© MAY 2026 | IRE Journals | Volume 9 Issue 11 | ISSN: 2456-8880
DOI: https://doi.org/10.64388/IREV9I11-1717698

Preliminary Assessment of Soil-Based Crop Suitability in Selected Barangays of Cabanatuan City

JULES VERGEL T. PANGILINAN[1], EVANN ANGELO B. MEJIA[2], ROSEL V. BABALCON[3]
[1, 2]*Student, Civil Engineering Department, College of Engineering, Nueva Ecija University of Science and Technology*
[3] *Faculty, Civil Engineering Department, College of Engineering, Nueva Ecija University of Science and Technology*

Abstract- ***This study conducted a preliminary soil-based crop assessment in selected barangays of Cabanatuan City, specifically Barangay Obrero and Barangay Lagare, using secondary data sources. The research aimed to identify documented soil characteristics, determine existing cropping patterns, and compare these with crops recommended for similar soil conditions. A descriptive-comparative documentary research design was employed, utilizing soil surveys, ecological profiles, and agricultural records. Results revealed that Barangay Obrero has Quingua silt loam with a pH of 6.66 and moderate nutrient levels, while Barangay Lagare has Prensa silt loam with a pH of 6.36 and relatively lower nutrient content. Both soils are generally suitable for a variety of crops, including rice, corn, vegetables, and fruit crops. However, differences in cropping patterns were observed. Barangay Obrero exhibits a diversified cropping system, while Barangay Lagare is dominated by rice monocropping. The comparison showed partial alignment between recommended and actual crops in Obrero, while Lagare is aligned with soil suitability but demonstrates low crop diversification. The findings indicate that while soil characteristics influence crop suitability, actual crop selection is also affected by irrigation, market demand, and farming practices. The study highlights the potential for crop diversification, particularly in areas dominated by monocropping, and emphasizes the importance of integrating soil-based assessments with broader agricultural planning.***

Index Terms- ***Crop Diversification, Cropping Patterns, Soil Assessment, Soil Suitability, Sustainable Agriculture***

I. INTRODUCTION

Background of the Study

Soil serves as the primary foundation for agriculture by supporting crop growth, supplying essential nutrients, retaining water, and providing a stable rooting medium, all of which directly influence agricultural productivity (Lal, 2020). Healthy soils regulate water flow, cycle nutrients, and sustain plant life, ensuring high yields and long-term sustainability (ICL Group, 2022). These functions highlight soil's critical role in food production and environmental stability (Sparks, 2019).

Different soil types favor specific crops due to variations in texture, pH, and nutrient profiles, making soil conditions a key factor in crop selection (FAO, 2021). Proper matching of crops to soil properties enhances resource efficiency, reduces input costs, and boosts yields (Smith & Jones, 2022). This concept underscores the need for suitability assessments to optimize farming practices (Dali et al., 2025).

Cabanatuan City in Nueva Ecija features agricultural barangays where rice production dominates, serving as a vital livelihood for many residents (PSA, 2021). Despite urbanization pressures converting farmlands, farming remains economically significant in these areas (Ramones, 2020). Traditional crop choices persist in some barangays, potentially overlooking soil-specific potentials (BASC, 2025).

Few local studies in Cabanatuan City systematically compare soil characteristics with currently grown crops across barangays (Dela Cruz et al., 2025). Existing assessments often focus on nearby areas like Muñoz, leaving a gap for preliminary evaluations using secondary data (Sajaas, 2025). This highlights the need for targeted soil-crop matching analyses in the region (MJST, 2025).

Therefore, this study aims to conduct a preliminary assessment of soil-based crop suitability in selected

barangays of Cabanatuan City using available secondary data.

Statement of the Problem

This study focuses on examining the suitability of soil conditions for crop production in Barangay Obrero and Barangay Lagare in Cabanatuan City in relation to the crops currently cultivated. It aims to address the following questions:

1. What documented soil characteristics are present in Barangay Obrero and Barangay Lagare?
2. What crops are currently grown in the selected barangays based on available records?
3. What crops are commonly recommended for the documented soil conditions based on secondary references?
4. How do actual crops grown compare with recommended crops for the identified soil conditions?
5. What planning insights can be derived from the comparison of soil suitability and existing crops?

Objectives of the Study

To conduct a preliminary assessment of soil-based crop suitability and compare it with current cropping patterns in selected barangays of Cabanatuan City.

1. Identify documented soil characteristics in the selected barangays.
2. Identify and summarize currently cultivated crops based on available records.
3. Identify crops commonly recommended for similar soil conditions using secondary references.
4. Compare recommended crops with actual crops grown.
5. Provide planning insights for crop selection and diversification.

Significance of the Study

The results of this study may benefit several groups:

Farmers. This study can guide farmers on possible alternative crops suited to the soil conditions of their land. It may also guide them in selecting crops that could produce better yields.

Local Government and Agricultural Planners. The findings may serve as a reference for agricultural extension, barangay planning and improving land-use strategies in Cabanatuan City.

Researchers and Students. This study may provide useful information and reference material for future studies related to soil suitability, crop production, and land evaluation.

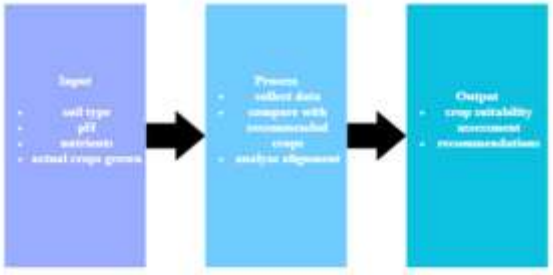
Agricultural Sector. By identifying the compatibility between soil conditions and crop selection, the study may contribute to more efficient and sustainable agricultural practices.

Scope and Limitation

This study focuses exclusively on Barangay Obrero and Lagare in Cabanatuan City, relying solely on secondary data sources such as existing soil surveys and agricultural records. No primary soil sampling was conducted, limiting the analysis to documented characteristics without new field validations. The assessment excludes climate factors, irrigation systems, and economic evaluations, positioning it as a preliminary tool for basic agricultural planning rather than comprehensive decision-making. No field validation, soil sampling, or farmer interviews were conducted.

Conceptual Framework

This study is based on the idea that soil characteristics influence crop suitability and agricultural productivity.



The conceptual framework of the study is presented in Figure 1, this shows how the study moves from input to process to output in determining crop suitability based on soil conditions. It begins with the collection of important input variables such as soil type, pH, nutrients, and the actual crops grown, which serve as the basic data needed for analysis.

The process part explains what will be done with these inputs. The gathered data will be collected, compared

© MAY 2026 | IRE Journals | Volume 9 Issue 11 | ISSN: 2456-8880
DOI: https://doi.org/10.64388/IREV9I11-1717698

with the recommended crops, and analyzed to identify whether the existing soil conditions match the growth requirements of specific crops. This step is important because it connects raw field data to meaningful interpretation and helps the researchers evaluate the relationship between soil characteristics and crop performance.

The expected output of the framework is a crop suitability assessment and practical recommendations. In other words, after analyzing the soil information, the study aims to determine which crops are best suited for the area and provide guidance that can help improve planting decisions and agricultural planning.

Research Design

The study used a descriptive-comparative documentary research design utilizing secondary data sources. It involved the collection and analysis of existing records on soil characteristics and cropping patterns, followed by a comparison between actual crops grown and those recommended based on soil conditions. This design is appropriate for identifying patterns and preliminary comparisons without conducting field experiments, as it relies on documented information to generate preliminary insights for agricultural planning.

Study Area

The study was conducted in Barangay Obrero and Barangay Lagare, both located in Cabanatuan City, Nueva Ecija. Barangay Obrero is characterized by a mix of residential and agricultural areas, where farming activities continue to contribute to local livelihood. Barangay Lagare, on the other hand, has more extensive agricultural lands, making it suitable for crop production and farming-related activities. These barangays were selected due to agricultural relevance, differing cropping patterns, and available documented records on soil characteristics and cropping patterns, as well as their relevance to local agricultural practices. Their inclusion allows for a comparative assessment of soil suitability and crop selection within the same city context.

Data Collection

This study utilized secondary data obtained from various government records and documented references relevant to soil characteristics and crop production. These data sources were selected to provide reliable information for identifying soil properties, determining existing cropping patterns, and comparing them with recommended crops suitable for specific soil conditions. The use of secondary data supports the study's objective of conducting a preliminary assessment without the need for primary data collection.

Data Needed	Source	Purpose
Soil Map	Ecological Profile of Cabanatuan City	Identify soil type
Crop Data	Ecological Profile of Cabanatuan City	Actual Crops Grown
Soil Fertility	Soil Survey of Nueva Ecija Province Philippines and Bureau of Soils and Water Management	Soil Properties
Crop Recommendation	Soil Survey of Nueva Ecija Province Philippines and Bureau of Soils and Water Management.	Indicative suitable crops

Data Gathering Procedure

The data gathering process for this study followed a systematic approach using secondary sources. First, official records and documents were requested from relevant offices such as the City Agriculture Office and City Planning Office. Second, available soil maps, ecological profiles, and agricultural data were collected for review. Third, specific information related to Barangay Obrero and Barangay Lagare was extracted from these documents, focusing on soil characteristics and existing crops. Finally, the gathered data were organized into tables to facilitate analysis and comparison of soil suitability and cropping patterns.

Data Analysis

Soil characteristics were compared with commonly recommended crops based on available secondary references. The actual crops grown in the selected barangays were then compared with these recommendations and classified using the following criteria:

Strong alignment – at least 50% of the actual crops grown match the recommended crops for the documented soil type.

Partial alignment – at least 1 but less than 50% of the actual crops grown match the recommended crops.

Limited alignment – none of the actual crops grown match the recommended crops, or the cropping pattern is dominated by crops outside the recommended list.

This system makes the comparison more objective and allows clearer interpretation of crop-soil matching.

Ethical Consideration

This study did not involve any human participants or personal respondents, as it relied solely on publicly available secondary data from government records and documented sources. All information used was handled responsibly and for academic purposes only, ensuring proper use of data without misrepresentation.

II. REVIEW OF RELATED LITERATURE

Soil properties are fundamental determinants of crop productivity because they directly influence water availability, nutrient retention, and root development. Soil texture refers to the proportion of sand, silt, and clay particles, while soil structure describes how these particles are arranged into aggregates that affect porosity and aeration (Brady & Weil, 2017). Sandy soils drain quickly but have low nutrient-holding capacity, whereas clay soils retain more moisture and nutrients but may restrict root growth due to poor aeration. Loamy soils are generally considered ideal for crop production due to their balanced physical properties. Soil chemical properties, particularly soil pH, also play a critical role in nutrient availability. Soil pH regulates the solubility of essential nutrients, affecting plant uptake and microbial activity (FAO, 2015). When soil pH is outside the optimal range, nutrient deficiencies may occur, limiting crop growth and yield potential. Soil fertility is another key factor influencing agricultural productivity. Adequate nutrient supply through proper soil management ensures healthy plant development and improved yield performance (Lal, 2020).

Soil suitability assessment involves evaluating land based on its capacity to support specific crops. The FAO land evaluation framework is widely used to classify land according to its suitability using soil and environmental parameters such as texture, depth, slope, and drainage (FAO, 1976). Modern approaches use Geographic Information Systems (GIS) to analyze spatial soil variability and generate suitability maps. GIS allows for the integration of soil and environmental data, improving the accuracy of crop suitability evaluation (Sys et al.,1993). In addition, precision agriculture integrates soil data with environmental and management information to improve decision-making. This approach enhances productivity by matching crops with site-specific soil conditions (McBratney et al., 2005).

In the Philippines, soil variability plays a significant role in agricultural productivity, especially in highly agricultural regions such as Central Luzon and Nueva Ecija. A GIS-based study conducted in Barangay Bantug, Science City of Muñoz, Nueva Ecija identified multiple soil types, including Maligaya clay, clay loam, silty clay loam, and Bantog clay loam. The study found that clay loam and Bantog clay loam soils were highly suitable for crops such as rice, corn, onion, mango, and sugarcane due to favorable texture and rooting conditions. In contrast, other soil types showed limitations related to drainage and surface texture, affecting crop performance. The study emphasized that detailed soil re-delineation improves the accuracy of crop suitability classification and supports local land-use planning (Alejo & Fiegalan, 2025). Another GIS-based land suitability study in Central Luzon, which includes Nueva Ecija as a major agricultural province, revealed that the region has extensive areas suitable for rice production under different environmental conditions. The study showed that soil and climate variability significantly influence land suitability, with Nueva Ecija having one of the largest areas classified as suitable for rice cultivation due to favorable soil and terrain conditions (Valdez, 2018). These findings are supported by broader agricultural studies in the Philippines, which indicate that crop productivity depends heavily on the compatibility between soil properties and crop requirements. GIS-

© MAY 2026 | IRE Journals | Volume 9 Issue 11 | ISSN: 2456-8880
DOI: https://doi.org/10.64388/IREV9I11-1717698

based analyses consistently show that integrating soil data with environmental factors such as elevation and rainfall improves the accuracy of crop suitability assessments. Overall, these studies highlight that localized soil variability within provinces like Nueva Ecija must be considered in agricultural planning. Even within small areas, differences in soil type can significantly affect crop yield and suitability.

Although several studies have examined soil properties and crop suitability in the Philippines, most are conducted at regional or provincial scales. There is limited research focusing on barangay-level soil suitability assessment, particularly in Cabanatuan City. Furthermore, many studies focus on general suitability mapping without directly comparing actual crops planted versus soil-based suitability classifications in specific local communities. This gap highlights the need for a more localized and detailed analysis. Therefore, this study aims to assess soil-based crop suitability in selected barangays of Cabanatuan City to provide more precise agricultural recommendations for farmers and local planners.

III. RESULTS AND DISCUSSION

This chapter presents the results and discussion of the study on the preliminary assessment of soil-based crop suitability in selected barangays of Cabanatuan City, specifically Barangay Obrero and Barangay Lagare. These areas were selected based on the availability of secondary data on soil characteristics and cropping patterns. The findings focus on the analysis of documented soil properties, the identification of suitable crops based on references, and the comparison between recommended crops and those currently grown in the selected barangays.

Soil Characteristics of Selected Barangays

This section presents the soil characteristics of the Barangay Obrero and Barangay Lagare in Cabanatuan City, particularly in terms of soil texture, soil pH, and nutrient content. These factors are essential in determining the suitability of soil for crop production.

Barangay	Soil Type	pH value	Organic Carbon	Nitrogen	Phosphoric acid	Potash	Lime	Magnesia
Obrero	Quingua silt loam	6.66	1.37	0.12	0.18	0.17	3.37	1.52
Lagare	Prensa silt loam	6.36	0.79	0.08	0.09	0.09	1.31	0.6

Soil Characteristics

Based on table , the soil in Barangay Obrero is classified as Quingua silt loam, a type of soil known for its balanced water retention and aeration, making it generally suitable for agricultural production. The soil of Barangay Obrero has a pH value of approximately 6.66, indicating slightly acidic conditions that are favorable for many crops due to improved nutrient availability. In terms of nutrient content, the soil contains about 1.37% organic carbon, 0.12% nitrogen, 0.18% phosphorus, and 0.17% potash. These values suggest that Barangay

Obrero has a moderate level of soil fertility, which can support a variety of crops with minimal soil amendments. On the other hand, the soil in Barangay Lagare is classified as Prensa silt loam, which also provides good conditions for crop growth due to its fine texture and adequate moisture retention. The soil of Barangay Lagare has a pH value of approximately 6.36, which is slightly acidic and suitable for most agricultural crops. However, the nutrient content in Barangay Lagare is relatively lower, with approximately 0.79% organic carbon, 0.08% nitrogen, 0.09% phosphorus, and 0.09% potash. These results indicate that while the soil is still suitable for crop production, it may require additional nutrient management to achieve optimal productivity.

Crops Currently Grown in the Selected Barangays

This section presents the crops currently cultivated in the selected barangays based on ecological profile records.

© MAY 2026 | IRE Journals | Volume 9 Issue 11 | ISSN: 2456-8880
DOI: https://doi.org/10.64388/IREV9I11-1717698

Barangay	Crop	Area (ha)
Obrero	Rice (wet)	67.60
Obrero	Rice (dry)	87.50
Obrero	Calamansi	45.60
Obrero	Eggplant	4.50
Obrero	Okra	3.50
Obrero	String beans	3.60
Obrero	Tomato and Chili	1.00
Lagare	Rice (wet)	258.70
Lagare	Rice (dry)	267.10

Existing Crops

(from Ecological Profile of Cabanatuan City)
Based on the table , the cropping pattern in Barangay Obrero reflects a diversified agricultural system, with both staple and high-value crops cultivated across varying land areas. Rice remains the dominant crop, with both wet (67.60 ha) and dry (87.50 ha) seasons covering the largest portions of land. However, a significant area is also devoted to calamansi (45.60 ha), indicating its importance as a cash crop. Additionally, smaller areas are allocated to vegetables such as eggplant, okra, string beans, and tomato with chili, suggesting that farmers engage in mixed cropping to supplement income, improve food variety, and maximize land productivity.

In contrast, Barangay Lagare exhibits a highly specialized cropping pattern dominated entirely by rice production. Both wet (258.70 ha) and dry (267.10 ha) rice cultivation occupy extensive land areas, indicating a strong dependence on rice farming. This monocropping pattern suggests that the area is highly suitable for rice production, possibly due to favorable soil conditions and irrigation availability. However, the absence of other crops indicates limited diversification, which may reduce flexibility in responding to market or environmental changes.

Overall, Barangay Obrero demonstrates a diversified cropping system, while Barangay Lagare is characterized by intensive rice monocropping. This contrast highlights differences in land use strategies, with Obrero maximizing crop variety and Lagare focusing on large-scale staple production.

Indicative Recommended Crops Based on Soil Conditions

Barangay	Soil Type	Indicative Crops
Obrero	Quingua Silt Loam	Corn, Rice, Banana, Tomato, Eggplant, Cabbage, Onion, Lettuce
Lagare	Prensa Silt Loam	Corn, Banana, Cabbage, Broccoli, Rice, Lettuce, Ampalaya, Cucumber

Recommended Crops
(from the Bureau of Soils and Water Management and University of Delaware.)

Based on table, the analysis reveals distinct soil types in the selected barangays, each supporting diverse indicative crops that reflect their physical and chemical properties. The table followed the Bureau of Soils and Water Management (BSWM) land evaluation framework, which is based on FAO land suitability classification. Crop recommendations were derived by matching soil properties with crop requirements rather than using fixed crop listings.

Quingua Silt Loam in Barangay Obrero accommodates both staple crops like corn and rice alongside vegetables such as tomato, eggplant, cabbage, onion, and lettuce. This versatility stems from the soil's fine texture, which provides good water retention and nutrient-holding capacity suitable for root and leafy vegetables as well as grains.

Prensa Silt Loam in Barangay Lagare similarly favors corn, rice, and banana but extends to broccoli, lettuce, ampalaya, and cucumber. These crops benefit from the soil's drainage characteristics, which prevent waterlogging while maintaining moisture for vining and brassica vegetables.

Both soils indicate potential for crop diversification beyond traditional rice monoculture, with overlapping suitability for corn, banana, cabbage, rice, and lettuce. This suggests opportunities for intercropping or rotation to enhance soil health and farmer resilience, though actual implementation depends on local practices and market demands.

Comparison Between Soil Suitability and Actual Crops Grown
This section compares the crops recommended based on soil suitability with the actual crops grown in the selected barangays.

© MAY 2026 | IRE Journals | Volume 9 Issue 11 | ISSN: 2456-8880
DOI: https://doi.org/10.64388/IREV9I11-1717698

Comparison of Soil Suitability and Actual Crops Grown

Barangay	Suitable Crops	Actual Crops Grown	Comparison/Remarks
Obrero	Corn, Rice, Banana, Tomato, Eggplant, Cabbage, Onion, Lettuce	Rice, calamansi, eggplant, okra, string beans, tomato, chili	Partial alignment; 3 out of 7 actual crops grown (rice, eggplant, and tomato) match the recommended crops for Quingua silt loam, equivalent to 42.86%. This is below the 50% threshold for strong alignment but indicates that some crops are consistent with soil-based recommendations.
Lagare	Corn, Banana, Cabbage, Broccoli, Rice, Lettuce, Ampalaya, Cucumber.	Rice	Aligned with soil suitability, but with low crop diversification due to rice monocropping. While rice matches the recommended crops for Prensa silt loam, the absence of other crops suggests limited utilization of the soil's full agricultural potential.

The table shows that Barangay Obrero appears to be more diversified in its cropping pattern, while Lagare is more rice-focused. In Barangay Obrero, the table shows not only wet and dry rice but also calamansi, eggplant, okra, string beans, and tomato with chili, which suggests that farmers are planting a wider range of crops. Barangay Lagare, on the other hand, is dominated by wet and dry rice areas, with no other existing crops listed, so its production is much more concentrated on rice. This difference may be possibly influenced by irrigation conditions, since rice production usually depends on reliable water supply, while a better-diversified area may have enough flexibility to support other crops. It may also reflect market opportunities, because farmers in Obrero may be responding to demand for vegetables and fruit crops, and tradition, since communities often continue the kinds of farming they have practiced for a long time.

Discussion of Findings

The results show that soil is an important factor influencing crop suitability because it provides the physical and chemical conditions necessary for plant growth. However, this study evaluates suitability based on soil characteristics alone, and actual crop selection is also influenced by irrigation availability, market demand, farmer preference, climate conditions, labor, and capital. Therefore, the identified crops should be interpreted as indicative suitability or potential crops based on soil conditions rather than definitive recommendations.

In this study, both Barangay Obrero and Barangay Lagare possess soil types that can support a range of crops. However, the observed cropping patterns reflect not only soil suitability but also practical and economic considerations. Barangay Obrero demonstrates a more diversified system, with rice, calamansi, and various vegetables being cultivated, while Barangay Lagare remains highly concentrated on rice production. This suggests that external factors such as irrigation access, market opportunities, production costs, and farming practices significantly influence crop selection.

This pattern is consistent with literature showing that diversification helps reduce production and income risk because farmers are not dependent on a single crop (SARE, 2021). Diversified cropping systems also reduce the vulnerability associated with monocropping, including pest and disease buildup, soil depletion, and weaker resilience to weather shocks (SARE, 2021; Earth Day, 2025). In addition, market access affects crop choice because farmers with stronger links to buyers and trading channels are more likely to grow crops that are profitable and easier to sell (J-PAL, 2023).

This means that soil suitability should be understood as a starting point, not the only basis for crop choice. Even if a barangay is technically suitable for crops like corn, banana, cabbage, or lettuce, farmers may still prefer rice if it is more familiar, less risky, better supported by irrigation, or easier to sell in local markets. At the same time, the findings suggest clear diversification opportunities, especially in Lagare, where the soil can support crops beyond rice. With better extension support, water management, and market linkage, farmers could gradually introduce alternative crops or rotations to improve income, reduce risk, and make better use of the soil's potential (SARE, 2021; J-PAL, 2023).

IV. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This chapter presents the summary of the findings, conclusions, and recommendations based on the preliminary soil-based crop assessment conducted in Barangay Obrero and Barangay Lagare in Cabanatuan City.

Summary
This study conducted a preliminary soil-based crop assessment using secondary data from Barangay Obrero and Barangay Lagare in Cabanatuan City, focusing on soil characteristics and existing cropping patterns to evaluate indicative crop suitability. Key findings revealed Quingua silt loam in Obrero (pH 6.66, moderate nutrients) and Prensa silt loam in Lagare (pH 6.36, lower nutrients), both generally suitable for diverse crops including rice, corn, vegetables, and fruits. Obrero showed diversified cropping with rice, calamansi, eggplant, okra, string beans, and tomatoes, aligning well with recommendations, while Lagare focused heavily on rice monocropping despite suitability for broader options.

Conclusions
Based on the findings of the study, the following conclusions are drawn:

1) Both barangays documented soil properties suggest generally suitable agricultural potential, with Quingua silt loam in Obrero and Prensa silt loam in Lagare supporting rice, corn, bananas, vegetables, and more due to favorable pH and texture.
2) Obrero shows more diversified cropping, including rice, calamansi, eggplant, okra, string beans, and tomatoes/chili across 67.60 ha wet rice, 87.50 ha dry rice, and 45.60 ha calamansi.
3) Lagare is more rice concentrated, with 258.70 ha wet rice and 267.10 ha dry rice dominating production.
4) Soil conditions influence crops but are not the only factor, as irrigation, markets, traditions, and economics shape actual patterns beyond suitability.
5) Secondary data can support preliminary planning by identifying potentials like diversification opportunities without primary fieldwork.

Recommendations
Based on the conclusions of the study, the following recommendations are proposed:

1) Conduct actual soil sampling to validate secondary data and assess current nutrient levels precisely.
2) Encourage crop diversification studies, focusing on introducing recommended crops like corn, bananas, cabbage, and lettuce in Lagare.
3) Consider irrigation and market analysis to support shifts from rice monocropping toward resilient, high-value alternatives.
4) Update barangay agricultural databases with integrated soil-crop records from city offices for better planning.
5) Pursue future GIS-based agricultural planning to map suitability, overlay cropping data, and visualize diversification potentials across Cabanatuan City.
6) Conduct farmer interviews to understand why crop choices differ from suitability recommendations.

ACKNOWLEDGMENT

The researchers sincerely express their gratitude to all individuals who contributed to the completion of this study.

In particular, they extend their deepest appreciation to their research adviser, Engr. Rosel Verdadero-Babalcon, for her invaluable guidance, patience, and unwavering support throughout the research process. Her expertise and insights played a significant role in the successful development of this study.

The researchers would also like to express their sincere appreciation to the City of Cabanatuan for their assistance and cooperation, particularly in providing relevant documents and records essential to this study. Their support offered valuable data and practical insights that significantly contributed to the completion of this research.

The researchers also extend their heartfelt appreciation to their friends for their constant encouragement, moral support, and companionship throughout this journey.

Above all, this work is humbly offered to the Almighty God for His boundless wisdom, guidance, and the strength granted to overcome every challenge. All glory belongs to Him.

REFERENCES

[1] Alejo, R. J. T., & Fiegalan, F. T. (2025). GIS-based mapping of crop suitability rating for the

re-delineated soil types in Barangay Bantug, Science

[2] City of Muñoz, Nueva Ecija, Philippines. Southeast Asian Journal of Agriculture and Allied Sciences, 5(1), 45–61. https://sajaas.basc.edu.ph/index.php/sajaas/article/view/70

[3] BASC. (2025). GIS-based mapping of crop suitability rating for the re-delineated agricultural lands of Barangay Bantug. Southeast Asian Journal of Agriculture and Agricultural Sciences, 1(1). https://sajaas.basc.edu.ph/index.php/sajaas/article/view/70

[4] Bationo, A., Kihara, J., Vanlauwe, B., Waswa, B., & Kimetu, J. (2019). Soil fertility evaluation and crop suitability assessment of agricultural soil condition in Samar Province, Philippines. https://www.researchgate.net/publication/338594329_Soil_Fertility_Evaluation_and_Crop_Suitability_Assessment_of_Agricultural_Soil_Condition_in_Samar_Province_Philippines

[5] Brady, N. C., & Weil, R. R. (2017). The nature and properties of soils (15th ed.). Pearson.

[6] Food and Agriculture Organization. (1976). A framework for land evaluation. FAO.

[7] Food and Agriculture Organization. (2015). Status of the world's soil resources. FAO.

[8] Dali, N., et al. (2025). Characterization, classification, and crop suitability assessment of selected soil series in Ilocos Norte. Mindanao Journal of Science and Technology. https://mjst.ustp.edu.ph/index.php/mjst/article/view/2386

[9] Earth Day. (2025, November 24). One crop to rule them all? The hidden dangers of monoculture farming. https://www.earthday.org/one-crop-to-rule-them-all-the-hidden-dangers-of-monoculture-farming/

[10] FAO. (2021). Soil-the foundation of agriculture. Nature Scitable. https://www.nature.com/scitable/knowledge/library/soil-the-foundation-of-agriculture-84224268/

[11] J-PAL. (2025, January 6). Increasing small-scale farmers' access to agricultural markets. Abdul Latif Jameel Poverty Action Lab. https://www.povertyactionlab.org/policy-insight/increasing-small-scale-farmers-access-to-agricultural-markets

[12] Lal, R. (2020). Soil health and sustainability. Journal of Soil and Water Conservation, 75(4), 83A–89A.

[13] Lal, R. (2020). Soil health and carbon management. Food and Energy Security, 9(2), e200. https://doi.org/10.1002/fes3.200

[14] McBratney, A. B., Whelan, B. M., Ancev, T., & Bouma, J. (2005). Future directions of precision agriculture. Precision Agriculture, 6(1), 7–23. https://doi.org/10.1007/s11119-005-0681-8

[15] Philippine News Agency. (2020). Livelihood program boosts Nueva Ecija farmers' income. https://www.pna.gov.ph/articles/1103115

[16] Philippine Statistics Authority. (2021). Agriculture statistical profile: Nueva Ecija. https://ijaems.com/upload_images/issue_files/8IJAEMS-10720197-Statusof.pdf

[17] SARE. (2021). Why diversify? Sustainable Agriculture Research and Education. https://www.sare.org/publications/diversifying-cropping-systems/why-diversify/

[18] Sajaas. (2025). GIS-based mapping of crop suitability rating [PDF]. https://sajaas.basc.edu.ph/index.php/sajaas/article/download/70/31/1971

[19] Smith, J., & Jones, K. (2022). Crop suitability assessment in the Philippines. International Journal of Agricultural Engineering, 15(2), 45–56.

[20] Sparks, D. L. (2019). Soil organic matter and nutrient cycling. In Advances in Agronomy (Vol. 156). Academic Press.

[21] Sys, C., Van Ranst, E., & Debaveye, J. (1993). Land evaluation: Part III—Crop requirements. Agricultural Publications.

[22] Thanushree, T., Lokannavar, S., Vidya, J., Sirisha, K. R., & Malipatil, S. B. (2023). Soil quality analysis and crop recommendation. International Journal of Innovative Science and Research Technology, 8(5), 1554. https://ijisrt.com/assets/upload/files/IJISRT23MAY1554.pdf

[23] Valdez, J. A. (2018). Mapping suitable areas of Central Luzon, Philippines for aerobic rice production using GIS-based land suitability analysis. Philippine Journal of Agricultural Economics.