**“PERCEPTIONS OF CLAVERIA FARMERS ON RICE HUSK BIOCHARCOAL AS A FERTILIZER ADDITIVE”**

**Academy of St. Joseph**

**C-1 Claveria, Cagayan**

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**APPROVAL SHEET**

This research paper is entitled, **“PERCEPTION OF CLAVERIA FARMERS ON RICE HUSK BIOCHARCOAL AS A FERTILIZER ADDITIVE”**, prepared and submitted by **KENT ANDREI TYLER ANCHETA, AEDRIAN CLYDE ARIDAO, IRISH KEIRA ICAT, CHRISTIAN LLAPITAN, AND JAKIELYN OANDASAN** in partial fulfilment for the requirements in Practical Research I has been examined and is recommended for acceptance and approval.

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**RESEARCH ABSTRACT**

2024; Perceptions of Claveria Farmers on Rice Husk Biocharcoal as a Fertilizer Additive: Kent Andrei Tyler Ancheta, Aedrian Clyde Aridao, Irish Keira Icat, Jakielyn Oandasan, and Christian Llapitan.

The presented study assesses the perceptions of farmers in Claveria regarding rice husk biocharcoal as an additive. This qualitative research utilizes surveys of 15 farmers in the barrios of Claveria, conducted in April during the 2nd semester of the 2023-2024 school year. A set of questions was used to obtain precise data regarding the farmers' experiences related to the topic.

The survey measured the farmers’ perceptions of rice husk biocharcoal as a fertilizer additive, focusing on their understanding and views on the concept.

The findings revealed that the majority of the farmers experienced certain benefits and advantages, although these varied depending on their usage and knowledge of farming techniques.

**CHAPTER I**

**INTRODUCTION**

**A. Background of the Study**

The cultivation of rice dates back thousands of years and is an important part of human civilization, as it is consumed by billions of people. Archeological evidence found in sites across continents indicates that its cultivation dates to the ancient times.

Rice has been a staple food for most people because it thrives well in varied weather patterns, is versatile and nutritious. It is also responsible for shaping cultural traditions, economies, and agricultural practices around the world. Rice can be found in many recipes ranging from sweet treats to savory dishes representing different cuisines worldwide.

Many parts of the globe rely on rice as their principal source of food making its production an essential aspect of global agriculture. Besides being a major source of nourishment, this grain defines economies and cultures in numerous countries greatly affecting them.

In order to have quality products at each stage soil type, water management insect control and climatic conditions have to be well thought out to ensure maximum output .Farmers also use different things too .Seeds are vital components among others; they are selected according to attributes such as potential yield range resistance pests diseases diversity etc.

Fertilizers high in potassium, phosphate, and nitrogen also improve soil nutrients and encourage the growth of healthy plants. Insecticides, integrated pest management programs, and biological controls are examples of preventative strategies against diseases and pests.

Lastly, harvesting equipment including threshers, combines, and drying rooms facilitate the efficient collection and processing of mature rice grains for sale or storage.

The use of these industrial materials in rice cultivation also presents drawbacks alongside benefits. While they boost yields, their high cost can strain farmers' budgets, particularly in developing regions. Additionally, improper application can lead to environmental pollution, soil degradation, and nutrient imbalances, compromising long-term sustainability.

The cultivation of rice invariably results in the production of substantial amounts of agricultural wastes, such as rice husks and straw.  The high costs and labour requirements of rice straw transportation and manipulation almost exclusively lead to open-field burning and to air pollution ([Beňová et al., 2021](https://www.sciencedirect.com/science/article/pii/S0016706123002549" \l "b0010)).Rice husk is the by-product of rice processing and is one of the plentiful resources in Asian countries.

The rice husks ash (RHA, produced by rice husk combustion) or rice husk biochar (RHB, produced by rice husk pyrolysis) could be potentially used as soil amendments to increase soil fertility and agronomic yields, while promoting [soil carbon](https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/soil-carbon). Furthermore, it could help to solve disposal problems of rice husks amounted from rice production.

In the Philippines, under an integrated and diversified system of farming, rice husk biochar (carbonized rice husk) has a lot of uses. Among other things, it is popularly used as soil conditioner and as main ingredient in the production of organic fertilizers.

It is also used as bedding or absorbent material to facilitate urine and manure collection as well as help eliminate foul odor in poultry, swine, and livestock. Once saturated, it is collected and applied to the soil as fertilizer.

Rice husks production amounted to 3.2 million metric tonnes per year. Rice husk had been used as fuel for heating (e.g. drying of palay). Its conversion into biochar is also

popular to farmers practicing Palayamanan. Palayamanan is an integrated system of farming which highlights diversification of farm components such as rice and other crops, livestock, and fish (Orge and Abon, 2011).

In the Municipality of Claveria, a new opportunity for agricultural innovation emerges with the incorporation of rice husk biochar into fertilizers. This initiative not only aids farmers in cultivating rice more efficiently but also addresses the challenge of reducing costs associated with industrial fertilizers while also reducing carbon emissions. Given that rice is the primary source of income and crop, substantial amounts of rice husk waste are generated every month.

Through surveys, the researchers seek to understand farmers' perspectives and promote environmentally friendly agricultural practices within the community. This exerted effort aims to utilize local resources effectively while promoting sustainability and resilience in Claveria’s agricultural community.

**B . RESEARCH PARADIGM**

Figure 1.1

**DEPENDENT VARIABLE**

* Assessment of selected farmers:

The perception of farmers to rice husk biocharcoal as an additive to industrial fertilizers.

**INDEPENDENT VARIABLE**

Demographic Profile:

1.Age

2.Years of Experience in Farming

Advantages of using rice husk biocharcoal

Insights of interviewees regarding the use of rice husk biocharcoal

Benefits of rice husk biocharcoal to crops

Importance of incorporating organic components to industrial fertilizers

The study is based around the IV-DV model, which emphasize two frames within a research paradigm. The first frame focuses on independent variable, exploring the benefits and advantages of integrating rice husk biochar (RHB) into commercial fertilizers. This step involves assessing how the use of rice husk biocharcoal as an additive to fertilizer benefits the farmers and what are the advantages of utilizing this process. Finally, the second frame signifies the dependent variable, which highlights the perception of farmers in Claveria to rice husk biocharcoal as an additive to fertilizers. The interconnected arrows illustrate the flow and interdependence among the two frames.

**C. STATEMENT OF THE PROBLEM**

The objective of this research is to determine the perceptions of Claveria farmers regarding waste management practices and the application of rice husks. Furthermore, the objective of the researchers is to ascertain the benefits and potential advantages that farmers in Claveria may derive from the use of rice husk biocharcoal.

1. Demographic Profile:

* 1. Age
  2. Years of Experience in Farming

1. What are the potential benefits of using rice husk biocharcoal as an additive to commercial fertilizers?
2. What are the advantages of utilizing rice husk biocharcoal to farmers?

**D. SIGNIFICANCE OF THE STUDY**

The aim of our study is to examine the potential benefits and advantages of using rice husk in sustainable farming techniques. Here is how different parties involved can gain advantages from our research:

**The Farmers,** the paper presents novel methodologies for integrating rice husk into agricultural methods, promoting sustainability. By employing these techniques, farmers can increase crop productivity while minimizing harm to the environment.

**The Agricultural Industries**, adopting sustainable procedures that utilize rice husk could lead to the creation of affordable and inventive fertilizer products. This not only benefits agricultural enterprises but also enhances access to vital agricultural resources.

**The Government Agencies,** by advocating for sustainable methods in rice cultivation, government organizations can reduce the expenses associated with distributing fertilizers to farmers through agricultural initiatives. This is consistent with the broader goals of attaining sustainable agriculture and guaranteeing food security.

**The Future Researchers,** that the outcome of this study can potentially function as a valuable guide or point of reference for future researchers or implementers, as it provides pertinent information and innovative ideas. This study welcomes the participation of students and researchers in order to contribute to the progress of society in the subject of Agriculture.

This research study will provide valuable assistance to farmers, agricultural sectors, government agencies, and future researchers by addressing concerns regarding the use of rice husk biochar (RHB).

**E. SCOPE AND DELIMITATION**

This study aims to understand the perspective of Claveria farmers regarding an alternate approach to disposing of the by-products of rice processing. The objective is to provide a description of their own experiences in the processing and utilization of Rice Husk Biochar. Furthermore, it offers ample information regarding the advantages and benefits of integrating rice husk biocharcoal into industrial fertilizers.   
This study is specifically focuses on farmers residing in the barrios of Claveria, Cagayan, notably Lablabig, Cadcadir West, and Cadcadir East with a population of 74, 80, 84 respectively. The researchers employed qualitative research methods to assess the data and derive findings in this study.

1. **DEFINITION OF TERMS**

**Agriculture** – the science and practice of farming.

**Agronomy** – the science of producing and using plants by agriculture

**Archaeological evidence** – physical artifacts left behind by the people of the past.

**Biocha**r – black residue made of ashes and carbon.

**Community** – a group of people having a particular characteristics in common

**Crop** – a plant that is grown mainly for profit or subsistence.

**Cuisine** – a style of cooking food characterized by a specific culture

**Dish**- variety of food ready to be served

**Farmer** – a person who manages a farm

**Fertilizer** – material that supplies chemical elements required for plant growth.

**Fue**l – material that is burned to produce fire

**Husk** – an outer shell or coating.

**Industr**y – a branch of a craft, art business, or manufacture.

**Innovate** – introducing new changes to what is established.

**Insecticide** – toxic substance that is used to kill pets.

**Labour** – physical work

**Livestock** – farm animals with the exception of poultry

**Organic** – produced without the use of artificial agents.

**Poultry** – domesticated bird used for food

**Produc**t – an object that is the result of a process

**Soil** – the organic and inorganic material on the surface of the earth

**Soil fertility** – the ability of soil to sustain plant growth

**Sustainability** – ability to maintain or support a process continuously over time.

**Swine** – domesticated pig used for food

**CHAPTER II**

**REVIEW OF RELATED LITERATURE**

This chapter presents the relevant literature and studies that the researchers considered in strengthening the importance of this study. This article also presents the synthesis of the art to fully study the impacts of rice husk biochar in farming community of Claveria.

**Definition and Overview of Rice Husk Biochar**

Ahmad Nawaz et al., (2022) emphasized that Rice (*Oryza sativa L*.) stands as the staple food for millions across Asia and the globe. However, the cultivation of rice also yields significant amounts of non-food biomass, chiefly in the form of straw and husks Bernard A. Goodman et al., (2020). These byproducts pose challenges for waste management and sustainability. Yet, in response to these challenges, efforts are made to explore efficient and sustainable uses for these agricultural residues. By harnessing innovative technologies and adopting environmentally friendly practices, researchers aim to transform rice straw and husks into valuable resources, thereby mitigating waste generation and promoting sustainable agricultural practices in rice-growing regions worldwide.

Rice husk biochar (RHB) or rice husk ash (RHA) emerges as a promising solution to address the challenges posed by rice straw and husks in waste management and environmental sustainability. Derived from the word biochar, defined as any biological residue from any organic based materials produced through gasification or pyrolysis under exclusion of oxygen (Mohammad [Ghorbani et al., 2019](https://www.sciencedirect.com/science/article/pii/S1658077X21001041#b0290)). Rice husk biochar would be the resulting residue from burnt rice husk which is an available agricultural by-product material Che-Way [Chang et al., (2019)](https://doi.org/10.1016/j.conbuildmat.2019.05.157).

**Production Methods and Techniques**

**A. Pyrolysis Process for Rice Husk Biochar Production**

It has been noted by Witold M. Lewandowski et al., (2020) that the thermochemical conversion of biomass fuels has three main modes: combustion, gasification, and pyrolysis. The main products of combustion and slow pyrolysis are biochar, and the main products of gasification and fast pyrolysis are biomass oil and biomass gas. Combustion methods include grate combustion, fluidized bed combustion, and suspension (jet) combustion (Fábio Roberto Vieira et al., (2020).

Grate combustion produces RHB with a large surface area that is suitable as an adsorbent. Fluidized bed combustion produces RHB that can be used as a filler for polymer composites and ceramic compounds. Suspension (jet) combustion produces RHB with completely amorphous silica, which is suitable for civil engineering and zeolite production (Daiane Calheiro et al., 2018).

According to Usman Khalil et al. (2020), pyrolysis is well-liked because of its high recovery rate and minimal asset usage. Through a complicated process involving reduced oxygen levels and thermochemical changes in the feedstock, biomass oil, biomass gas, and biochar are produced. The biomass is broken down by pyrolysis into a combination of inorganic and organic chemicals. Biochar is a fine-grained, porous, aromatically stable solid substance that is rich in carbon.

Depending on the operating conditions, pyrolysis can be classified as slow, fast, or flash. Slow pyrolysis is performed at low temperatures, slow heating rates, and long residence times, which facilitates char production. Flash pyrolysis typically has a residence time of

less than 0.5 s and a very high heating rate. Fast pyrolysis is performed at moderate temperatures, a high heating rate, and long vapor residence time. Fast pyrolysis and flash pyrolysis favor the formation of bio-oil.

**Impact on Crop Productivity and Soil Health**

**A. Reduction of Greenhouse Gas Emissions**

The significance of biochars in reducing soil greenhouse gas emissions (CO2, CH4, and N2O) has been further supported by their capacity to do so. Biochars are thought to usually increase soil CO2 emissions, decrease N2O emissions, and have variable impacts on CH4 emissions, according to a number of recently published meta-analyses (Schmidt et al., 2021).

However, feedstock, pyrolysis conditions, application rate, soils, and climate all affect the direction and strength of the effects on GHG emissions. According to some of these meta-analyses, the majority of the data came from greenhouse and laboratory trials as opposed to   
  
field experiments (Schmidt 2021). Furthermore, the majority of short-term laboratory experiments indicated the largest decreases in GHG emissions (Qi Liu et al., 2022). It might not be appropriate to draw conclusions from such brief laboratory research. Long-term field trials should serve as the foundation for the trustworthy and useful advice regarding the use of biochars to reduce greenhouse gas emissions. There are, however, few studies describing the impact of biochar on greenhouse gas emissions after several years of use.

**CHAPTER III**

**RESEARCH METHODOLOGY**

This chapter includes information about the research design, setting, population and sampling methods, research instrument, data collection method, and data analysis. The procedures that were followed by the researchers for data collection and analysis are listed below.

**A. Research Design**

This study used structured questionnaires to assess the insights of Claveria Farmers about the benefits, advantages, and perception regarding the use of Rice Husk Biochar (RHB) as components to industrial fertilizers or as an additive to the soil of the crops of Claveria. The method utilized by the researchers is the qualitative research design, especially on collecting qualitative data.

Furthermore, the researchers used phenomenological research to describe things that people have already experienced. This method focuses on individuals' personal perspectives and experiences. The study emphasizes how farmers perceive the incorporation of rice husk biocharcoal into commercial fertilizers.

**B. Research Locale**

Claveria is the chosen town for the researchers to get insights from the Claveria farmers regarding the use of rice husk biochar as components to commercial fertilizer. The study was conducted in five barangays in Claveria, Cagayan namely: Lablabig, Cadcadir West, and Cadcadir East.

**C. Research Participants**

In conducting this study, the researchers surveyed five (5) farmers within the barrios of Cadcadir East, Cadcadir West, and Lablabig. With each having a population of farmers of 74, 80 and 84 respectively, the respondents were selected using purposive sampling to recruit participants who can provide sufficient and detailed information about the occurrence being studied.

**D. Research Instruments**

This research study used questionnaires with structured question to gather the information needed, which focuses on the application of rice husk biochar as a component to industrial fertilizer. The researcher used open-ended questions to gather significant data about this study. The respondents answered the questions on-the-spot. The interview consists of two main parts: the profile and the questions. The questions are designed to acquire valid responses from the selected respondents.

**E. Data Collection Procedure**

The data was collected through structured questionnaire which includes open-ended questions.

**F. Data Analysis**   
Upon completing the data collection, the relevant data was arranged and organized to prepare it for analysis and interpretation.

**CHAPTER IV**

**DATA PRESENTATION, ANALYSIS, INTERPRETATION, DISCUSSION, AND IMPLICATION OF FINDINGS**

This chapter presents the data gathered from the study **“Perceptions of Claveria Farmers on Rice Husk Biocharcoal as a Fertilizer Additive”** among the 15 respondents. It provides an analysis and interpretation of the data, followed by a discussion of the findings that served as the basis for the formulation of conclusions and recommendations.

**A. DATA ANALYSIS AND INTERPRETATION PROCEDURE**

Figure 1.1 *Sex of the Respondents*

|  |  |  |
| --- | --- | --- |
| **SEX** | **FREQUENCY** | **PERCENTAGE** |
| MALE | 11 | 73% |
| FEMALE | 4 | 27% |
| **TOTAL** | **15** | **100%** |

In the analysis of 15 participants, a pie chart was used to illustrate the gender distribution. It's clear from the table that 27% (4 respondents) of the group identified as female, while the remaining 73% (11 respondents) identified as male.

Figure 1.2 *Address of the Respondents*

|  |  |  |
| --- | --- | --- |
| **ADDRESS** | **FREQUENCY** | **PERCENTAGE** |
| CADCADIR EAST | 5 | 33.33% |
| CADCADIR WEST | 5 | 33.33% |
| LABLABIG | 5 | 33.33% |
| **TOTAL** | **15** | **100%** |

The table reveals that Cadcadir East accounts for 33.33% of the surveyed population, Cadcadir West for 33.33%, and Lablabig for the remaining 33.33%. The result gives useful data about the spatial distribution of respondents within the selected areas.

Figure 1.3 *Age of the Respondents*

|  |  |  |
| --- | --- | --- |
| **AGE** | **FREQUENCY** | **PERCENTAGE** |
| 20 & BELOW | 0 | 0% |
| 21-30 | 1 | 7% |
| 31-40 | 3 | 20% |
| 41-50 | 3 | 20% |
| 51-60 | 6 | 40% |
| ABOVE 60 | 2 | 13% |
| **TOTAL** | **15** | **100%** |

The graph above shows that none of the respondents were 20 years old or younger. The age distribution is as follows: 7% (1 respondent) were between the ages of 21 and 30, 20% (3 respondents) were between the ages of 31 and 40, another

20% (3 respondents) were between the ages of 41 and 50, 40% (6 respondents) were between the ages of 51 and 60, and 13% (2 respondents) were 60 years of age or older.

Figure 1.4 *Years of Experience in Farming*

|  |  |  |
| --- | --- | --- |
| **YEARS OF EXPERIENCE** | **FREQUENCY** | **PERCENTAGE** |
| UNDER 10 YEARS | 2 | 13% |
| 10-20 YEARS | 8 | 54% |
| ABOVE 20 YEARS | 5 | 33% |
| **TOTAL** | **15** | **100%** |

The figure above illustrates the range of farming experience among the participants. Specifically, 13% (2 respondents) had less than 10 years of experience, while the majority, constituting 54% (8 respondents), indicated a farming term ranging between 10 and 20 years. Furthermore, 33% (5 respondents) had at least 20 years of farming experience.

Figure 1.5 *Frequency of using rice husk biocharcoal as an additive.*

|  |  |  |
| --- | --- | --- |
| **HOW OFTEN RICE HUSK BIOCHARCOAL IS USED** | **FREQUENCY** | **PERCENTAGE** |
| EVERYDAY | 3 | 20% |
| OCCASIONALLY | 7 | 47% |
| EVERY OTHER MONTH | 5 | 33% |
| **TOTAL** | **15** | **100%** |

As shown in the table above, the use of rice husk biocharcoal as an addition differs by respondent. Specifically, 20% (3 respondents) reported taking it on a daily basis, while   
  
the majority, 47% (7 respondents), claimed occasional use. Meanwhile, 33% (5 respondents) of participants reported using rice husk biocharcoal in their farming methods every other month. This wide range of usage frequencies illustrates biocharcoal's adaptability and usefulness as an addition improving soil health and crop yields.

Figure 1.6 *Advantages of using Rice Husk Biocharcoal*

|  |  |  |
| --- | --- | --- |
| **ADVANTAGES** | **FREQUENCY** | **PERCENTAGE** |
| INCREASED CROP YIELDS | 4 | 10% |
| IMPROVED SOIL HEALTH | 9 | 23% |
| WATER CONSERVATION | 5 | 13% |
| REDUCED SOIL EROSION | 2 | 5% |
| SUSTAINABLE WATER MANAGEMENT | 8 | 20% |
| COST SAVING TO MAKE | 0 | 0% |
| PROMOTION OF SUSTAINABLE AGRICULTURE | 12 | 30% |
| **TOTAL** | **40 votes** | **100%** |

As shown in Figure 1.6, respondents noted that using rice husk biocharcoal in farming provides various benefits. About 10% (4 respondents) reported higher crop yields, implying that biocharcoal improves productivity. Moreover, 23% (9 respondents) emphasized its function in increasing soil health, making it more suitable for agricultural production. Additionally, 13% (5 respondents) highlighted water conservation, implying that biocharcoal helps retain moisture in the soil, which aids in drought resistance. 5% (2 respondents) reported decreased soil erosion, demonstrating biocharcoal's ability to protect   
  
soil. Furthermore, 20% (8 respondents) identified sustainable water management as a key benefit, emphasizing biocharcoal's contribution to efficient water usage. Though no respondents mentioned cost savings, 30% (12 respondents) emphasized the promotion of sustainable agriculture, highlighting biocharcoal's role in environmentally friendly farming. These data demonstrate how biocharcoal benefits farming in a variety of ways, including increased yields, soil protection, and water management.

Figure 1.7. *Benefits of using Rice Husk Biocharcoal*

|  |  |  |
| --- | --- | --- |
| **REDUCED DEPENDENCE ON SYNTHETIC FERTILIZERS** | **FREQUENCY** | **PERCENTAGE** |
| YES | 10 | 67% |
| NO | 5 | 33% |
| NO ANSWER | 0 | 0% |
| **TOTAL** | **15** | **100%** |

Among the benefits of using rice husk biocharcoal, the table above shows that a significant 10 of the respondents said it reduced dependence on synthetic fertilizers. In contrast, 5 respondents answered that it didn't contribute to reduced reliance on synthetic fertilizers. Notably, none of the respondents abstained or provided a response, demonstrating a firm position on this issue.

Figure 1.8. *Benefits of using Rice Husk Biocharcoal*

|  |  |  |
| --- | --- | --- |
| **LOWERS PRODUCTION COST** | **FREQUENCY** | **PERCENTAGE** |
| YES | 2 | 13% |
| NO | 13 | 87% |
| NO ANSWER | 0 | 0% |
| **TOTAL** | **15** | **100%** |

The data above reveals that only 2 of the respondents agreed that rice husk biocharcoal lowers production costs, while a significant majority of 13 respondents did not agree with this notion. Importantly, none of the respondents abstained from providing an answer.

Figure 1. 9. *Benefits of using Rice Husk Biocharcoal*

|  |  |  |
| --- | --- | --- |
| **LOWERS PRODUCTION COST** | **FREQUENCY** | **PERCENTAGE** |
| YES | 11 | 73% |
| NO | 4 | 27% |
| NO ANSWER | 0 | 0% |
| **TOTAL** | **15** | **100%** |

According to the table, 11 of the respondents agreed that using rice husk biocharcoal minimizes environmental pollution, while 4 respondents did not agree with this statement. Notably, no respondents abstained from providing an answer, reflecting a clear position on the perceived environmental benefits of biocharcoal use.

Figure 1.10 *Benefits of using Rice Husk Biocharcoal*

|  |  |  |
| --- | --- | --- |
| **HAS LONG LASTING EFFECTS ON SOIL HEALTH** | **FREQUENCY** | **PERCENTAGE** |
| YES | 3 | 20% |
| NO | 12 | 80% |
| NO ANSWER | 0 | 0% |
| **TOTAL** | **15** | **100%** |

As per the graph, it's evident that only 3 of the respondents agreed that rice husk biocharcoal has long-lasting effects on soil health, whereas 12 respondents disagreed with this. Remarkably, none of the respondents abstained from expressing their opinion on the matter.

**B. DISCUSSIONS AND IMPLICATION OF FINDINGS**

The respondents' profiles were determined based on their sex, address, age, and farming experience. These profile factors are crucial for evaluation as they significantly contribute to the study's overall enhancement.

As depicted in Table 1.3, the majority of respondents are adults aged 50 and above. Additionally, Table 1.4 shows that the majority have over 20 years of farming experience, indicating that most respondents have experience with various farming practices, including the use of organic components, advanced industrial machinery, and more.

As for the address in Figure 1.2, the graph reveals that Cadcadir East, Cadcadir West, and Lablabig each account for a similar portion of the surveyed population. This distribution provides useful data about the spatial representation of respondents within the selected areas. These barangays were chosen because they are known for practicing rice husk biocharcoal utilization.

The data from Figure 1.6 illustrates several benefits of using rice husk biocharcoal in farming. Firstly, it improves productivity by enhancing crop yields. Additionally, it contributes to soil health, making it more conducive to agricultural production. Furthermore, biocharcoal aids in water conservation by helping soil retain moisture, which is particularly beneficial for drought resistance. It also reduces soil erosion, thus protecting the soil. Another significant benefit is its contribution to sustainable water management, ensuring efficient water usage. Although cost savings weren't mentioned, the promotion of sustainable agriculture was highlighted by many respondents, indicating the environmentally friendly nature of using rice husk biocharcoal as an additive in farming.

Figure 1.5 also shows that respondents use rice husk biocharcoal in different frequencies, including daily, occasional, or every other month in farming. This variety in usage demonstrates the flexibility and effectiveness of biocharcoal as an addition, indicating its ability to enhance soil health and crop yields regardless of how often it's used.

Figure 1.7 indicates that a significant number of respondents find that using rice husk biocharcoal reduces dependence on synthetic fertilizers, suggesting its potential to offer an alternative to traditional fertilizers. However, a considerable percentage of respondents do not share this view, indicating a certain skepticism or perhaps a belief that biocharcoal's benefits may not extend to fertilizer reduction. Moreover, in Figure 1.9, a

minority of respondents believe that biocharcoal lowers production costs, hinting at its perceived economic advantages. Conversely, the majority of respondents disagree with this notion, suggesting that while biocharcoal may offer benefits, cost reduction may not be one of them. In Figure 1.9, in terms of environmental impact, a majority of respondents agree that biocharcoal minimizes pollution, indicating a belief in its ability to contribute positively to environmental sustainability. However, a smaller percentage of respondents do not share this sentiment, implying a degree of uncertainty about its environmental benefits. Similarly, in Figure 1.10, when considering long-term effects on soil health, fewer respondents agree compared to those who disagree, suggesting a lack of consensus on the lasting impact of biocharcoal on soil health. This indicates a need for further research or more convincing evidence to establish biocharcoal's efficacy in this regard.

The researchers concluded that respondents' perceptions of rice husk biocharcoal as a fertilizer additive vary depending on their knowledge and experiences regarding its benefits and advantages. This research demonstrates that rice husk biocharcoal can contribute to sustainable agriculture, increased crop yield, and improved soil health. However, respondents also oppose the idea that its use can be cost-effective. Furthermore, the widespread adoption of this practice among farmers in Claveria could promote sustainable and innovative agriculture in the municipality.

**CHAPTER V**

**SUMMARY OF FINDINGS, CONCLUSION, AND RECOMMENDATION**

The primary aim of this study was to collect information about the perspectives of Claveriano Farmers regarding the utilization of Rice Husk Biocharcoal on their soil and fertilizers. It discusses the insights of the respondents and the depth of their knowledge and experiences.

This study involved a sample of 15 participants who were picked from the barangays of Cadcadir East, Cadcadir West, and Lablabig. The participants were chosen using the purposive sampling approach, with 5 participants taken from each barangay.

The researchers collected data using surveys and employed a qualitative research approach. In gathering data, the researchers used a structured questionnaire to assess the experiences of farmers regarding the benefits and advantages of using rice husk biocharcoal as an additive to fertilizers. The researchers developed the questionnaire by reviewing past studies and pertinent published and unpublished theses.

The researchers have collected sufficient data to address the research questions using the questionnaire. The researchers employed a qualitative study approach specifically for gathering qualitative data. Phenomenological research is used wherein it is the study of phenomena, or things as they appear in human experience. As a phenomenological research study, it is mainly concerned with the advantages and benefits to the farmers.

The study specifically identified the characteristics of the respondents in terms of their age and years of expertise in farming. The correlation between age and years of experience in farming also demonstrated the positive outcomes and benefits it provides to the participants.

The demographic factors, such as age and years of experience, significantly impact their perception of the utilization of rice huck biocharcoal. The respondents' level of expertise is directly linked to their opinions since the extent of their experience varies. Regarding age, the greater the age of the respondent, the greater their capacity to share valuable insights and wisdom regarding the advantages and benefits of it.

The current study has yielded significant insights into the significance of employing rice husk biocharcoal for the development of a sustainable and pioneering agricultural system. In addition, the respondents' practical experiences and the extensive information settings from similar studies offered the essential solutions to the research problems.

The findings of the study led the researchers to the conclusion that the perceptions of rice husk biocharcoal as a supplement for fertilizer varied based on the respondents' knowledge and experiences regarding the benefits and advantages brought about by the substance. According to the findings of this study, rice husk biocharcoal has the potential to make a contribution to sustainable agriculture, as well as to greater crop output and more improved soil health. On the other hand, respondents are not in agreement with the notion that its utilization can be economical. It is also possible that the broad adoption of this approach among farmers in Claveria could lead to the development of innovative and environmentally responsible agricultural practices within the municipality.

**CONCLUSION**

Based on the obtained data, the researchers have gained further knowledge and information that is significant to the study and have drawn the following conclusions:

1. Cultivating rice poses numerous obstacles for respondents, mostly because to budgetary limitations, pest invasions, and the unexpected nature of severe weather conditions.

2. Based on the collected data, rice husk biochar enhanced soil health by facilitating water retention and mitigating soil erosion.

3. The utilization of rice husk biochar has facilitated the development of sustainable agriculture by effectively repurposing the byproducts of rice production.

4. The utilization of rice husk biochar has diminished the reliance on synthetic fertilizers among certain participants.

5. The utilization of rice husk biocharcoal did not contribute to the reduction of rice production expenses for certain individuals, as the high cost of rice cultivation is not solely attributed to fertilizers.

**RECOMMENDATIONS**

Considering the study's findings of varied opinions among farmers on the utilization of rice husk biocharcoal as an additive to fertilizers, it is advisable for the future researchers to resolve the stated concerns in order to enhance the overall acceptance and validation of the study. More precisely, the future researchers ought to:

1. To establish the generalizability of the findings and evidence, it is possible to undertake a comparable study on a bigger sample size and in several barangays.

2. Expand the questionnaire by adding additional questions to gather a broader range of facts and information.

3. Further investigate the practical use of rice husk biocharcoal to enhance its sustainability.

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**APPENDICES**

Resume of the Researcher

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***Personal Data***

|  |  |  |
| --- | --- | --- |
| **Age** | **:** | 17 |
| **Date of Birth** | **:** | October 10, 2006 |
| **Sex** | **:** | Male |
| **Place of Birth** | **:** | Claveria, Cagayan |
| **Civil Status** | **:** | Single |
| **Height** | **:** | 170 cm |
| **Nationality** | **:** | Filipino |
| **Religion** | **:** | N/A |
| **Mother’s Name** | **:** | Mayvee Lynne Ancheta |
| **Occupation** | **:** | N/A |
| **Father’s Name** | **:** | Diomedes Ancheta |
| **Occupation** | **:** | Police |

***Educational Background***

|  |  |  |
| --- | --- | --- |
| * ELEMENTARY | Claveria West Central School | 2013-2019 |
| * JUNIOR HIGH SCHOOL | Academy of St. Joseph | 2019- 2023 |
| * SENIOR HIGH SCHOOL | Academy of St. Joseph | 2023-2025 |



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***Personal Data***

|  |  |  |
| --- | --- | --- |
| **Age** | **:** | 17 |
| **Date of Birth** | **:** | November 30, 2006 |
| **Sex** | **:** | Male |
| **Place of Birth** | **:** | Mariano Marcos Memorial Hospital |
| **Civil Status** | **:** | Single |
| **Height** | **:** | 167 cm |
| **Nationality** | **:** | Filipino |
| **Religion** | **:** | Roman Catholic |
| **Mother’s Name** | **:** | Eden Chona Aridao |
| **Occupation** | **:** | Teacher |
| **Father’s Name** | **:** | Dick Aridao |
| **Occupation** | **:** | Forest Technician |

***Educational Background***

|  |  |  |
| --- | --- | --- |
| * ELEMENTARY | Claveria West Central School | 2013-2019 |
| * JUNIOR HIGH SCHOOL | Academy of St. Joseph | 2019- 2023 |
| * SENIOR HIGH SCHOOL | Academy of St. Joseph | 2023-2025 |

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***Personal Data***

|  |  |
| --- | --- |
| **Age** | **:** |
| **Date of Birth** | **:** |
| **Sex** | **:** |
| **Place of Birth** | **:** |
| **Civil Status** | **:** |
| **Height** | **:** |
| **Nationality** | **:** |
| **Religion** | **:** |
| **Mother’s Name** | **:** |
| **Occupation** | **:** |
| **Father’s Name** | **:** |
| **Occupation** | **:** |

***Educational Background***

|  |  |  |
| --- | --- | --- |
| * ELEMENTARY | Claveria West Central School | 2013-2019 |
| * JUNIOR HIGH SCHOOL | Academy of St. Joseph | 2019- 2023 |
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***Personal Data***

|  |  |  |
| --- | --- | --- |
| **Age** | **:** | 17 |
| **Date of Birth** | **:** | March 5, 2007 |
| **Sex** | **:** | Female |
| **Place of Birth** | **:** | Claveria, Cagayan |
| **Civil Status** | **:** | Single |
| **Height** | **:** | 152 cm |
| **Nationality** | **:** | Filipino |
| **Religion** | **:** | Roman Catholic |
| **Mother’s Name** | **:** | Irene Icat |
| **Occupation** | **:** | N/A |
| **Father’s Name** | **:** | Edison Icat |
| **Occupation** | **:** | Marine Engineer |

***Educational Background***

|  |  |  |
| --- | --- | --- |
| * ELEMENTARY | Claveria West Central School | 2013-2019 |
| * JUNIOR HIGH SCHOOL | Academy of St. Joseph | 2019- 2023 |
| * SENIOR HIGH SCHOOL | Academy of St. Joseph | 2023-2025 |



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|  |  |  |
| --- | --- | --- |
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| **Date of Birth** | **:** | July 22, 2006 |
| **Sex** | **:** | Female |
| **Place of Birth** | **:** | Sta. Filomena, Calanasan, Apayao |
| **Civil Status** | **:** | Single |
| **Height** | **:** | 144 cm |
| **Nationality** | **:** | Filipino |
| **Religion** | **:** | Roman Catholic |
| **Mother’s Name** | **:** | Analyn Silvano Oandasan |
| **Occupation** | **:** | Vendor |
| **Father’s Name** | **:** | Rodolfo Corpuz Oandasan Jr. |
| **Occupation** | **:** | Tricycle Driver |

***Educational Background***

|  |  |  |
| --- | --- | --- |
| * ELEMENTARY | Sta. Filomena Elementary School | 2013-2019 |
| * JUNIOR HIGH SCHOOL | Academy of St. Joseph | 2019- 2023 |
| * SENIOR HIGH SCHOOL | Academy of St. Joseph | 2023-2025 |

**April 11, 2024**

**REV. FR. JEROME A. ADRIATICO, SVD**

*School Director*

Thru: **REMAR P. AGCAOILI, MAED`**

*School Principal*

Dear Father:

Warm Greetings!

We, the students of Grade 11 St. Lorenzo class (STEM Strand), are conducting a research study titled **"PERCEPTIONS OF CLAVERIA FARMERS ON RICE HUSK BIOCHARCOAL AS A FERTILIZER ADDITIVE AMONG CLAVERIA FARMERS**”.

We respectfully request your permission to distribute survey questionnaires in the designated barangays in Claveria for us to obtain the necessary information relevant to our study. The data and information that will be gathered will be treated with utmost confidentiality and will only be used for research purposes.

Thank you for your time, and we look forward for your favorable response.

Sincerely yours,

**KENT ANDREI P. ANCHETA AEDRIAN CLYDE C. ARIDAO**

Researcher Researcher

**IRISH KEIRA N. ICAT CHRISTIAN S. LLAPITAN JAKIELYN S. OANDASAN**

Researcher Researcher Researcher

**RACHELLE C. DE PERALTA, LPT**

Noted:

Subject Teacher

Recommending Approval:

**REMAR P. AGCAOILI, MAED**

School Principal

Approved:

**REV. FR. JEROME A ADRIATICO, SVD**

School Director

**RACHELLE C. DE PERALTA, LPT**

Noted:

Subject Teacher

Recommending Approval:

**REMAR P. AGCAOILI, MAED**

School Principal

Approved:

**REV. FR. JEROME A ADRIATICO, SVD**

School Director

**RACHELLE C. DE PERALTA, LPT**

Noted:

Subject Teacher

Recommending Approval:

**REMAR P. AGCAOILI, MAED**

School Principal

Approved:

**REV. FR. JEROME A ADRIATICO, SVD**

School Director

**RACHELLE C. DE PERALTA, LPT**

Noted:

Subject Teacher

Recommending Approval:

**REMAR P. AGCAOILI, MAED**

School Principal

Approved:

**REV. FR. JEROME A ADRIATICO, SVD**

School Director

**RACHELLE C. DE PERALTA, LPT**

Noted:

Subject Teacher

Recommending Approval:

**REMAR P. AGCAOILI, MAED**

School Principal

Approved:

**REV. FR. JEROME A ADRIATICO, SVD**

School Director

**RACHELLE C. DE PERALTA, LPT**

Noted:

Subject Teacher

**RACHELLE C. DE PERALTA, LPT**

Noted:

Subject Teacher

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School Principal

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**REV. FR. JEROME A ADRIATICO, SVD**

School Director

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Noted:

Subject Teacher

Recommending Approval:

**REMAR P. AGCAOILI, MAED**

School Principal

Approved:

**REV. FR. JEROME A ADRIATICO, SVD**

School Director

**RACHELLE C. DE PERALTA, LPT**

Noted:

Subject Teacher

Recommending Approval:

**REMAR P. AGCAOILI, MAED**

School Principal

Approved:

**REV. FR. JEROME A ADRIATICO, SVD**

School Director

**April 11, 2024**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

Dear Sir:

Warm Greetings!

We, the students of Grade 11 St. Lorenzo class (STEM Strand), are humbly requesting to grant us permission to perform data collecting in your humble barangay as part of our ***Practical Research 1*** requirement titled **"PERCEPTIONS OF CLAVERIA FARMERS ON RICE HUSK BIOCHARCOAL AS A FERTILIZER ADDITIVE AMONG CLAVERIA FARMERS”**

Rest assured that all survey data and information will be handled with utmost confidentiality and will only be used for research purposes.

Your positive response to our request would be greatly appreciated.

Thank you for your consideration.

Respectfully yours,

**KENT ANDREI P. ANCHETA AEDRIAN CLYDE C. ARIDAO**

Researcher Researcher

**IRISH KEIRA N. ICAT CHRISTIAN S. LLAPITAN JAKIELYN S. OANDASAN**

Researcher Researcher Researcher

**RACHELLE C. DE PERALTA, LPT**

Noted:

Subject Teacher

Recommending Approval:

**REMAR P. AGCAOILI, MAED**

School Principal

Approved:

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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Punong Barangay

Punong Barangay

Punong Barangay

Punong Barangay

Punong Barangay

Punong Barangay

**RACHELLE C. DE PERALTA, LPT**

Noted:

Subject Teacher

Recommending Approval:

**REMAR P. AGCAOILI, MAED**

School Principal

Approved:

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**



**RACHELLE C. DE PERALTA, LPT**

Noted:

Subject Teacher

Recommending Approval:

**REMAR P. AGCAOILI, MAED**

School Principal

Approved:

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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**RACHELLE C. DE PERALTA, LPT**

Noted:

Subject Teacher

Recommending Approval:

**REMAR P. AGCAOILI, MAED**

School Principal

Approved:

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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Punong Barangay

**April 11, 2024**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

*\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*

Dear Sir/Madam:

Warm Greetings!

We, the students of Grade 11 St. Lorenzo class (STEM Strand), are humbly asking for your participation to answer our research questionnaire as part of our ***Practical Research 1*** requirement titled **"PERCEPTIONS OF CLAVERIA FARMERS ON RICE HUSK BIOCHARCOAL AS A FERTILIZER ADDITIVE AMONG CLAVERIA FARMERS”.**

Rest assured that all survey data and information will be handled with utmost confidentiality and will only be used for research purposes.

Your positive response to our request would be greatly appreciated.

Thank you for your consideration.

Respectfully yours,

**KENT ANDREI P. ANCHETA AEDRIAN CLYDE C. ARIDAO**

Researcher Researcher

**IRISH KEIRA N. ICAT CHRISTIAN S. LLAPITAN JAKIELYN S. OANDASAN**

Researcher Researcher Researcher

**RACHELLE C. DE PERALTA, LPT**

Noted:

Subject Teacher

Recommending Approval:

**REMAR P. AGCAOILI, MAED**

School Principal

**RACHELLE C. DE PERALTA, LPT**

Noted:

Subject Teacher

Recommending Approval:

**REMAR P. AGCAOILI, MAED**

School Principal

**RACHELLE C. DE PERALTA, LPT**

Noted:

Subject Teacher

Recommending Approval:

**REMAR P. AGCAOILI, MAED**

School Principal

**QUESTIONNAIRE**

Academy of St. Joseph

Senior High School Department

C-1, Claveria, Cagayan

**Research Title: “Perceptions of Claveria Farmers on Rice Husk Biocharcoal as a fertilizer additive among Claveria Farmers”**

This questionnaire is designed to gather data on **“Perceptions of Claveria Farmers on Rice Husk Biocharcoal as a fertilizer additive among Claveria Farmers”**. Your responses will be kept confidential and will only be used for research purposes. Please answer each question to the best of your ability, and feel free to skip any questions you do not wish to answer.

**Directions: Please provide pertinent information to the items below by checking the appropriate boxes and shading the scale that corresponds to your answer.**

***I.***

**1.Demographic Profile**

**Name (optional):** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Sex:** \_\_\_\_\_\_\_\_\_\_

**Address:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Age**

* 20 yrs old below
* 21-30 yrs old
* 31-40 yrs old
* 41-50 yrs old
* 51-60 yrs old
* 60 yrs old above

**Experience in Farming**

* Below 10 years
* 10-20 years
* 20 years above

**1.What problems do you encounter in rice farming?**

* Expensive equipments and materials (pesticides, fertilizer, etc.) requirement.
* Rice crops being destroyed by pests or insects.
* Harsh weather conditions
* Lack of water irrigation
* Others: \_\_\_\_\_\_\_\_\_\_\_\_\_ (Specify)

**2.How often do you use rice husk biocharcoal as an additive?**

* I use rice husk charcoal as an additive everyday.
* I use rice husk charcoal occasionally.
* I use rice husk charcoal every other month.

***II. Advantages***

**1. What advantages does the use of rice husk biocharcoal as an additive give to you?**

|  |  |
| --- | --- |
| **Benefits** | **Checklist** |
| Increased Crop Yields |  |
| Improved Soil Health |  |
| Water Conservation |  |
| Reduced Soil Erosion |  |
| Sustainbale Waster Management |  |
| Cost Saving |  |
| Promotion of Sustainable Agriculture |  |

***III. Benefits***

**1. What benefits does the use of rice husk biocharcoal as an additive give?**

|  |  |  |  |
| --- | --- | --- | --- |
| **Advantages** | **Yes, it does** | **No, it does not** | **Abstain/ No Answer** |
| **Reduced dependence on synthethic fertilizers** |  |  |  |
| **Lowers production cost** |  |  |  |
| **Minimizes environmental pollution** |  |  |  |
| **Has long-lasting effects on soil health** |  |  |  |

**DOCUMENTATION**

**A collage of people holding papers

Description automatically generated**