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Functionality of Learning Sites for Agriculture as Farmers' Field Schools in the Province of Benguet, Philippines

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Abstract. This study examines the functionality of Learning Sites for Agriculture (LSAs) as Farmers' Field Schools (FFS) in delivering key agricultural extension services in the BLISTT (Baguio, La Trinidad, Itogon, Sablan, Tuba, and Tublay) areas of the province of Benguet, Philippines. The research focuses on four primary services: training, technology demonstration, farm business advisory, and information and communication support. A cross-sectional comparative design was used, with a sample of 50 local farmers and 16 LSA cooperators. The study employed t-tests and ANOVA to compare perceptions of these services between the two groups. The findings revealed that local farmers and LSA cooperators generally shared similar perceptions, with no statistically significant differences across the four services ($p > 0.05$). Training and technology demonstration services were considered sufficient, while farm business advisory and information support services were moderately sufficient. Challenges in information and communication services were noted, particularly regarding limited internet connectivity in remote areas. Overall, the results indicate that LSAs effectively meet the needs of small-scale farmers in Benguet province. The improvements in information and communication infrastructure could further enhance their impact. Future research could explore the long-term effects of LSAs on agricultural productivity and the effectiveness of specific extension methods across different regions.

Keywords: Agricultural extension; Technology transfer; Agricultural training; Farm business advisory; Agricultural innovations.

1.0 Introduction

Agriculture in the global context faces numerous hurdles that encompass dwindling agricultural land base, an aging farming population, the impacts of climate change, diminishing soil fertility, the emergence of new pests and diseases, limited mechanization and technology adoption, capital constraints, inadequate financial literacy among farmers, and similar issues (Sassenrath et al., 2008). Furthermore, the sector contends with the added strains of rapid population growth, high poverty rates, and recurring natural disasters, all of which exert continuous pressure on the advancement of agriculture in this region (Mohamed, 2017).

Despite these obstacles, many of our farmers have responded to the call to emerge as pioneers within their farming communities. The farmers manage agricultural enterprises where they exhibit their abilities and expertise to their fellow farmers (Kilpatrick, 2000). The farmers put into practice the technological knowledge acquired through their training and seminars, offering practical demonstrations of relevant innovations and serving as valuable sources of information in their specialized fields and more (Black, 2000). These agricultural hubs have earned the

designation of "Agricultural Learning Sites" and the accompanying recognition from the Agricultural Training Institute following a thorough process of farm validation, interviews, and documentation (Department of Agriculture, 2022).

The primary objective of the Learning Sites for Agriculture in the Philippines has been to serve as exemplars, showcasing practical agricultural technologies and processes related to agricultural products and by-products. This endeavor aimed to enhance the capacities of small-scale farmers and other rural community members (Lapar & Ehui, 2004). The foundational principles guiding the creation of these Learning Sites for Agriculture are rooted in the belief that experience is the most effective teacher (Knobloch, 2003). These principles emphasize hands-on learning, active participation, and practical experiences. Moreover, they promote a farmer-to-farmer knowledge-sharing approach, encouraging problem-solving within the farming community (David, 2007). Learning by observation and modeling also plays a pivotal role in this initiative. It underscores the importance of farmers adopting the role of entrepreneurs, treating farming as a business enterprise. Lastly, the curriculum at these Learning Sites for Agriculture is demand-driven and tailored to address specific needs (Department of Agriculture, 2022).

Learning Sites for Agriculture are believed to play a crucial role in promoting the viability of agriculture as a business. It is essential to efficiently and effectively convey suitable farming technologies and strategies to farmers to facilitate rural development (Knox et al., 2012). Therefore, an evaluation is necessary to assess their performance and effectiveness in delivering essential agricultural extension services. The feedback from both the collaborators of Learning Sites for Agriculture and local farmers will provide valuable insights into their roles as partners in agricultural extension. By the Agriculture and Fisheries Modernization Act (AFMA) of 1997, also known as Republic Act 8435, Section 87 outlines that "Agriculture and Fisheries extension services shall encompass the following primary services for the farming and fishing community." These services encompass training, farm or business advisory, demonstration, and information and communication support services through various media outlets.

In its pursuit of excellence and improved governance in the delivery of extension services, the Agricultural Training Institute (ATI) recognizes the need to conduct an assessment of these Learning Sites for Agriculture (Bonifacio, 1994). With the impending full implementation of the Mandanas-Garcia ruling, the changing landscape and related concerns affecting the provision of extension services at the national, regional, and local levels are addressed (Department of Agriculture, 2022). However, despite the establishment of LSAs, the specific problem lies in the limited evaluation of their functionality in delivering essential agricultural extension services tailored to the unique challenges of small-scale farmers. While studies have discussed the general role of LSAs (Kilpatrick, 2000; Black, 2000), there is a gap in the literature regarding their effectiveness as Farmers Field Schools (FFS) in Northern Luzon, specifically in addressing critical areas such as training services, technology demonstration, and farm business advisory services. This study aims to fill this gap by assessing the functionality of LSAs as Farmer's Field Schools and their role in stimulating local innovations for sustainable agriculture. By aligning agricultural extension strategies with the Sustainable Development Goals (SDGs), particularly SDG 1 (No Poverty), SDG 3 (Good Health and Well-being), SDG 4 (Quality Education), and SDG 17 (Partnerships for the Goals), this research contributes to broader efforts to ensure food security and rural development (Lal et al., 2021).

2.0 Methodology

2.1 Research Design

This study utilized a cross-sectional comparative design to evaluate the functionality of Learning Sites for Agriculture (LSAs) as Farmer's Field Schools (FFS) in delivering essential agricultural extension services. Data were collected from two distinct groups—local farmers and LSA cooperators—at a single point in time, allowing for a direct comparison of their perceptions regarding specific services provided by LSAs.

2.2 Research Locale

The study was conducted in the BLISTT (Baguio, La Trinidad, Itogon, Sablan, Tuba, and Tublay) area of Benguet, Philippines. This province provides a diverse and representative setting for evaluating the functionality of Learning Sites for Agriculture (LSAs) as Farmer's Field Schools (FFS). The BLISTT area was chosen due to its mix

of rural and peri-urban farming communities, which allows for a comprehensive assessment of agricultural extension services across different types of LSAs.

2.3 Research Participants

A total of 50 local farmers were selected using random sampling. This method ensured that the sample represented a broad cross-section of farmers from the BLISTT (Baguio, La Trinidad, Itogon, Sablan, Tuba, and Tublay) areas. Random sampling allows for the inclusion of farmers from various backgrounds and with different levels of involvement with LSAs, ensuring diversity in the data and minimizing selection bias. Moreover, a group of 16 LSA cooperators was selected using purposive sampling. This approach was used to identify individuals directly involved in the management and operations of LSAs. These cooperators play a key role in delivering agricultural extension services, and their insights are critical for understanding the internal functionality of LSAs.

The combined sample size of 66 participants was deemed sufficient for conducting t-tests and ANOVA to compare the perceptions of these two groups regarding the four major agricultural extension services offered by LSAs (training services, technology demonstration services, farm business advisory services, and information and communication support services). Using random and purposive sampling ensures that the study captures a well-rounded perspective from service recipients (local farmers) and service providers (LSA cooperators).

2.4 Research Instrument

The research instrument used in this study is a structured survey questionnaire designed to collect quantitative data from two distinct groups: local farmers and Learning Sites for Agriculture (LSA) cooperators. The instrument was developed based on the study's objectives, which aim to assess and compare the functionality of LSAs as a Farmer's Field School in the BLISTT areas. It was divided into several sections to gather relevant information on the participants' demographics, their awareness and perceptions of agricultural extension services, and the effectiveness of LSAs in meeting agricultural training needs. The survey questionnaire was validated, including expert evaluation from agricultural extension specialists and pilot testing with a small subset of local farmers and LSA cooperators. Feedback from these processes was used to refine the instrument, ensuring the questions were clear, relevant, and aligned with the research objectives. Cronbach's alpha was used to assess internal consistency for the items, particularly in the perceptions and functionality sections, achieving an acceptable reliability coefficient of 0.85.

2.5 Data Gathering Procedure

The data-gathering procedure for this study followed a structured approach, beginning with pre-data collection activities such as the preparation and validation of the survey instrument. Experts in agricultural extension and a pilot test with local farmers and LSA cooperators helped refine the questionnaire to ensure clarity and relevance. Permissions were then secured from local government units and agricultural offices in the BLISTT areas, along with consent from LSA cooperators. Enumerators were trained to administer the survey to ensure consistency, focusing on ethical considerations and assisting respondents. Sampling involved the random selection of 50 local farmers from diverse communities and the purposive sampling of 16 LSA cooperators. During the data collection, face-to-face interviews were conducted to accommodate respondents who needed clarification or assistance with the survey. This method allowed for more accurate data collection, with informed consent obtained before each interview to ensure voluntary participation. Finally, the face-to-face approach helped establish rapport, enhancing the reliability of responses.

2.6 Data Analysis Procedure

The study employed comparative analysis techniques, specifically t-tests and analysis of variance (ANOVA), to assess differences in perceptions between these two groups. These tests were chosen because they can compare means across groups and determine whether any observed differences are statistically significant. T-tests were used to compare the mean responses of local farmers and LSA cooperators for each major agricultural extension service: training services, technology demonstration services, farm business advisory services, and information and communication support services. The t-test is appropriate here because it evaluates whether the mean perceptions between the two independent groups (local farmers and LSA cooperators) are significantly different.

ANOVA was employed when comparing multiple variables across more than two categories. In this case, ANOVA helps to determine whether variations in the perceptions of specific services are influenced by factors such as geographic location, farmer demographics, or types of LSAs. ANOVA can assess the interaction between these variables and how they impact overall perceptions of LSA functionality. The dependent variables in this study are the perceptions of agricultural extension services, measured on a Likert scale. The independent variables are the respondent group (local farmers or LSA cooperators) and type of service (e.g., training, technology demonstration). These statistical tests allow for a detailed understanding of how the two groups perceive services differently and whether these differences are statistically significant, providing insights into the functionality of LSAs in agricultural extension.

2.7 Ethical Considerations

Ethical considerations were central to the design and execution of this study to ensure that the rights, dignity, and privacy of all participants were respected. First, informed consent was obtained from all respondents before they participated in the study. The purpose of the research, the voluntary nature of participation, and the right to withdraw at any time without penalty were explained clearly to the local farmers and LSA cooperators. Participants were assured that their responses would remain confidential and that their identities would not be disclosed in any part of the research findings.

3.0 Results and Discussion

Learning Site for Agriculture is an innovative extension modality conceptualized by the ATI. Farmers worthy of emulation and willing to share their technologies on their farms will be partners in implementing training and extension interventions, particularly hands-on training or on-the-job instruction to complement classroom instruction (Davis et al., 2019). The statistical comparison of perceptions between local farmers and cooperators plays a crucial role in understanding the dynamics of the study on the functionality of Learning Sites for Agriculture (LSAs) in the Benguet province. The data in Table 1 presented here provides valuable insights into the participants' perceptions regarding major agricultural extension services offered by LSAs, including training services, technology demonstration services, farm business advisory services, and information and communication support services.

Table 1. Major agricultural extension services offered by LSAs

Services	Mean	SD	SEM	N	P-Value	Level of perception
Training Services	3.34	0.94	0.13	50	0.4154	Moderately Sufficient
Technology-Demonstration Services	3.62	0.57	0.08	50	0.7851	Sufficient
Farm Business Advisory Service	3.38	0.11	0.11	50	0.3357	Moderately Sufficient
Information and Communication Support Services	3.24	0.67	0.12	50	0.5585	Moderately Sufficient

In assessing various aspects of the services provided by Learning Sites for Agriculture (LSAs), it is evident that local farmers and cooperators generally share similar perceptions. In terms of training services, there is a moderate level of agreement between the two groups, with both local farmers and cooperators finding these services to be moderately sufficient for meeting the needs of their clients (Constance & Choi, 2010). This alignment is reinforced by the statistical analysis, which shows that the difference in their opinions is not statistically significant. Similarly, when it comes to technology demonstration services, local farmers and cooperators once again exhibit a high level of agreement in their perceptions, indicating that they both consider these services sufficient. The statistical analysis further supports this consensus by showing no statistically significant difference in their views. Moving on to farm business advisory services, both groups express a moderate agreement, with local farmers and cooperators perceiving these services to be moderately sufficient. The statistical analysis continues to confirm their alignment, as no statistically significant difference exists between their assessments.

Lastly, in the realm of information and communication support services, both local farmers and cooperators maintain a moderate level of agreement, with neither group finding these services inadequate. The statistical analysis again affirms this consensus by revealing no statistically significant difference in their perceptions. Overall, these findings suggest a general alignment in the views of local farmers and cooperators regarding the sufficiency of the services provided by LSAs across the different domains assessed.

In summary, the statistical comparison of perceptions between local farmers and cooperators suggests that there is no significant difference in their views regarding the major agricultural extension services provided by LSAs. Both groups tend to perceive these services as moderately sufficient. These findings lay the foundation for further investigations into the study's objectives, particularly those related to evaluating the functionality of LSAs in delivering agricultural extension services using the Participatory Technology Adaptation (PTA) model.

In determining the difference in the level of agreement between the local farmers and learning sites for agriculture cooperators on the functionality of learning sites for agriculture as a farmer's field school in delivering major agricultural extension services. A Two-Sample t-test was utilized to assess if the mean difference is statistically significant on the level of agreement between the local farmers and learning sites for agriculture cooperators on the functionality of LSAs as a Farmer's Field School. These calculations were done for each of the four major agricultural extension services (training services, technology demonstration services, farm business advisory services, information and communication support services) for both local farmers and cooperators.

Training Services

The first core function of LSA in providing agricultural extension services is the training services in their respective farms. Based on the Independent Samples t-test, there is no statistically significant difference in perceptions between local farmers and cooperators regarding training services. Local farmers and cooperators regarding training services have similar perceptions that the provisions training services are sufficient to accommodate the needs of the clients, especially the small farmers who need such training on the best agricultural practices. The study also shows that the training services, which include training equipment, training facilities, sufficient numbers of training personnel in the farm, and training contents such as modules and workbooks, can provide a conducive set-up for the training and allow the clients and learners to be able to maximize the opportunity to learn from the LSA cooperators.

Moreover, most of the LSA cooperators mentioned the necessity of training materials and equipment to effectively course their knowledge to the clients (Maake & Antwi, 2022). The presented findings are supported by the study by Cardenas et al. (2004). which states that LSA cooperators implement extension programs using varied modalities. Generally, LSA cooperators supplement government extension programs in communities where they are based; thus, reaching out to farmers is not usually covered by other extension providers (Alex et al., 2002; Adeyanju et al., 2021). These institutions also serve as channels through which government extension services are delivered. Agriculture-based government agencies and donor institutions frequently commission them to undertake regional extension programs (Gustafson, 2002; Cooreman et al., 2021).

Technology-Demonstration Services

The t-test results indicate no statistically significant difference in perceptions between local farmers and cooperators regarding technology demonstration services. Both groups have similar perceptions that the Learnings Sites for Agriculture (LSA) successfully demonstrated farming or Agri-processing as a viable enterprise for learning purposes or a special technology on agriculture (e.g., urban gardening, edible landscaping, etc.). Moreover, the result suggests that the LSAs provide sufficient technology demonstration services to clients. The LSA cooperators apply the technology they learned from their training and seminars, demonstrate applicable technologies, serve as resource persons in their areas of specialization, and many more (Braun et al., 2005). A study by Juanillo (2002) further discusses that as part of agricultural extension services, LSAs must be able to provide clock assistance to farmers to ensure the transfer of technology and good harvest.

Farm Business Advisory Service

The t-test results indicate no statistically significant difference in perceptions between local farmers and cooperators regarding farm business advisory services. Both groups have similar perceptions that the provisions of advisory services on agricultural crop production, Postharvest technology, Market and marketing-related concerns, and Marketing standards for Agriculture Products have been utilized by the LSA cooperators as an essential link between agricultural input suppliers and farmers located in remote areas far from commercial centers (Katz, 2002). It has been understood that the Farm business advisory services of LSA are an essential part of their approach to creating resilience hubs where farmers group to coordinate farm production and collective sales (Alex et al., 2002).

Moreover, the result indicates how LSAs understand the crucial role of farm business advisory services in boosting agricultural productivity, increasing food security, improving rural livelihoods, and promoting agriculture as an engine of pro-poor economic growth. This is also supported by the stipulations of the Agricultural Fisheries Modernization Act (RA 8435) of 1997, which suggest that the functionality of Learning sites for Agriculture (LSA) in performing training, technology demonstration, farm business advisory, and information and communication support services need to be assessed to provide the basis for their capability building, enhancement, and another developmental upgrade to successfully complement the other pillars of extension i.e. LGUs, SUCs, DA & the private sectors.

Information and Communication Support Services

The t-test results indicate no statistically significant difference in perceptions between local farmers and cooperators regarding information and communication support services. Both groups have similar perceptions that most Learning Sites utilize tri-media to provide information to the farmers and help them access relevant information on new programs and technologies of the farm. The LSA cooperators still experience problems with Information and communication support services because of the lack of internet connection, very weak internet data connectivity, and lack of knowledge on media literacy.

Moreover, the area where the farm is situated is also a factor for the LSA cooperators not to be able to properly utilize the tri-media because most of them are far-flung places where no data is available. Furthermore, Adeyanju et al. (2021) acknowledge that the support to provide a channel where LSAs can provide access to information relative to their agricultural practices is very important for maximizing the use of information and communication technology and creates an electronic and interactive bridge for farmers, fishers and other stakeholders (Caine et al., 2015). During the focus group discussion conducted by the researchers, the informants, which are the LSA cooperators, suggested that one of the possible solutions to address the gap in information between the LSAs and the farmers is for the ATI to create a website or a channel where the information about the LSAs are present and easily viewed by the public.

Department of Agriculture (2022) further added that the initiative to create an information hub showcases the evolution and history of agricultural extension, the successful farmers and technologies applied in the country, a diorama of appropriate farming systems in different landscapes, and an interactive corner and a playroom for kids and kids at heart (Caine et al., 2015). It will soon offer an entrepreneur's corner to showcase products and café serving produce and meals from organic agriculture practitioners (Osorio-Vega, 2019).

Table 2. Comparison between the agreement of local farmers and cooperators on the functionality of learning sites

F-Test Result	Comparison with α (α = 0.05)	Comparison with α (α = 0.01)	Interpretation
0.202188536	p-value > 0.05	p-value > 0.01	The p-value (0.202188536) is notably greater than the significance levels of 0.05 and 0.01. Consequently, the data does not provide strong enough evidence to reject the null hypothesis. Therefore, within the context of the analysis (likely a Two-Way ANOVA or similar), there are no statistically significant differences between the groups or conditions.

The findings revealed that local farmers and LSA cooperators shared similar perceptions of training services, indicating that LSAs provide sufficient agricultural extension services that cater to small farmers seeking knowledge on best agricultural practices. This aligns with the role of LSA cooperators in supplementing government extension programs, extending outreach to underserved farmers, and facilitating agricultural knowledge transfer. In determining the significant difference in the level of agreement between local farmers and learning sites for agriculture (LSA) cooperators regarding the functionality of LSAs as farmer's field schools for delivering major agricultural extension services, the F-test result assumes great importance. When we consider a significance level (α) of 0.05, commonly used in statistical analyses, the obtained p-value of 0.202188536 surpasses this threshold. This indicates that the differences in perceptions between local farmers and LSA cooperators are not statistically significant, as shown in Table 2.

Table 3. Practical implications of the statistical analysis

Practical Considerations	Interpretation
Random Variation	The absence of statistical significance suggests that any differences observed between groups or conditions are likely due to random variability in the data.
Meaningful Differences	Researchers often use statistical significance to determine whether observed differences are meaningful or merely the result of chance.

The study further shows that the agricultural extension services of the Learning Sites for Agriculture as a Farmers Field School are effective and sustainable. Moreover, table 3 shows that the sufficiency of inputs and conduciveness of the facilities are directly related to program success. The study's findings are anchored by a similar work conducted by Maake and Antwi (2022), which investigated the effectiveness of extension services in improving agricultural productivity. The authors surveyed and analyzed extension programs implemented in various agricultural contexts in their study. They found that field visitation, conduct of training, and technical briefings were among the most common extension methods utilized by agricultural extension services worldwide.

Field visitation emerged as a prominent strategy in extension services due to its personalized approach. According to Cardenas et al. (2004), direct interaction between extension workers and farmers during field visits allows a better understanding of farmers' specific needs, challenges, and local conditions. Extension workers can provide tailored recommendations through face-to-face communication, offer immediate solutions to problems, and demonstrate agricultural practices on-site. These personalized interactions build trust and rapport between the extension workers and farmers, fostering knowledge transfer and adopting improved practices.

The study conducted by Contado (2004) further supports the significance of training programs in extension services. Training sessions offer a structured platform for farmers to acquire new knowledge and skills. Cooreman et al. (2021) emphasized that interactive and participatory training programs, where farmers actively engage in hands-on activities and knowledge-sharing, have a greater impact on knowledge retention and behavior change. These training programs enhance farmers' understanding of modern agricultural techniques and empower them to adopt innovative practices in their farming operations (Gustafson, 2002).

In addition to field visitation and training programs, technical briefings focused on concise information to farmers. These briefings provide updates on new technologies, market trends, policy changes, and other relevant agricultural information. Cardenas et al. (2004) highlights that technical briefings serve as a means to bridge the knowledge gap between researchers, extension workers, and farmers. By conveying scientific knowledge in a simplified and accessible manner, technical briefings enable farmers to stay informed and make informed decisions regarding their agricultural practices. Furthermore, the researchers also evaluated the overall process of learning sites for agriculture as farmers' field schools in delivering major agricultural extension services using the Participatory Technology Adaptation (PTA) model, as shown in Figure 1. The Participatory Technology Adaptation (PTA) model plays a crucial role in the context of Farmers Field School (FFS) and Learning Sites for Agriculture by fostering a collaborative and farmer-centered approach to agricultural development (Reichelt & Nettle, 2023). FFS and Learning Sites are designed to empower farmers with knowledge and skills. However, PTA enhances its effectiveness by involving farmers directly in developing and adapting agricultural technologies (Mashi et al., 2022).

In the FFS setting, PTA enables farmers to actively experiment with and adapt best practices, fostering a sense of ownership and agency in their learning process (Sabourin et al., 2002). Similarly, within Learning Sites for Agriculture, PTA can help tailor extension services to farmers' specific needs and preferences, making the learning experience more relevant and engaging (Quiroga et al., 2014; Mwongera et al., 2017). By engaging farmers as partners and co-creators of knowledge, PTA not only enhances the impact of FFS and Learning Sites but also promotes sustainable and context-specific agricultural solutions, ultimately contributing to the improvement of practices and rural livelihoods (Mwongera et al., 2017; Reichelt & Nettle, 2023).

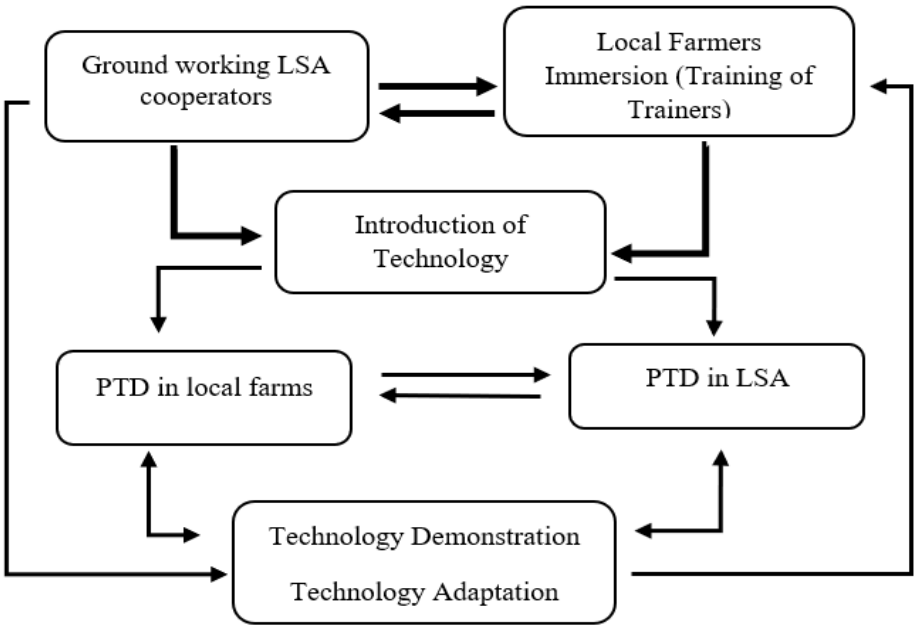

Figure 1. Flow chart for establishing PTA in Learning Sites for Agriculture (LSA)

It is clear from the flow chart that at least seven (7) important steps should be followed in conducting PTA at the Learning Sites for Agriculture. These are as follows:

Step 1: Conduct Ground Working Activities
Local farmers will do the field visit and actively participate in the LSA's PTA program. During this interaction, they will share insights about on-site challenges, traditional farming practices, and cultural management techniques. Additionally, this stage allows for the initial connection with LSA cooperators, which is valuable for identifying relevant technologies to address perceived farm issues. Furthermore, local farmers can exchange thoughts regarding the community's attitudes, values, and norms.

Step 2: Conduct LSA Immersion Activities
With support from facilitators, local farmers actively engage in the LSA farm experience. Likewise, they take the opportunity to introduce themselves and the program, aiming to establish a positive rapport with fellow farmers or clients. In this phase, participants verify the agricultural challenges observed in local fields and the existing farming methods identified during the initial groundwork activities carried out by LSA cooperators and local farmers within the community.

Step 3: Prioritizing Agricultural Problems to be Addressed by the Technology Adaptation
By harnessing the data collected during on-site groundwork and farm immersion activities, a foundational survey tool is deployed to delve deeper into farm-related challenges. These issues are subsequently ranked as a priority by examining the agricultural context. This prioritization is the foundation for collaborative efforts between farmers and facilitators to initiate the Participatory Technology Adaptation process. This process aims to broaden the comprehension of all stakeholders regarding the ecological, socio-economic, cultural, and political aspects influencing the current situations.

Step 4: Plan and Design PTA Activities
Once the field problems have been prioritized, planning and developing PTA (Participatory Technology Adaptation) activities begin, focusing on identifying promising solutions. The goal is to establish a clear agenda for experimentation. The PTA experiments should be straightforward yet capable of yielding dependable results, all while being manageable and assessable by the farmers themselves.

Step 5: Implement PTA Activities
It is essential for all participants to collectively assess these activities While certain PTA activities are implemented on the Learning Site for Agriculture (LSA) farm. However, it is worth noting that LSA cooperators typically oversee and manage the PTA activities on the farm. The focus is on addressing urgent issues that require immediate attention, often utilizing demonstration technologies, whether they are indigenous or research-developed, within the LSA farm. As participants engage in, evaluate, and analyze PTA experiments, they concurrently enhance their skills in conducting agricultural experiments and strengthen their capacity to conduct and monitor their experiments independently.

Step 6: Collect and Interpret the Result of PTA Activities
Participants should gather and analyze PTA results depending on their information requirements. Learning Sites for Agriculture training primarily emphasizes agroecosystem analysis (AESA), which enables participants to better understand ecological dynamics within the agricultural environment. This, in turn, empowers them to generate novel ideas, identify technology deficiencies, or uncover emerging issues that can be incorporated into subsequent PTA initiatives in the community.

Step 7: Utilize Results in Succeeding PTA Activities
It is essential to consistently apply the outcomes to ensure that PTA remains a sustainable approach for addressing future community field challenges. Any innovations generated during PTA endeavors should be integrated into solutions for similar field issues that may arise. Additionally, any technology gaps or new problems identified in prior PTA experiments should be considered when planning, designing, and executing future PTAs. These insights should serve as an additional foundation for guiding and improving PTA activities within the Learning Site for Agriculture (LSA) for subsequent projects.

The outlined process for Participatory Technology Adaptation (PTA) within the Learning Site for Agriculture (LSA) framework reflects a comprehensive and systematic approach to addressing agricultural challenges in the community. The initial phases, including groundwork activities and immersion experiences, emphasize the importance of community engagement and collaboration. These steps provide valuable insights into local farming practices and challenges and facilitate the establishment of trust and rapport among participants (Mwongera et al., 2017). Prioritizing agricultural problems is a critical step that ensures a focused and data-driven approach to technology adaptation (Reichelt & Nettle, 2023).

PTA activities' subsequent planning and design aim for practicality and effectiveness, aligning with the identified priorities (Mwongera et al., 2017). As the PTA activities are implemented, they address immediate concerns and serve as opportunities for capacity building and skill enhancement among the participants. The emphasis on data collection and interpretation allows for a more profound understanding of the agricultural ecosystem and fosters innovation (Kaplan et al., 2021). Furthermore, the iterative nature of the process, where insights and solutions from previous PTAs inform future endeavors, underscores the sustainability and continuous improvement of the approach. Overall, this approach appears well-structured, emphasizing community participation, data-driven decision-making, and the empowerment of local farmers in effectively addressing agricultural challenges within the LSA framework.

4.0 Conclusion
This study has provided valuable insights into the functionality of Learning Sites for Agriculture (LSAs) in Northern Luzon, particularly in their role as Farmers Field Schools (FFS) for delivering agricultural extension services. The statistical analysis revealed that local farmers and LSA cooperators generally share similar perceptions regarding the sufficiency of the four major agricultural extension services provided by LSAs: training services, technology demonstration, farm business advisory, and information and communication support services. These findings suggest that LSAs are effectively fulfilling their role in agricultural extension, especially in addressing the needs of small-scale farmers. However, the results also highlighted specific areas that could benefit from improvement, particularly in information and communication support services, where infrastructure challenges such as limited internet connectivity hinder the full potential of LSAs in delivering timely and relevant agricultural information. Addressing these gaps could further enhance the effectiveness of LSAs and strengthen their impact on rural communities.

In terms of future research, several key areas warrant further investigation. One promising avenue is the exploration of the long-term impacts of LSAs on agricultural productivity and rural livelihoods, which could provide deeper insights into the sustainability and overall contribution of LSAs to rural development. Comparative studies across different regions of the Philippines could also identify region-specific challenges and best practices in agricultural extension. Another area of interest is assessing the effectiveness of specific extension methods used in LSAs, such as field visits, technical briefings, and participatory technology adaptation (PTA), to determine which approaches yield the most significant improvements in farmer knowledge, adoption of technologies, and agricultural outcomes. Given the growing importance of digitalization in agriculture, future research could explore how LSAs can better integrate information and communication technologies (ICT) to improve service delivery, especially in remote areas where connectivity remains challenging. Overall, this study underscores the crucial role of LSAs in enhancing agricultural productivity, empowering small-scale farmers, and contributing to rural development. By addressing current challenges and exploring new research avenues, LSAs can continue to evolve and play an even more pivotal role in sustainable agriculture.

5.0 Contributions of Authors

The paper has a single author who confirms that the author reviewed this study.

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7.0 Conflict of Interests

The author declares no conflicts of interest about the publication of this paper.

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