



RESEARCH PAPER

OPEN ACCESS

Synthesizing and integrating environmental awareness and bio-intensive gardening under the Gulayan sa Paaralan (SIBUG) extension project

Violeta F. Collado^{*1}, Analyn V. Sagun², Angelina T. Gonzales², Marilyn D. Respicio³

¹College of Education, Don Mariano Marcos Memorial State University, North La Union Campus, Bacnotan, La Union, Philippines

²College of Agriculture, Don Mariano Marcos Memorial State University, North La Union Campus, Bacnotan, La Union, Philippines

³Department of Education, Mangan Elementary School, La Union, Philippines

Key words: Extension model, Gulayan sa Paaralan, Research-based extension project, Sustainable future

Received: May 24, 2026 **Accepted:** June 08, 2026 **Published:** June 12, 2026

DOI: <https://dx.doi.org/10.12692/ijb/28.6.82-88>

ABSTRACT

School-based extension programs play an important role in promoting environmental sustainability, food security, and community participation through research-based interventions. This study evaluated the implementation of the Synthesizing and Integrating Environmental Awareness and Bio-intensive Gardening under the Gulayan sa Paaralan (SIBUG) Extension Project at Mangan Elementary School, La Union, Philippines. Specifically, the project aimed to establish a functional and sustainable Gulayan sa Paaralan, strengthen stakeholders' knowledge and skills in producing organic fertilizers and pesticides, promote environmental awareness, and encourage collaborative participation among school and community stakeholders. A participatory extension approach guided by the Ako-Kami-Tayo (AKT) Model was employed involving school administrators, teachers, students, parents, university extension professionals, and community partners. Project implementation included orientation sessions, technical training, hands-on workshops, environmental awareness campaigns, waste management activities, and continuous monitoring and evaluation. The training programs received excellent participant evaluations, with mean scores of 4.80 for organic fertilizer training and 4.78 for organic pesticide training, indicating high levels of participant satisfaction and perceived usefulness. The project successfully established a sustainable school garden, enhanced stakeholders' environmental awareness, promoted the adoption of organic gardening practices, and strengthened partnerships between the university and the beneficiary school. Furthermore, the project contributed to school recognition through several institutional awards, demonstrating its sustainability and community impact. Overall, the SIBUG Extension Project proved to be an effective research-based extension model that integrates environmental education, sustainable agriculture, and participatory community engagement. The findings suggest that similar extension initiatives can be replicated in other schools to promote food security, environmental stewardship, and sustainable community development.

*Corresponding author: Violeta F. Collado ✉ vcollado@dmmmsu.edu.ph

INTRODUCTION

Rendering services is a prideful experience, and higher education institutions are implementing research-based extension projects to address community needs and support the Sustainable Development Goal (SDG). The 2030 Agenda for Sustainable Development was approved by the UN General Assembly in September 2015. The 17 Sustainable Development Goals (SDGs) are part of this. The objectives highlight a comprehensive strategy for attaining sustainable development for all, building on the crucial idea of "leaving no one behind.", Global Rewinding Initiative. Faculty members, researchers, and extension professionals in the academe play a crucial role in developing and implementing community-based projects to achieve SDGs. The researchers' role is to develop innovation, strategy, and products that can be turned into extension projects. According to the Spade Survey (2023), social research informs policymakers on the most effective ways to address social issues by bringing light on societal needs and concerns.

It also helps to examine the efficacy of programs and policies to ensure that the expected outcomes are achieved. The product of research, whether technical or non-technical, must be realized so that it does not end with publication. Extension professionals play an important role in translating research findings into extension project that benefit the community for the long term.

Don Mariano Marcos Memorial State University aims to increase extension services to 95%, implementing research-based initiatives like Gulayan sa Paaralan, a small-scale production initiative for undernourished students, under Project SIBUG, to build effective and sustainable extension projects. One of the objectives of this project is to combat malnutrition because health and nutrition should be a lifestyle that must be embarked on by the learners, parents, and stakeholders as well. It is a very important aspect that each family should consider to strongly build a nation. Food is an essential ingredient for survival. In fact, SDG 3 aims to ensure healthy lives and promote well-being for all at all ages. Moreover, SDG 2's

concern is to end hunger, achieve food security and improved nutrition, and promote sustainable agriculture, while SDG 17 focuses on partnerships to achieve the goal. These SDGs are important in this project because schools should be a strong partner of the family to combat hunger and malnutrition. Every learner must be healthy and full to power the body and help the mind to think. The growing cases of malnourished schoolchildren should be part of the Priority Improvement Area (PIA) of the School Planning Team (SPT) and the school stakeholders.

This project Synthesizing and Integrating Environmental Awareness and Bio-intensive Gardening Under Gulayan sa Paaralan (SIBUG), aimed to yield better and more organically produced products of the Gulayan sa Paaralan. The Bio Organic Inputs research output of Sagun (2018) was utilized in the production of organic fertilizer.

Likewise, organic insecticides against major insect pests of Limon (2018) were used to fight pests and diseases of plants. These were achieved utilizing the participatory method with a contest, a collaboration and partnership of DMMMSU and MES administrators, teachers, parents, learners and stakeholders from planning, implementation, monitoring, and evaluation were applied. Furthermore, GPP provided the beneficiaries with the importance of environmental sustainability. They become more concerned with environmental problems, which lead to greater environmental appreciation. For the continuous improvement of the project, reports were carefully reviewed where program gaps were identified. Strategies and techniques were formulated to solve the program gaps during the implementation phase. Results were presented during the Agency In-House Review (AIHR) for monitoring and evaluation, and recommendations were presented to the beneficiaries as well.

Furthermore, the DMMMSU-CGS extension program made an effort to translate and apply research outputs to extension initiatives based on the Ako, Kayo, and Tayo (AKT) model. Hence, trainings and

other activities for teachers, learners, parents, and stakeholders at Mangan Elementary School were planned and implemented collaboratively by CGS extension professionals, researchers, administrators, teachers, students, non-teaching staff, and other stakeholders, allowing them to share their knowledge, skills, and expertise with the beneficiaries.

This project aimed to assist Mangan Elementary School's (MES)' request to assist them by providing orientation, training, seminars, workshops, and contest then applying the knowledge or skills learned in their everyday tasks. Extension professionals aimed to: (1) establish one (1) functional and sustainable Gulayan sa Paaralan; (2) train twenty-eight (28) beneficiaries to produce organic fertilizers and pesticides (technology from DMMMSU-NLUC) in growing vegetables in school / at home per year; (3) harvest produce vegetables, which can generate revolving funds for the school or food for the malnourish learners; (4) instil awareness of the importance of gardening to the stakeholders through trainings and contest; (5) established Gulayan sa Paaralan will serve as laboratory area for EPP and other related subjects; and (6) determine one (1) eco-friendliest classroom.

Theoretical framework

One of the demands of the Extension Office from the College of Graduate Studies (CGS) is that they conduct their own research and extension programs. As a result, the administration, affiliate faculty members, extension professionals, and students recognized the need to carry out extension projects. CGS Extension Program (AKO) was the result of planning at DMMMSU NLUC's administration building. KAMI or the proponents, stakeholders, and the school beneficiary met to discuss each party's obligations and responsibilities. A Memorandum of Agreement (MOA) was signed to establish the partnership. For TAYO to stand and move, all CGS programs, stakeholders, and scheduled activities must be accomplished, and the project's direction is to complete the objectives through careful planning, implementation, and evaluation undertakings (Fig. 1).

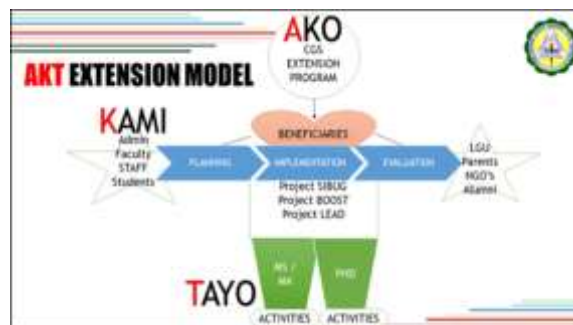


Fig. 1. A conceptual paradigm showing the process of developing extension project

This Synthesizing and Integrating Environmental Awareness and Bio-intensive Gardening Under Gulayan sa Paaralan Project (SIBUG) is a supplemental project of the existing Gulayan sa Paaralan Program that supports Sulong EduKalidad through the Improvement of the Learning Environment and the Engagement of Stakeholders for Support and Collaboration, which are two of the Four Pillars of Aggressive Reforms for Quality. The school, classrooms, and other learning facilities were prepared to improve learning experiences in the improvement of the learning environment, while DMMMSU technology and best practices, as well as gender sensitivity, are always observed in all activities.

The project's implementation began shortly after approval. Various activities were carried out under this initiative to effectively implement the entire CGS extension program. Meanwhile, class learners are cultivating an awareness of the environment through composting and a search for eco-friendlies by distinguishing trash as biodegradable for composting and non-biodegradable for recycling. The SIBUG project was also evaluated to see if the goals were met and to identify program weaknesses that should be addressed in the next year/s of implementation.

MATERIALS AND METHODS

Research design

This extension endeavor made use of a participatory method of investigation. According to Vaughn and Jacquez (2020), research strategies, methodologies, and frameworks that employ systematic inquiry in

close cooperation with individuals impacted by a topic under study in order to effect change or take action are collectively referred to as participatory research (PR).

Since Don Mariano Marcos Memorial State University North La Union Campus (DMMMSU) and Mangan Elementary School (MES) stakeholders were involved in this extension project, the participatory method was used. It was utilized to give stakeholders an opportunity to respond to the school's requests for support services in order to influence development.

Sources of data

The participants of this project were the administrators, faculty members, learners, parents, staff, and other stakeholders of DMMMSU North La Union Campus- College of Graduate Studies and Mangan Elementary School, Santol, La Union, Philippines (Fig. 2).



Fig. 2. Map of DMMMSU Bacnotan and Santol, Philippines

Planning

The College of Graduate Studies (CGS) started a need-based extension program to make sure that the output is sustainable and met the specific needs of the beneficiaries. Hence, the CGS adopted Mangan Elementary School (MES) in Santol, La Union for a two-year term. According to the team's preliminary survey, this school lacks *Gulayan sa Paaralan*. Consequently, the graduate school developed an extension project to meet the requests of the school. DMMMSU and MES launched the "Gulayan sa Paaralan Project (GPP)" through stakeholder

meetings, and it was successfully implemented in 2022. The team intended to train administrators, teachers, parents, students, and other interested stakeholders in establishing and developing GPP. This project's planned activities included trainings on organic fertilizers and organic pesticide production. These are DMMMSU technologies developed by researchers at DMMMSU-NLUC.

As planned, produced products will serve as food to deal with the issue of hunger and malnutrition. Malnutrition has been identified as a Priority Improvement Area (PIA) in Mangan Elementary School's School Improvement Plan. Some of the products will be sold and generated income will be used as a revolving fund for MES. Meanwhile, learners practiced environmental awareness by categorizing waste products as biodegradable or non-biodegradable for composting and recycling. DMMMSU and MES successfully signed a Memorandum of Agreement (MOA) for this extension project.

Orientation activity

The preliminary activity in the conduct of the extension work is the orientation stage. In this stage, the extension professionals introduced the project's objectives and concepts. This means that the stakeholders from MES, Santol, La Union, Philippines ought to participate in the planned activities. The responsibilities of extension professionals, the Parents and Teachers Association (PTA), LGU, and other stakeholders are clarified in this activity. It was explained in the orientation stage the trainings and activities to be conducted. It was also highlighted that the participatory method is to be imposed in this extension project.

Implementation

After the orientation activity, the construction of *Gulayan sa Paaralan* was conducted. Parents were the key players in the construction area. After the construction, the extension professionals conducted the training: (1) organic fertilizer; (2) organic pesticides; and (3) proper waste disposal (biodegradable and non-biodegradable waste). Another strategy imposed in the extension activity was the "search for the eco-friendliest classroom" contest.

There were also hands-on waste management initiatives during the search. Furthermore, the extension professionals also provided video presentations to expound on the management of gulayan (garden) and recyclable materials. After the training and seminars were conducted, hands-on workshops were performed and executed so that the learners would completely understand the execution of waste management in a real-world scenario.

Monitoring and evaluation

The extension professionals, campus extension unit, and representative from the town of Santol monitored the project's development (both announced and unannounced). The GPP progress was properly documented and the activity search for the eco-friendliest classroom was designed to help participants learn more about trash management. Evaluators chose the winner of the eco-friendliest classroom contest.

RESULTS NAD DISCUSSION

Table 1 presents the evaluation results of the training programs conducted under the Synthesizing and Integrating Environmental Awareness and Bio-intensive Gardening under the Gulayan sa Paaralan (SIBUG) Extension Project. The respondents rated the Organic Fertilizer Training with a mean score of 4.80 and the Organic Pesticides Training with a mean score of 4.78, both interpreted as "Excellent." These findings indicate that the participants highly appreciated the content, delivery, relevance, and practical applicability of the training activities. The high evaluation ratings suggest that the training programs effectively enhanced the knowledge and skills of teachers, parents, learners, and other stakeholders in adopting environmentally sustainable gardening practices.

Table 1. Summary of training evaluations conducted

Training	Mean	Remarks
Organic fertilizer	4.80	Excellent
Organic pesticides	4.78	Excellent

The excellent ratings demonstrate that the research-based technologies transferred through the extension project were well received by the beneficiaries. The findings support the assertion of

Gonzales and Ramos (2019) that educational and community-based environmental programs with positive participant experiences tend to achieve greater engagement and long-term adoption of sustainable practices. Similarly, Torres *et al.* (2021) emphasized that practical and skills-oriented training programs improve participant competence and encourage the application of acquired knowledge in real-life agricultural settings. In the present project, participants were not only exposed to theoretical concepts but also engaged in hands-on activities involving the preparation and utilization of organic fertilizers and organic pesticides, thereby increasing the likelihood of sustained implementation.

Beyond participant satisfaction, the successful establishment of a functional Gulayan sa Paaralan (GPP) demonstrated the effectiveness of the capacity-building interventions. The integration of organic farming technologies contributed to the promotion of environmentally friendly agricultural practices within the school community. These outcomes are consistent with the findings of Delos Reyes (2021), who reported that organic farming training programs enhance sustainable agricultural practices through improved soil management, reduced dependence on synthetic agricultural inputs, and increased environmental stewardship. The application of DMMMSU-developed technologies enabled beneficiaries to adopt practical solutions that support both food production and environmental conservation.

The implementation phase further revealed the importance of participatory engagement among stakeholders. Parents, teachers, students, school administrators, and community partners actively participated in the construction and maintenance of the school garden, training activities, and environmental awareness initiatives. This collaborative approach reflects the principles of participatory research advocated by Vaughn and Jacquez (2020), wherein stakeholders become active contributors rather than passive recipients of interventions. Such participation enhanced project ownership and strengthened the sustainability of project outcomes.

Continuous monitoring and evaluation also contributed significantly to the project's success. Extension professionals, campus extension personnel, and local government representatives conducted both announced and unannounced visits to assess project progress and provide technical guidance. Regular documentation and monitoring ensured transparency, accountability, and timely identification of implementation gaps. These findings corroborate the work of Mariano (2020), who emphasized that sustained stakeholder coordination and systematic monitoring are critical determinants of the success and longevity of community extension programs. Likewise, Torres and Dela Cruz (2021) highlighted that transparent monitoring mechanisms strengthen stakeholder confidence and improve project sustainability.

An important component of the project was the Search for the Eco-Friendliest Classroom, which promoted environmental awareness and responsible waste management among learners and teachers. Through this activity, participants practiced waste segregation, recycling, composting, and classroom beautification. The Kinder Class emerged as the winner, demonstrating exemplary commitment to environmental stewardship. The success of this initiative supports the findings of Gonzales and Ramos (2019), who reported that interactive and competition-based environmental activities enhance student engagement and foster positive environmental behavior. Furthermore, Martinez (2020) noted that early exposure to sustainability education significantly influences long-term environmental responsibility, suggesting that the involvement of young learners in ecological activities can generate lasting behavioral change.

The project's accomplishments extended beyond the establishment of a sustainable school garden. The beneficiary school, together with its administrators and student organizations, received recognition through various awards, including distinctions during the "Pammadayaw Awarding." Such achievements indicate that the project generated

measurable institutional impacts and strengthened the culture of environmental responsibility within the school community. The awards also serve as evidence of effective collaboration among the university, school personnel, parents, learners, and local stakeholders.

Overall, the findings demonstrate that the SIBUG Extension Project successfully integrated environmental awareness, sustainable agriculture, and community participation into a comprehensive school-based development initiative. The combination of technical training, participatory implementation, continuous monitoring, and environmental advocacy contributed to the achievement of project objectives and the establishment of a functional and sustainable Gulayan sa Paaralan. These outcomes align with UNESCO's (2021) framework for Education for Sustainable Development, which emphasizes experiential learning, stakeholder collaboration, and community engagement as essential components of sustainable educational programs. The project therefore serves as a viable model for future research-based extension initiatives that seek to promote food security, environmental sustainability, and community empowerment.

CONCLUSION

The project successfully integrated technical education in organic farming, ensuring sustainability and long-term impact, highlighting the importance of continuous training, stakeholder participation, and environmental consciousness. Based on the conclusions, the following recommendations were designed: (1) This extension project can be a basis for assisting more schools in the region; (2) Participatory method with contest be used in conducting activities; (3) AKT Model can be used by extension professionals in initiating more extension projects.

ACKNOWLEDGEMENTS

The authors acknowledge Don Mariano Marcos Memorial State University for funding the research project.

REFERENCES

- Delos Reyes J.** 2021. The impact of organic farming training on sustainable agricultural practices: A case study in community-based programs. *Journal of Agricultural Extension* **15(2)**, 54–72.
- Global Rewinding Initiative.** n.d. 17 sustainable development goals: United Nations. <https://glorew.com/articles/17-sustainable-development-goals-united-nations>
- Gonzales R, Ramos M.** 2019. School-based environmental activities and student engagement in sustainability programs. *Environmental Education Journal* **45(2)**, 67–85.
- Mariano P.** 2020. The role of coordination in community extension projects: A case study in rural education programs. *Journal of Extension Studies* **12(3)**, 45–60.
- Martinez L.** 2020. Early exposure to sustainability education and its long-term effects on environmental responsibility. *Sustainable Learning Journal* **8(1)**, 23–39.
- Spade Survey.** 2023. The importance of research: Advancing knowledge and progress in society. LinkedIn. <https://www.linkedin.com/pulse/importance-research-advancing-knowledge-progress-society>
- Torres J, Dela Cruz S, Lopez M.** 2021. Assessing the effectiveness of training programs in agricultural extension projects. *Journal of Sustainable Development* **19(3)**, 88–104.
- Torres J, Dela Cruz S.** 2021. Transparency and accountability in school-based extension projects: Lessons from community engagement initiatives. *Journal of Public Administration & Education* **17(4)**, 102–118.
- United Nations Educational, Scientific and Cultural Organization (UNESCO).** 2021. Education for sustainable development: A roadmap for transformation. UNESCO Publishing.
- Vaughn LM, Jacquez F.** 2020. Participatory research methods: Choice points in the research process. *Journal of Participatory Research Methods* **1(1)**. <https://doi.org/10.35844/001c.13244>