve productivity. Feder and Anderson (2004) found that training and extension programs lead to measurable gains in crop yields and farm management efficiency, while Pingali, Aiyar, and Abraham (2019) emphasized that such initiatives foster resilience and innovation among smallholders. Collectively, these studies show that training interventions not only enhance technical capacity but also empower farmers to make informed decisions, participate in value chains, and manage their enterprises more sustainably.

### **Challenges of Smallholder Farmers in Developing Economies**

Despite the proven benefits of capacity-building, smallholder farmers in developing countries continue to face barriers that limit the uptake and impact of training programs. The Food and Agriculture Organization (FAO, 2021) highlights persistent challenges such as inadequate access to modern technologies, financial capital, and extension services. In the Philippines, many rural farmers rely on traditional practices that are

increasingly unsustainable under changing climatic conditions. Moreover, government-led extension programs remain uneven in coverage and quality (Department of Agriculture, 2020), forcing local farmer organizations to assume a larger role in capacity development. In Majayjay, Laguna, these challenges are evident among small-scale vegetable farmers who struggle with limited technical knowledge, resource constraints, and climate-induced risks that directly affect their productivity and livelihoods.

### **The Role of Farmer Associations in Agricultural Development**

Farmer associations serve as vital mechanisms for collective empowerment and knowledge sharing in local agricultural systems. Bingen, Serrano, and Howard (2003) note that these organizations enhance social capital and bargaining power, allowing farmers to access resources, markets, and technical support more effectively. In the Philippines, associations such as the Majayjay Organic Farmers Association (MOFA) and Brgy. Bucal Vegetable Planters' Association facilitate community-based learning and collaborative training programs. However, many local groups continue to face internal challenges: weak leadership, limited management capacity, and insufficient financial resources that hinder their effectiveness (Hellin et. al., 2009). Addressing these gaps requires targeted capacity-building initiatives that combine technical, business, and social development training.

### **Impact of Capacity-Building Programs on Smallholder Farmer Empowerment**

Empirical evidence suggests that well-designed training programs can enhance both the competence and confidence of farmers, leading to greater empowerment and sustainability. Beaman et al. (2013) and Davis et al. (2012) emphasize that participatory and context-specific training approaches are most effective in fostering long-term behavioral and organizational change. Feder et al. (2010) further observed that programs integrating technical and business management components yield higher productivity and profitability than those focusing on a single dimension. While these findings affirm the general benefits of capacity-building, few studies have examined how such interventions translate to empowerment outcomes in small Philippine municipalities. This research addresses that gap by evaluating how capacity-building trainings influence the technical knowledge, business management skills, and empowerment of smallholder vegetable farmers in Majayjay, Laguna.

## **OBJECTIVES**

This research study aims to:

1. Investigate the influence of capacity-building initiatives on vegetable farmer associations in Majayjay, Laguna.
2. Identify knowledge and ability gaps within selected farmer associations, including MOFA, Brgy. Bucal Vegetable Planters' Association, and Malinao Farmers' Association.
3. Develop tailored training programs to address specific needs in technical skills, business management, and social development.
4. Assess the effectiveness of interactive training sessions in providing real learning experiences for farmers.

## **METHODOLOGY**

### **Research Design and Participants**

The study adopted a descriptive evaluative research design to assess the effectiveness of tailored capacity-building trainings conducted among smallholder vegetable farmers in Majayjay, Laguna, Philippines. A total of 35 participants were selected through purposive sampling, drawn from three key farmer associations: the Majayjay Organic Farmers Association (MOFA), the Brgy. Bucal Vegetable Planters' Association, and the Malinao Farmers' Association. Purposive sampling was intentionally employed, rather than random sampling, for two primary reasons: (1) the limited, identifiable population of actively engaged smallholder vegetable farmers within the municipality, and (2) the need to ensure participants were directly involved in the capacity-building interventions being evaluated. This approach maximized the relevance and quality of the data for this program-specific evaluation, ensuring that respondents represented the diverse barangays and association structures targeted by the training. The small sample size of  $n=35$  is acknowledged and supports the choice of a descriptive rather than an inferential analytical framework. Purposive sampling was used due to the limited number of active vegetable farmers and their availability for participation. This approach ensured that respondents represented different barangays and association structures, capturing the diversity of farming experiences in Majayjay.

### **Data Collection Procedures**

Data collection consisted of three key phases:

### **1. Needs Assessment:**

To identify gaps in technical, managerial, and social competencies, a needs assessment was conducted using focus group discussions (FGDs), key informant interviews (KIIs), and structured surveys. Participants included farmers, association officers, agricultural technicians, and representatives from the local government.

### **2. Training Implementation:**

Based on the assessment results, tailored capacity-building modules were designed and delivered collaboratively with subject matter experts, agricultural extension workers, and local stakeholders. Training topics covered areas such as sustainable vegetable production, pest and disease management, bookkeeping, leadership, and financial literacy. Interactive strategies such as field demonstrations, case discussions, and hands-on workshops were employed to enhance practical learning and knowledge retention.

### **3. Impact Evaluation:**

Following the training, participants completed the Capacity Building Training: Impact Assessment Questionnaire. Respondents rated their satisfaction using scales such as “Lubos na masaya” (very satisfied) and “Napakapektibo” (very effective). Additionally, this impact evaluation was done through one-on-one key informant interviews (KIIs) post-training to gather qualitative insights on how farmers applied newly learned practices and experienced changes in confidence and empowerment.

The questionnaire, written in Filipino for accessibility, contained sections on:

- Training evaluation (organization, logistics, content quality, trainer effectiveness)
- Perceived learning outcomes (improvement in knowledge and skills)
- Behavioral application (use of learned techniques)
- Empowerment indicators (confidence in farm decision-making and leadership roles)

Although data collection faced practical constraints, including restricted field time, and weak mobile network connectivity in upland areas that prevented phone-based follow-ups, the steps taken during the study remained sufficient to ensure that the information gathered was

dependable. These constraints also meant that only farmers who were both available and willing at the time of field visits were interviewed, which contributed to the modest number of respondents.

Despite these limitations, several measures helped maintain the study's credibility. The questionnaire was carefully drafted and refined by the research team to ensure that the items reflected the actual content and objectives of the training. Conducting the survey in Filipino helped reduce misinterpretation and increased participants' comfort in expressing their views. The inclusion of KIIs further strengthened the dataset because the qualitative accounts provided opportunities to confirm, clarify, and contextualize survey responses. This combination of methods reinforces the reliability and credibility of the results, even without further validation processes like follow-up interviews conducted remotely.

### Variables and Measurement Indicators

Table 1. Variables and Their Corresponding Indicators Used in Assessing the Impact of Capacity-Building Trainings Among Smallholder Farmers in Majayjay, Laguna

Variable Type	Variable Name	Indicators / Description
Independent Variable	Capacity-Building Trainings	Participation in technical, business, and social development trainings
Dependent Variables	Technical Knowledge	Understanding and application of sustainable vegetable production, pest management, and post-harvest practices
	Farm Business Management Skills	Competence in recordkeeping, budgeting, marketing, and financial literacy
	Empowerment	Confidence, leadership participation, and decision-making ability within farm or association

### Data Analysis

Data were analyzed using descriptive statistics, including frequency counts, percentages, and means, to summarize responses and identify training outcomes. Ratings of satisfaction and perceived learning

improvement were tabulated to assess the overall effectiveness of the training programs.

While correlation analysis could have provided insights into relationships among variables, it was not performed due to the limited sample size (n=35), which would not yield statistically reliable results. Instead, findings were interpreted descriptively and supported by qualitative data from KIIs to provide contextual depth.

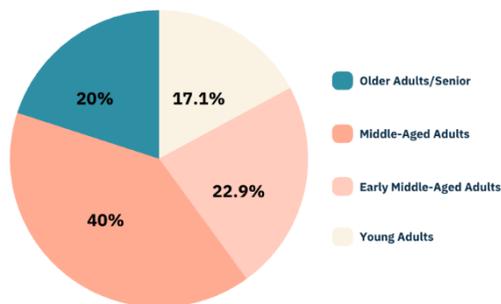
### **Ethical Considerations**

The study was conducted with ethical integrity. Prior to data collection, all participants gave their informed consent. Respondents were guaranteed confidentiality and privacy, and participation was entirely voluntary. Cultural sensitivity and respect to ethical norms for community-based agricultural research were guaranteed through collaboration with Majayjay's Municipal Agriculture Office and partner organizations.

## **RESULTS AND DISCUSSION**

### **Age Distribution and Its Implications**

The majority of respondents were middle-aged (41–50 years, 40%), followed by those aged 31–40 (22.9%), with young adults (20–30) representing only 17.1%. This age distribution mirrors a broader national trend of declining youth participation in agriculture (PSA, 2022). The limited engagement of younger farmers suggests potential challenges for succession and the long-term sustainability of farming communities in Majayjay.



*Figure 1. Percentage Distribution of Respondents Across Age Groups*

This pattern highlights an urgent need for capacity-building programs to incorporate targeted strategies that address youth-specific barriers. Such

strategies could include mentorship initiatives, practical incentives aligned with younger farmers' motivations, and flexible training schedules accommodating their varied demands. Without these adaptations, the sector risks an aging farmer population with knowledge gaps that could weaken productivity and innovation over time.

### Gender Distribution

Gender participation in vegetable farming was nearly balanced, with males comprising 51.4% and females 48.6% of respondents. This near parity reflects the increasing involvement of women in agricultural production and decision-making, consistent with findings by Beaman et al. (2012). High female participation in training sessions indicates a positive trend toward gender-inclusive extension approaches.

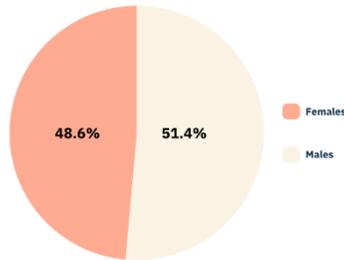


Figure 2. Percentage Distribution of Respondents According to Sex

However, these figures prompt further inquiry into whether men's and women's access to resources, credit, and decision-making power is genuinely equitable. Strengthening gender-sensitive programming could not only enhance productivity but also empower women as critical agents of agricultural development.

### Organizational Affiliation

Respondents were primarily affiliated with local farmer groups: Brgy. Bucal Vegetable Planters' Association (37.1%), Malinao Farmers' Association (28.6%), MOFA (22.9%), and the LGU (11.4%). These associations serve as essential platforms for peer learning and collective action, supporting access to training and resources (Bingen et al., 2003).

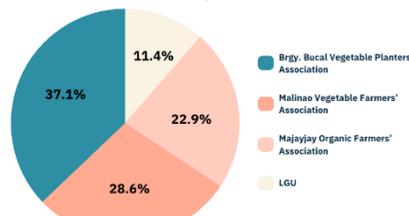


Figure 3. Distribution of Respondents Across Organizations (LGU and Farmers' Associations)

This organizational involvement underscores the key role local institutions play in mobilizing farmer participation and facilitating capacity-building. Future programs could leverage these networks more strategically to scale up outreach and foster stronger community-led initiatives.

### Satisfaction with Training Organization and Logistics

A large majority of respondents were very satisfied (77.1%) or satisfied (20%). While the results appear highly positive, it is important to acknowledge potential factors that may influence such ratings, including familiarity with trainers, community expectations, and small sample size.

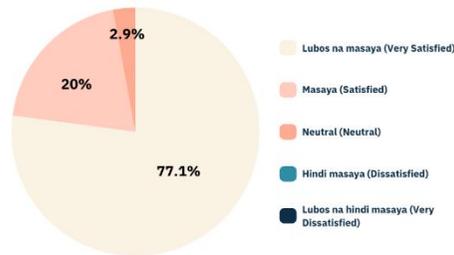


Figure 4. Farmers' Satisfaction Rating with the Overall Results of the Training Provided

These limitations do not indicate response bias but reflect the nature of purposive sampling and the established trust between extension workers and farmer groups.

### Quality of Training Content

Training quality was rated as excellent (80%) or good (20%). Respondents noted that the content was clear, practical, and relevant to their farming needs. This aligns with earlier needs-assessment findings and supports the idea that context-specific training enhances learning effectiveness (Davis et al., 2012).

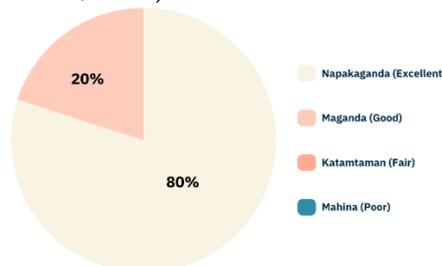


Figure 5. Farmers' Ratings on the Quality of Training Provided

Although the ratings were high, variation in participant backgrounds may explain small differences in perception. Some farmers may already possess experience in certain topics, influencing how new information is evaluated. This calls for adaptive, modular training programs that can be customized to different skill levels, optimizing learning outcomes and resource use.

### Extent to Which Training Met Expectations

A significant 88.6% of respondents reported that the training met all their expectations, while 11.4% felt it only partially met them.

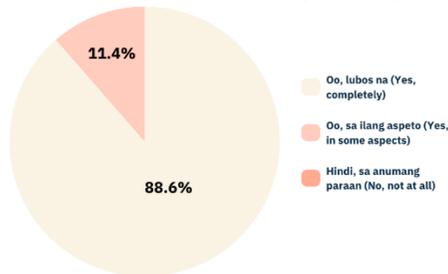


Figure 6. Farmers' Ratings on Whether Their Expectations from the Training Were Met

This suggests strong alignment between training design and participant needs but indicates room for improvement concerning specific topics, scheduling, and preferred learning methods. Incorporating regular participant feedback loops and iterative curriculum adjustment could enhance relevance and participant satisfaction.

### Effectiveness of Trainers

Nearly all respondents rated the trainers as very effective (97%). Farmers highlighted clear explanations, hands-on demonstrations, and approachable trainers as strengths of the program.

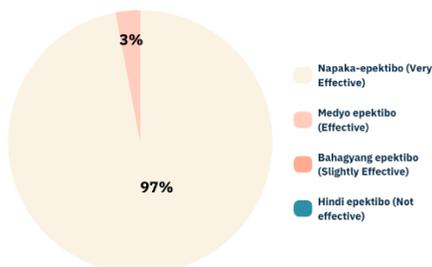


Figure 7. Farmers' Ratings on the Effectiveness of Trainers in the Conduct of the Capacity Building Trainings

High ratings are common in community-based training where interactions are personal and practical, but it remains important to continue improving facilitation skills through periodic refresher training for extension workers. To sustain this quality, periodic refresher training for extension workers focusing on facilitation skills and adult learning principles is recommended.

### Impact on Farming Knowledge and Skills

Almost all respondents (97%) reported a very significant improvement in their farming knowledge and skills.

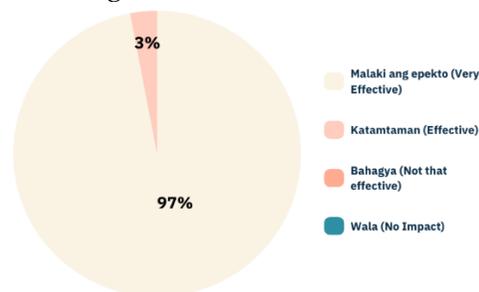


Figure 8. Farmers' Ratings on the Impact of the Capacity Building Trainings on Their Understanding and Skills in Farming Activities

To address reviewer concerns, this study clarifies the specific skills gained, moving beyond self-reported satisfaction.

*Farmers reported improvement in the following areas:*

- Technical Skills
- Proper seed selection and nursery management
- Soil preparation and nutrient management
- Pest and disease identification and basic control
- Post-harvest handling of vegetables

*Farm Business Skills*

- Recordkeeping of expenses and income
- Simple budgeting
- Understanding of basic marketing practices

*Social and Organizational Skills*

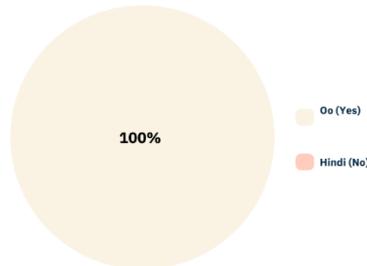
- Communicating with other farmers
- Participating in group decisions
- Sharing techniques within associations

These reflect the three major dimensions of development: technical, managerial, and social, identified in the training objectives. Training effectiveness is supported by similar findings from Farmer Field School

studies, where experiential learning enhances adoption of improved practices (Red et al., 2021; Ilar, 2015).

### **Implementation of Learned Techniques**

All respondents (100%) reported applying at least one technique learned from the training. Commonly implemented practices include improved planting methods, fertilizer management, and proper spacing. This full adoption rate, while high and potentially influenced by self-reporting bias, strongly suggests that the content was highly practical, relevant, and immediately applicable within the Majayjay context. Commonly implemented practices were concrete, such as improved fertilizer management and proper crop spacing. This practical utility is the strongest evidence of training effectiveness. Comparable results were reported by Cayabyab et al. (2024), where a high proportion of farmers implemented training knowledge.



*Figure 9. Farmers' Implementation of Knowledge and Techniques Learned from the Training in Their Farming and Livelihood*

Although the results are positive, future studies should document which techniques produce the most observable improvements in yield or income.

### **Farmer Confidence in Applying Skills**

Most respondents (97%) felt very confident in applying their newly learned skills.

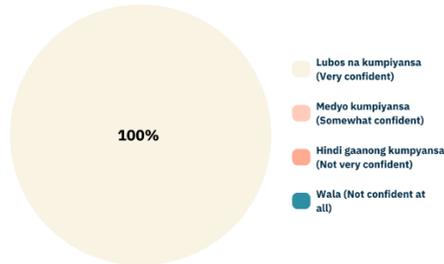


Figure 10. Farmers' Confidence in Applying the Skills Learned from the Training in Their Farming Activities

High confidence indicates not only knowledge acquisition but also a sense of empowerment. This study expands the definition of empowerment beyond satisfaction by incorporating indicators of:

- *Autonomy*: ability to decide when and how to use new practices
- *Decision-making*: increased participation in farm and association decisions
- *Innovation*: trying new techniques learned from training

Farmers reported feeling more capable of making informed decisions, which reflects improved self-efficacy, a known outcome of effective capacity-building (Feder & Anderson, 2004).

Given the consistently high percentages observed across several indicators, it is essential to clarify the analytical rationale behind the methods used, especially the decision not to conduct correlation or other inferential statistical tests. Correlation analysis and other inferential statistical tests were not performed because the study involved a small sample size ( $n=35$ ) drawn through purposive sampling. These conditions do not meet the basic assumptions required for valid inferential testing; particularly random sampling, adequate subgroup variation, and minimum sample size thresholds for correlation or group comparison analyses. Applying such tests under these constraints may produce unstable, biased, or non-generalizable results.

Instead, the study used descriptive statistics, which are methodologically appropriate for exploratory evaluations and localized impact assessments involving small, non-random populations. Descriptive approaches are commonly recommended in community-based agricultural research where the primary aim is to document participant experiences, training outcomes, and observable patterns rather than to produce population-level inferences (Gonsalves (2005). This aligns with methodological guidance that emphasizes the suitability of descriptive

analysis for small-sample program evaluations and participatory extension studies (e.g., Rivera & Qamar, 2003; FAO, 2021).

## **CONCLUSION AND RECOMMENDATION**

The capacity-building initiatives implemented in Majayjay, Laguna have effectively strengthened the knowledge, skills, and empowerment of smallholder vegetable farmers. Participants demonstrated significant improvements in technical farming knowledge, including sustainable vegetable production, pest and disease management, and post-harvest handling. In addition, they enhanced farm business management skills, such as recordkeeping, budgeting, marketing, and financial literacy, and showed increased confidence in decision-making, leadership participation, and cooperative engagement. High levels of satisfaction and consistent application of newly learned techniques highlight the overall effectiveness of the training programs in meeting the technical, managerial, and social development needs of the farmers.

Limitations of the study include the small sample size (n=35), reliance on self-reported data, and the focus on specific farmer associations within Majayjay, which may limit the generalizability of the findings. Despite these constraints, the results provide strong evidence that tailored, participatory capacity-building programs can significantly enhance practical competencies and empower smallholder farmers.

Based on these results, it is recommended that future capacity-building initiatives continue to address technical, managerial, and social development needs while fostering inclusive and gender-responsive participation. Sustained support from local government units, farmer associations, and extension services is essential to maintain and scale these gains. Efforts should also focus on strengthening knowledge-sharing platforms and promoting collaboration among stakeholders to ensure the continuity and sustainability of agricultural capacity-building efforts in Majayjay and other similar contexts.

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