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School and home cacao learning sites: Promoting community empowerment through cacao-based education, nutrition, and enterprise development

Bernard P. Madarang*, John Carlo Banan, Jehan U. Gerardo, Perla R. Bautista, Jackielyn Garcia, Ronel T. Pacubat, Wilfredo M. Perciano, Rocky Casilana

Cagayan State University, Philippines

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ABSTRACT

Community-based interventions that integrate agricultural education, nutrition, and livelihood development are essential for improving rural well-being and promoting sustainable development. This study evaluated the implementation of the School + Home Cacao (S+HC) Learning Sites in Lasam, Cagayan, Philippines, as a participatory model for strengthening community empowerment through cacao-based education, nutrition, and enterprise development. A community-based participatory action research (PAR) design was employed involving Cagayan State University, the Department of Education, local government units, teachers, parents, pupils, and community stakeholders. Baseline assessments, structured questionnaires, interviews, focus group discussions, field observations, and participatory consultations were used to assess participants' knowledge, skills, and attitudes, while descriptive statistics and thematic analysis were applied to evaluate project outcomes. The project established two school-based cacao learning sites and distributed 400 cacao seedlings, comprising 160 (40.0%) at IBJ Elementary School, 150 (37.5%) at Magsaysay Elementary School, and 90 (22.5%) in parents' home backyards. A total of 57 parents and 30 schoolchildren participated in literacy, nutrition, and cacao-processing activities. Capacity-building programs enhanced participants' knowledge and practical skills in cacao production and value addition, while locally developed cacao-based products promoted nutrition awareness and entrepreneurship. The project also produced two international publications, four utility models, two developed cacao products, trained 57 beneficiaries, and achieved 100% accomplishment for its planned outputs. Reported outcomes included a 25% increase in access to education, a 20% increase in agricultural literacy, and a 10% improvement in indicators of sustainable community development. The School + Home Cacao Learning Sites demonstrated that integrating education, nutrition, and value-added cacao enterprise through participatory community engagement is an effective and replicable approach for enhancing agricultural literacy, livelihoods, food security, and sustainable rural development.

*Corresponding author: C. Magulod ✉ gilbertmagulod_rdecusulasam28@yahoo.com

INTRODUCTION

Poverty reduction remains a major development priority under the Sustainable Development Goals (SDGs), particularly in rural communities where agriculture is the primary source of livelihood. In the Philippines, poverty incidence remains highest among households engaged in agriculture, reflecting persistent challenges such as low productivity, limited technical knowledge, price fluctuations, and inadequate livelihood opportunities (FAO, 2017; Joffe, 2007; Gizaw *et al.*, 2022; Miladoniv, 2023). These constraints continue to affect food security, education, and the overall well-being of rural households.

Among the country's high-value agricultural commodities, cacao (*Theobroma cacao*) has gained increasing attention because of its economic, nutritional, and livelihood potential. The growing demand for cacao products presents opportunities for income generation, value addition, and rural enterprise development. However, despite government support and increasing market demand, cacao production in the Philippines remains constrained by declining productivity, limited processing capacity, and inadequate technical knowledge among farming communities, highlighting the need for community-based interventions that strengthen the cacao value chain.

Schools and higher education institutions play an important role in promoting sustainable rural development through education, research, and community extension. Integrating agriculture into basic education provides opportunities for experiential learning while strengthening agricultural literacy, nutrition awareness, and community engagement. Such approaches encourage learners and their families to appreciate agriculture as a viable source of livelihood and contribute to the development of practical skills relevant to local communities (UNESCO, 1990; FNRI, 2013; Fajardo-Gacal *et al.*, 2020; Montagna *et al.*, 2019). Likewise, empowering households through agricultural training, value-added

processing, and small-scale enterprise development can diversify income sources while promoting food security and local economic growth (Mallari *et al.*, 2019). Integrating cacao-related concepts into school learning also enhances interdisciplinary education and supports the development of critical thinking and problem-solving skills among learners (Ogena, 2019; Guina, 2020).



Fig. 1. Virtual launching of Cacao processing center at CSU Lasam during the 2020 RSTW

Cagayan State University (CSU), through its Cacao Processing Center, has actively promoted research, extension, and technology transfer to advance the cacao industry in the Cagayan Valley Region (Fig. 1). Building on these initiatives, the School + Home Cacao (S+HC) Project was implemented as a participatory action research initiative that connects schools, households, local government units, and community stakeholders to promote cacao-based education, nutrition, and enterprise development. The project integrates school-based learning, community participation, and value-added cacao technologies to improve literacy, livelihood opportunities, and community resilience.

The project was guided by a conceptual and operational framework that integrates participatory action research, technology diffusion, and community engagement to promote literacy, nutrition, livelihood, and climate resilience through cacao-based interventions. The conceptual framework (Fig. 2) illustrates the relationships among key stakeholders and project components, whereas the operational framework (Fig. 3a) presents the project's inputs, processes, outputs, outcomes, and expected impacts, providing the basis for implementation and evaluation.

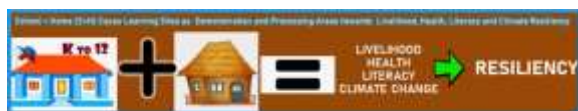


Fig. 2. Operational framework of the project

Although previous studies have examined cacao production, agricultural extension, nutrition, and school-based learning independently, limited evidence exists on integrated community-based models that simultaneously promote education, nutrition, livelihood, and community empowerment

through cacao. Addressing this gap, the present study evaluated the implementation of the School + Home Cacao Learning Sites in Lasam, Cagayan, Philippines, as a participatory model for promoting community empowerment through cacao-based education, nutrition, and enterprise development. Specifically, the study assessed the establishment of cacao learning sites, participants' knowledge, skills and attitudes, literacy and training activities, dissemination of research outputs, and the project's contributions to sustainable rural development.

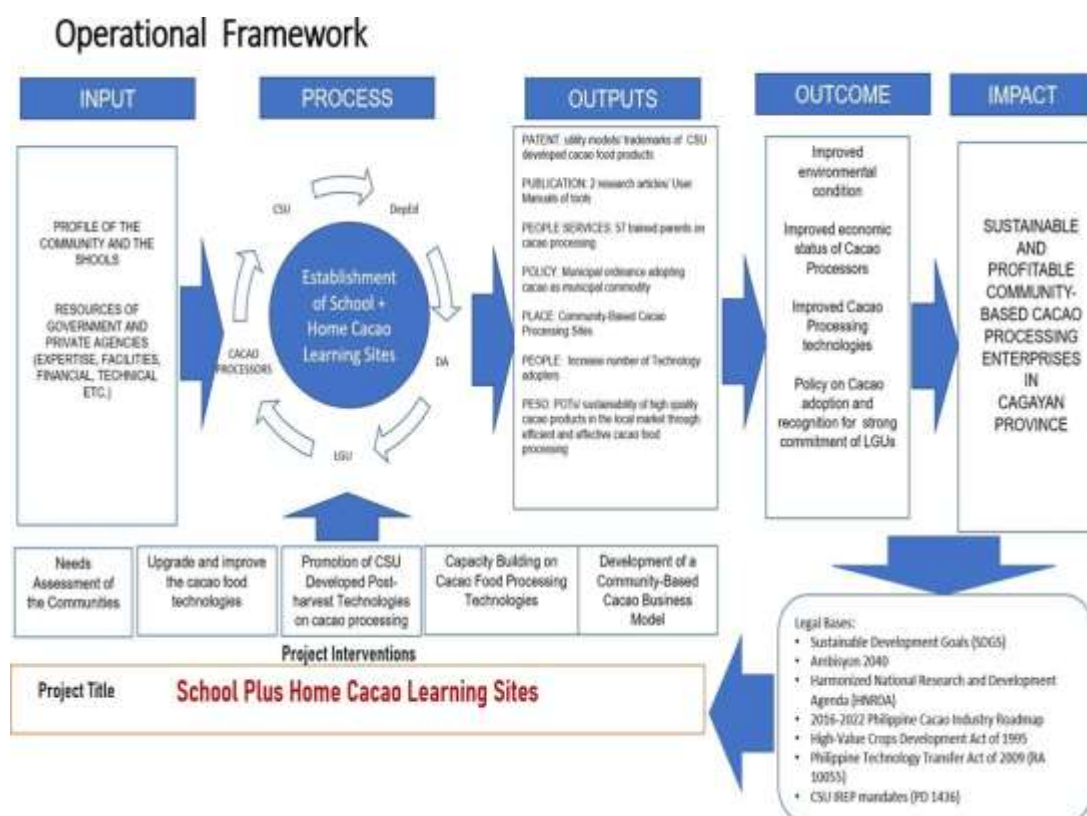


Fig. 3a. General operational framework in like manner,

MATERIALS AND METHODS

Study Design

This study employed a community-based participatory action research (PAR) design to develop, implement, and evaluate the School + Home Cacao (S+HC) Learning Sites initiative in the Municipality of Lasam, Cagayan, Philippines. The participatory approach emphasized collaborative planning, implementation, monitoring, and evaluation involving Cagayan State University, the Department of Education (DepEd), local government units

(LGUs), parents, teachers, pupils, and community stakeholders. The project was designed to promote community empowerment through cacao-based education, nutrition, and livelihood development while strengthening local capacity for sustainable agricultural enterprise.

The methodological framework consisted of sequential pre-implementation, implementation, monitoring, and technology adoption phases, as illustrated in Fig. 3b.



Fig. 3b. Methodology Framework of the Project

Study area

The study was conducted in the Municipality of Lasam, Cagayan Province, Philippines. Lasam is

predominantly an agricultural municipality with favorable agro-climatic conditions for cacao production, including a tropical climate, well-distributed rainfall, suitable temperature ranges, and fertile soils with high organic matter content. These environmental conditions provide an appropriate setting for sustainable cacao cultivation and community-based agricultural interventions.

Two public elementary schools—Magsaysay Elementary School and Ignacio B. Jurado (IBJ) Elementary School—served as the pilot implementation sites (Fig. 4). According to the Municipal Agriculturist Office, Lasam has an established cacao industry with approximately 58,528 cacao trees, including 16,537 fruit-bearing trees. Previous regional assessments have likewise identified Lasam as one of the municipalities with significant potential for cacao production in Cagayan Province (Gonzales *et al.*, 2018).

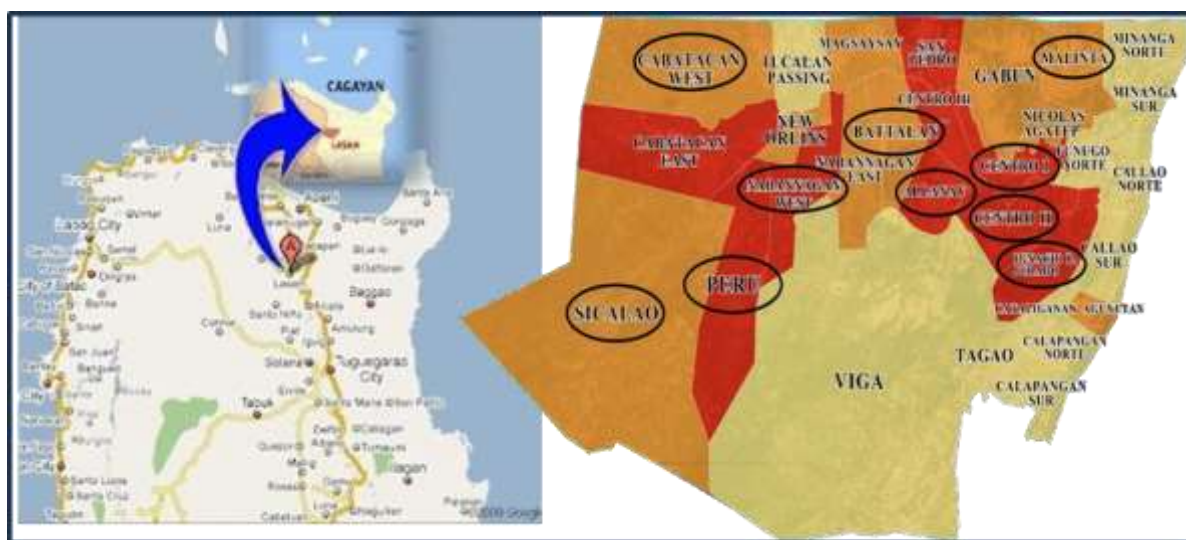


Fig. 4. Location of the pilot schools (Magsaysay and IBJ)

Study participants and sampling

The project involved multiple stakeholder groups, including elementary school pupils, parents, teachers, school administrators, university faculty members, LGU representatives, and partner government agencies.

The pilot schools were selected using purposive sampling based on three criteria:

1. willingness of school administrators to participate;
2. presence of nutritionally vulnerable pupils; and

3. availability of suitable garden space with an adequate water supply, following the selection approach of Calub *et al.* (2019).

Intermediate pupils (Grades IV–VI) participated in school-based educational activities, while 57 parents were included in the baseline assessment of knowledge, skills, and attitudes related to cacao production, processing, and nutrition. The demographic characteristics of the participating parents are summarized in Table 1.

Project framework

The School + Home Cacao Learning Sites project was implemented using an integrated framework that linked schools, households, and community partners to promote literacy, nutrition, livelihood, and climate resilience through cacao-based interventions. The framework incorporated participatory planning, capacity building, experiential learning, technology adoption, enterprise development, and continuous stakeholder engagement.

Implementation followed four major phases: site selection and profiling, pre-implementation preparation, project implementation, and technology adoption and commercialization, as presented in Fig. 3b. These phases collectively supported the establishment of school and household cacao learning sites while strengthening community participation and institutional collaboration.

Baseline assessment

Baseline assessments were conducted before project implementation to establish the characteristics of participating schools, households, and beneficiaries. Data collection included interviews, mini-surveys, site validation, and community consultations.

The assessment generated information on:

1. demographic characteristics of participating parents;
2. educational attainment;
3. household livelihood and income;
4. land tenure;
5. nutritional status of selected pupils;
6. existing school garden conditions; and
7. household socioeconomic characteristics.

The demographic profile of the parent respondents is presented in Table 1. To determine training needs, parents' baseline knowledge, skills, and attitudes regarding cacao production, processing, and nutrition were also assessed using structured questionnaires. The results of this assessment are presented in Fig. 5, which served as the basis for designing subsequent capacity-building activities.

Intervention design

The intervention was implemented in three sequential phases beginning in July 2020. During the pre-implementation phase, pilot schools were selected, stakeholder consultations were conducted, baseline assessments were completed, existing school gardens were evaluated, project plans were developed, curriculum integration was initiated, and required resources and planting materials were prepared.

The implementation phase focused on establishing School + Home Cacao Learning Sites through site preparation, cacao seedling production and planting, experiential learning activities, curriculum integration, parent capacity-building programs, community organization, and continuous maintenance of school and household cacao gardens.

The technology adoption and sustainability phase emphasized knowledge dissemination, enterprise development, promotion of cacao-based products, technology transfer, commercialization initiatives, and strengthening partnerships among schools, households, LGUs, and Cagayan State University to ensure long-term project sustainability.

Data collection

Both quantitative and qualitative data collection methods were employed throughout the project. Quantitative data were obtained using structured survey questionnaires administered to participating parents during the baseline assessment. The questionnaires evaluated respondents' demographic characteristics and their knowledge, skills, and attitudes regarding cacao production, processing, and nutrition.

Qualitative information was collected through key informant interviews, focused group discussions (FGDs), participatory consultations, field observations, and site validation activities involving parents, teachers, school administrators, LGU representatives, and university personnel. These methods provided contextual information on project

implementation, stakeholder participation, challenges encountered, and perceived project outcomes.

Project implementation records, attendance sheets, field monitoring reports, and documentation of training activities were also maintained to support project monitoring and evaluation.

Monitoring and evaluation

Project implementation was monitored continuously throughout all phases. Regular site visits were conducted to evaluate the establishment and maintenance of cacao learning sites, monitor the survival and growth of planted seedlings, assess participation of stakeholders, and document implementation progress.

Participatory monitoring approaches were adopted through regular consultations, focused group discussions, and stakeholder meetings involving school personnel, parents, LGU representatives, and university extension staff. Monitoring results were used to guide project adjustments and improve implementation efficiency while ensuring that planned activities were completed according to project objectives.

Data analysis

Quantitative data were analyzed using descriptive statistics. Frequencies, percentages, and summary tables were used to describe participant characteristics, baseline knowledge, skills, attitudes, and project accomplishments. The findings are presented using tables and figures, including Table 1, Table 2, and Fig. 5.

Qualitative information obtained from interviews, focus group discussions, observations, and participatory consultations was synthesized through thematic interpretation to identify major implementation experiences, stakeholder perceptions, challenges, and emerging outcomes supporting community empowerment through cacao-based education and enterprise development.

Ethical considerations

Participation in the project was voluntary. Prior to data collection and implementation activities, permission was obtained from participating schools, local government officials, and relevant institutional partners. Parents and other participants were informed of the objectives of the project, and informed consent was obtained before participation. Confidentiality of participant information was maintained throughout the study, and all collected data were used solely for research, extension, and project evaluation purposes. The implementation adhered to the ethical principles governing community-based participatory research, including respect for participants, collaborative decision-making, transparency, and mutual benefit among all stakeholders.

RESULTS AND DISCUSSION

Profiling and characterization of the target sectors

The baseline profiling of the target sectors provided important socioeconomic information for designing context-specific interventions under the School + Home Cacao (S+HC) Learning Sites project. A total of 57 parent-respondents participated in the assessment, and their demographic characteristics are presented in Table 1.

As shown in Table 1, most respondents were female (78.95%), indicating the active involvement of mothers in school and community development activities. The majority were high school graduates (75.44%), while relatively few had attained college education. Farming was the principal source of livelihood for 91.23% of respondents, highlighting the community's strong dependence on agriculture. Although most participants owned agricultural land (75.44%), nearly 88% reported a monthly income below PHP 5,000, reflecting the limited economic capacity of many households. These findings underscore the need for community-based livelihood interventions that integrate agricultural development with value addition, capacity building, and income diversification to improve rural livelihoods (World Bank, 2008; FAO, 2017).

Table 1. Profile of the parent-respondents (N=57)

Profile variables		f	%
Sex	Male	12	21.05
	Female	45	78.95
Educational attainment	Elementary graduates	6	10.53
	High school graduates	43	75.44
	College level	8	14.04
Sources of income	Farming	52	91.23
	Business/trading	2	3.51
	Government/ Private employment	3	5.26
Lend tenure	Land owners	43	75.44
	Tenants	14	24.56
Monthly income	Below 5,000.00	50	87.72
	6 - 10,000.00	7	12.28

The socioeconomic profile suggests that the participating households possess a favorable foundation for adopting cacao-based interventions because of their agricultural background and land access. However, the low household income emphasizes the importance of improving value-added processing, technical capacity, and market opportunities to enhance livelihood outcomes. Similar studies have shown that strengthening farmers' technical skills and access to value chains contributes to increased productivity, household income, and community resilience (Porter and Kramer, 2011; FAO, 2017). This baseline information informed the design of subsequent training, extension, and enterprise development activities implemented through the School + Home Cacao Project.

Baseline data on the knowledge, skills and attitudes of parents were assessed related to cacao processing, production, and nutrition

The baseline assessment revealed generally low levels of knowledge, practical skills, and awareness among parents regarding cacao production, processing, and nutrition (Fig. 5). While a small proportion of respondents reported having a basic understanding of cacao processing, familiarity with cacao production stages, practical cultivation experience, and knowledge of the nutritional benefits of cacao remained limited, indicating substantial capacity gaps among participating households.



Fig. 5. Baseline data on the knowledge, skills and attitudes of parents were assessed related to cacao processing, production, and nutrition (N=57)

These findings highlight the need for targeted training and experiential learning interventions to strengthen community knowledge and technical competencies in cacao production and value addition. The baseline results also provided an evidence-based foundation for designing project activities that addressed identified learning needs while promoting sustainable livelihood opportunities. Consistent with previous studies, experiential learning and community participation enhance agricultural knowledge, strengthen technical skills, and encourage the adoption of improved farming and processing practices (Bradford *et al.*, 2019; Cox *et al.*, 2016). Likewise, increasing awareness of the nutritional value of cacao products may contribute to healthier dietary practices and greater utilization of locally produced cacao-based foods (Tan *et al.*, 2021).

Establishment of school + home Cacao learning sites as demonstration and processing areas towards improved livelihood, health, literacy and climate resiliency

The establishment of the School + Home Cacao (S+HC) Learning Sites translated the project's participatory framework into practical community-based interventions through site preparation, cacao planting, and stakeholder engagement. The selection and preparation of demonstration sites (Fig. 6) created an enabling environment for experiential learning, while the distribution and planting of 400 cacao seedlings across the two pilot schools and parents' home backyards (Table 2; Fig. 7) demonstrated the collaborative involvement of schools, households, and the wider community in promoting sustainable cacao production.

Table 2. Data on the planted cacao seedlings

Site	Number of cacao seedlings planted (n)	Percentage (%)
Magsaysay elementary school (Cacao site 2)	150	37.5
IBJ elementary school (Cacao site 1)	160	40.0
Parents' home backyards	90	22.5
Total	400	100.0

**Fig. 6.** Site visit, selection and clearing of the School + Home cacao learning sites in the two pilot elementary schools (right: IBJ Elementary school, left: Magsaysay elementary school)**Fig. 7.** Cacao planting activity conducted in the selected cacao learning sites (Right: IBJ E/S, Left: Magsaysay E/S)

The official launching and turnover ceremonies (Fig. 8) further strengthened stakeholder ownership and institutional commitment by formally transferring responsibility for managing the learning sites to participating schools and communities. Such participatory approaches are widely recognized as essential for improving local capacity, encouraging technology adoption, and enhancing the sustainability of community-based agricultural initiatives (Carayannis *et al.*, 2018; UNDP, 2015). Overall, the successful establishment of the learning sites provided a practical platform for integrating agricultural education, livelihood development,

nutrition, and community empowerment within the project area.

**Fig. 8.** the project management team headed by Prof. Gilbert C. Magulod Jr, PhD, CEO Prof. Victor M. Balatico, and faculty members initiated the launching and turnover of the School + Cacao Learning Site at IBJ Elementary School and Magsaysay Elementary School

Conduct of literacy activities as component of the school plus home cacao learning site

The literacy component of the School + Home Cacao Project complemented agricultural interventions by integrating cacao-related learning into basic education through the distribution of school supplies, development of curriculum-based learning materials (Table 3), and storytelling activities (Fig. 9 and 10).

**Fig. 9.** Distribution of school supplies for 30 school children

These activities provided learners with contextualized educational experiences that linked classroom instruction with practical agricultural knowledge while fostering appreciation for cacao as an important local resource. Context-based and experiential learning approaches have been shown to improve learner engagement and promote meaningful knowledge acquisition by connecting educational

content with real-life experiences (Kolb, 1984; UNESCO, 2017).



Fig. 10. Mr. Mark Jellico Rodillas, 4th Year education student delivering the cacao story telling for children in one of the Cacao School Sites

The project also promoted parental involvement by encouraging families to participate in literacy and learning activities, thereby strengthening the connection between schools and communities. Integrating cacao concepts across different subject areas enhanced learners' knowledge of agriculture, nutrition, and environmental stewardship while supporting the project's broader objectives of improving literacy, promoting sustainable livelihoods, and building climate-resilient communities. These findings are consistent with previous studies demonstrating that family engagement and community-based learning contribute to improved educational outcomes, stronger school–community partnerships, and sustainable local development (Epstein, 2011; UNESCO, 2017).

Table 3. Number of learning materials developed on cacao for children

Grade level	Subject	Lesson title
Grade 4	Science	The Life Cycle of Cacao Trees
Grade 4	Mathematics	Measuring Cacao Pods and Seeds
Grade 4	English	Writing a Cacao Processing Procedure
Grade 5	Home Economics	Creating Cacao-Based Recipes
Grade 5	Science	Understanding Cacao Fermentation
Grade 5	Mathematics	Calculating Cacao Yields
Grade 6	English	Presenting the History of Cacao
Grade 6	Home Economics	Exploring Cacao Nutritional Benefits

Conduct of trainings on cacao processing technologies with the school-children's parents

A series of capacity-building activities was conducted to enhance parents' knowledge and practical skills in cacao processing and value addition. The training covered key processing techniques, including roasting, grinding, product formulation, packaging, and quality improvement, enabling participants to transform locally produced cacao into marketable products (Fig. 11–14). These hands-on activities strengthened participants' technical competencies and increased their confidence in adopting cacao-based livelihood opportunities. Similar findings have shown that farmer training and practical extension programs improve knowledge acquisition, technology adoption, and agricultural productivity (FAO, 2018; Davis *et al.*, 2012).



Fig. 11. Dean Bernard Madarang and Mr. John Carlo Banan are conducting training on Cacao Food Processing with the parents of the school children in the two cacao learning sites



Fig. 12. CTED faculty-researchers presented their research results as component of the School Plus Home Cacao Project



Fig. 13. Two (2) Developed cacao-based food products



Fig. 14. Two (2) international publications on the profile of the school plus home cacao project

Beyond technical skill development, the training encouraged community participation and knowledge sharing among parents, schools, and project implementers. The practical approach facilitated technology transfer while promoting entrepreneurship, food utilization, and income diversification. Capacity-building initiatives that combine technical training with community participation have been recognized as effective strategies for strengthening rural livelihoods and supporting sustainable agricultural development (World Bank, 2008; FAO, 2018). By equipping parents with value-adding skills, the project contributed to improving household livelihoods and supported the long-term sustainability of the School + Home Cacao Learning Sites.



Fig. 15. Four cacao-based food products developed as utility models



Fig. 16. Places and partnership/ People services

Research results dissemination component of the school plus home cacao project

The dissemination of research results served as a key component of the School + Home Cacao Project by communicating project outcomes, best practices, and lessons learned to stakeholders, including community members, partner institutions, and local government units (Fig. 15–17, Table 4&5). These dissemination activities facilitated knowledge exchange, increased stakeholder awareness, and strengthened support for the continued implementation and expansion of cacao-based education and livelihood initiatives. Effective dissemination is widely recognized as essential for promoting the adoption of research outputs and translating scientific knowledge into practical community applications (Rogers, 2003; Nutley *et al.*, 2007).

The active participation of multiple stakeholders during dissemination activities reinforced collaboration among schools, communities, researchers, and development partners. Sharing project experiences and outcomes encouraged wider

adoption of successful practices while enhancing institutional commitment to sustainable agriculture, community empowerment, and local enterprise development. These findings underscore the

importance of knowledge dissemination in strengthening research utilization and supporting evidence-based community development initiatives (Rogers, 2003; World Bank, 2008).

Table 4. Research results dissemination

Faculty- researchers of the college of teacher education	Generated technologies disseminated
John Carlo Banan	Method of Production of Cacao Products, Process of making improved veggie cupcakes enhanced with Cacao chocolate.
Bernard Madarang	Development Fabrication and Tasting of small food processing tools (Chocolate molder, choco drier and bean grinder)
Ronel T. Pacubat	From Trash to Cash: Optimization of Bio-Ethanol Synthesis from Cacao Pod Husk -"Marrying Banana and Cocoa" Mineral, heavy metal.
Wilfredo M. Perciano	Profile of Cacao Growers in the Municipality of Lasam
Dr. Dolores C. Quebral	Food Preparation and Sanitation Practices of Native Delicacies Vendors In Lasam Public Market.
Janilete R. Cortez	Newsworthiness of Selected Environmental Related Articles and their Implication for Public Understanding of Environmental Issues

Table 5. Outputs of the school plus home cacao project

6Ps	Expected outputs (quantify)	Actual outputs	Percentage of accomplishment
Products	2 developed products	2 developed products	100%
Publications	2 research publications in international journals	2 research publications in international journals	100%
Patent	4 utility models developed	4 utility models developed	100%
People services	57 trained clientele	57 trained clientele	100%
Places and partnerships	2 partner schools established (Established Cacao) Demonstration learning sites (place)	2 partner schools established	100%
Policy	1 ordinance (on process)	1 ordinance (on process)	-

Table 6. Percentage of increase of the indicators

Outcomes Identified	Facts/ Data	Percentage of increase	Remarks
Increased number of cacao planted in the Municipality of Lasam	400 cacao seedlings planted in this project		Rehabilitation to be done in the School Plus Home Cacao Phase 2 project of 2023-2024
Improved access to education	57 parents and 30 school children have enhanced accessibility to education and hands-on learning experience on Cacao (literacy, health and climate resiliency)	25% increase	Respondents noted an increased availability of educational resources and experiential learning opportunities.
Enhanced Literacy	Deeper understanding of sustainable agriculture among 30 school children .	20% increase	Respondents reported improved agricultural literacy among students.
Positive changes in government policy and planning	Ongoing efforts to pass an ordinance recognizing the importance of cacao farming in the two barangays		Respondents perceived positive changes in government policies related to cacao farming.
Impact on sustainable development	Improved livelihoods, health, literacy, and climate resilience in the community.	10% increase	Respondents observed a comprehensive improvement in various aspects of community development.



Fig. 17. Developed cacao IEC materials of the project for copyright

Promoting Cacao's Nutritional Benefits through S+HC Learning Sites

The School + Home Cacao (S+HC) Project promoted the nutritional value of cacao by developing locally produced cacao-based products, including cacao powder, tablets, dark chocolate bars, spicy cacao balls, chocolate spread, and cacao champorado. The registration of these products with the Intellectual Property Office of the Philippines (IPOPHIL) enhanced

their sustainability and supported local entrepreneurship. Integrating these products into school feeding activities and household consumption increased awareness of cacao's nutritional benefits while encouraging healthier dietary practices. These findings are consistent with studies demonstrating that school-based nutrition programs and the promotion of nutrient-rich local foods improve dietary diversity, nutrition education, and community health (Montagna *et al.*, 2019; FAO, 2019; WHO, 2021).

Outcomes

The School + Home Cacao (S+HC) Learning Sites project strengthened education, livelihood, nutrition, and community development by enhancing participants' knowledge and skills in cacao production, processing, and value addition. The establishment of demonstration sites promoted experiential learning, sustainable farming practices, and cacao-based enterprise development, consistent with previous findings on community-based agricultural education (FAO, 2017; IFAD, 2021).

The project also fostered collaboration among schools, families, local government units, and the university, creating a sustainable platform for community engagement. By integrating literacy, nutrition, enterprise development, and stakeholder participation, the S+HC Learning Sites demonstrate a replicable model for inclusive rural development, food security, and community resilience (UNDP, 2019; World Bank, 2008).

CONCLUSION

The School + Home Cacao (S+HC) Project demonstrated that a community-based, participatory approach integrating agricultural education, literacy, nutrition, and livelihood development can effectively promote sustainable rural development. The establishment of school and home cacao learning sites, coupled with capacity-building activities, literacy interventions, and hands-on training in cacao production and processing, significantly enhanced participants' knowledge, technical skills, and awareness of the nutritional and economic value of cacao. These

interventions also strengthened collaboration among schools, families, local government units, and the university, fostering community ownership and active stakeholder participation.

The development and promotion of value-added cacao products further highlighted the project's potential to improve household livelihoods through entrepreneurship and income diversification while encouraging the utilization of locally available agricultural resources. Likewise, the integration of nutrition education and contextualized learning into school activities contributed to improved agricultural literacy and greater appreciation of sustainable food systems among learners and their families.

Overall, the School + Home Cacao Project provides a practical and replicable model for linking education, research, extension, and community engagement to address local development challenges. Its holistic framework demonstrates how participatory, school-community partnerships can simultaneously support agricultural productivity, nutrition, literacy, and socioeconomic resilience. Future initiatives should focus on strengthening market linkages, expanding value-added cacao enterprises, and conducting long-term impact assessments to further enhance the sustainability and scalability of the model across similar rural communities.

RECOMMENDATIONS

To sustain and expand the impact of the School + Home Cacao (S+HC) Project, the following recommendations are proposed:

1. Institutionalize cacao development through local policies: Local government units are encouraged to enact barangay and municipal ordinances recognizing cacao as a priority agricultural commodity to strengthen policy support, resource allocation, and long-term implementation.
2. Integrate cacao education into the school curriculum: The Department of Education (DepEd), in collaboration with higher education institutions, should incorporate cacao production, processing, nutrition, and entrepreneurship into relevant learning areas to promote agricultural literacy and contextualized learning.
3. Strengthen multi-stakeholder partnerships: Continued collaboration among local government units, educational institutions, farmer organizations, private sector partners, and community stakeholders is essential to enhance technical support, technology transfer, value-chain development, and market access for cacao-based products.
4. Promote research, innovation, and product development: Future research should focus on improving cacao production systems, climate-resilient cultivation practices, value-added processing technologies, and product diversification to enhance the competitiveness and sustainability of local cacao enterprises.
5. Conduct long-term impact assessment: Monitoring and evaluation should be continued to assess the project's long-term effects on agricultural productivity, household income, nutrition, educational outcomes, and community resilience, providing evidence to guide future program refinement and replication.
6. Support project expansion and sustainability: Securing financial and institutional support for a second phase of the project is recommended to consolidate current achievements, expand implementation to additional communities, and establish the School + Home Cacao Learning Sites as a scalable model for community-based agricultural education and rural development.

This integrated approach will strengthen the sustainability, scalability, and long-term impact of the School + Home Cacao Project while contributing to improved livelihoods, food security, agricultural education, and community resilience.

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