

“KAPE-KAPE”: A CASE STUDY OF LOCAL COFFEE FARMING SUSTAINABILITY

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Abstract

This case study explores the local coffee farming sustainability in Barangay Tigbanaba Sitio-Buyuan Igbaras, Iloilo, focusing on the local coffee farming practices, sustainability issues, and farmers' recommended solutions. In this study, five (5) participants from the members of the coffee growers' association in Sitio-Buyuan Tigbanaba Igbaras, Iloilo, were purposefully selected based on the criteria set by the researchers. Data gathered through interviews were transcribed and underwent thematic analysis. Based on the findings, coffee farming at Sitio-Buyuan Tigbanaba Igbaras involves the following stages and practices: 1) cultivating coffee plants; 2) harvesting; 3) coffee processing procedures; 4) coffee milling process; and 5) packaging. The participants identified several issues pertaining to sustainability. In the social aspect, these problems were encountered by the farmers: physical and mental health struggles, security challenges, membership crisis in Coffee Farming Association, less interest of younger generation to engage in coffee farming, leadership challenges and non-compliance issues, and financial struggles. With regards to the economic aspect, these themes were identified: Inadequate tools and equipment, Organizational financial challenges, and Financial Struggles of the Coffee Growers Association. In the environmental aspect, the following issues were identified: climate crisis, combating coffee pests, and safeguarding coffee plants from invasive weeds. To address these issues, the following solutions were proposed by the coffee farmers: medical support, health and social security benefits, improvement of transportation and water access, financial assistance to purchase insecticides and pesticides, additional machinery and additional tools for farming operations, and improvement of facilities.

Keywords: Coffee, Local coffee farming practices, Local coffee farming sustainability, Sustainability issues

INTRODUCTION

Coffee or kape in the Filipino language is a beloved beverage cherished for its aroma and diverse flavors. In Iloilo, the term or phrase “makape-kape ta” or “kape ta” is a way of inviting people to drink coffee and it became a symbol of social cohesion and human connection. Consuming coffee has always been a normal thing to do in the Philippines. Moreover, Filipinos have experienced or developed a place attachment to their respective favorite coffee shops over time. Coffee is the second most traded commodity across the world, next to Petroleum (Chengappa & Devika, 2016). The International Coffee Organization (ICO, 2021) has gathered nearly 60 countries that produce coffee, of which the Philippines is part of the coffee-producing countries. This production plays a significant role in the economy and employing people (Reinecke *et al.* 2012). According to Tan (2020), it serves as a source of income for a lot of farmers and even businesses locally. Despite its historical prominence as a leading global coffee producer in the late 1800s, Philippines have transitioned to a minor contributor in contemporary times, as outlined in the History of Philippine Coffee. Nonetheless, the country remains a prominent coffee producer in Asia, with over 200,000 coffee farmers dispersed nationwide. The cultivation of coffee presents formidable challenges and requirements, particularly for farmers residing in remote regions due to limited access to essential resources and support systems. In Western Visayas, the enduring tradition of coffee farming in

Igbaras, Iloilo, dating back to the 1950s, has witnessed continuous advancements facilitated by government agencies and local support, underscoring the region's dedication to fostering a sustainable coffee industry. In Sitio-Buyuan Tigbanaba Igbaras, local coffee farmers confront numerous of challenges and opportunities in their quest to ensure the sustainability of coffee production. Despite encountering, social, economic and environmental challenges, coffee farming remains a cornerstone of the local economy, providing employment opportunities and a vital income source for the community. Hence, this study aims to comprehensively explore the factors contributing to the sustainability of local coffee farming and shed light on the practices, sustainability issues, and proposed solutions of the local coffee farmers in Barangay Tigbanaba Sitio-Buyuan Igbaras, Iloilo.

Conceptual Framework

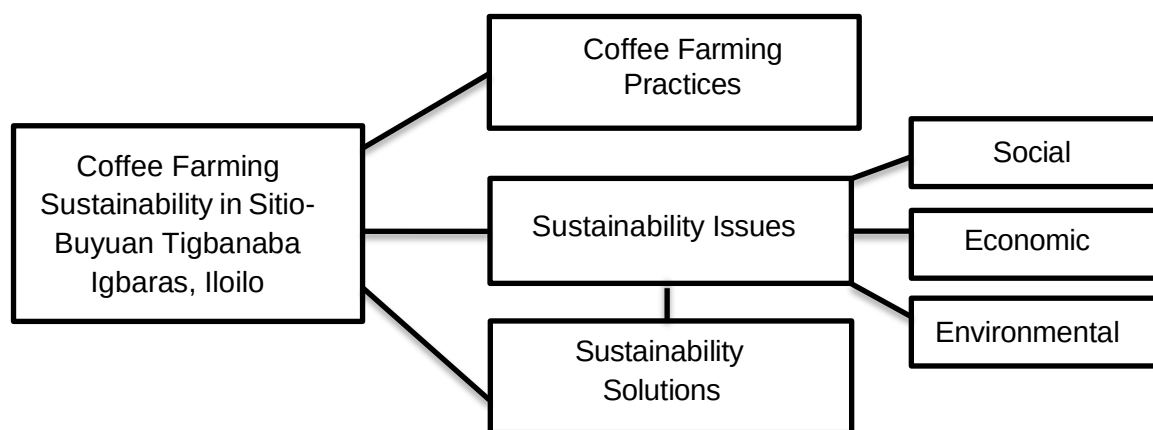


Figure 1: Paradigm of the Study

Figure 1 shows the conceptual framework of the study with coffee farming sustainability in Sitio Buyu-an Tigbanaba Igbaras, Iloilo as the case to be studied. The in-depth case study aims to explore the coffee farming practices, sustainability issues which cover the social, economic, and environmental aspects, and sustainability solutions proposed by coffee farmers in coffee growers' association.

Statement of The Problem

This case study is an in-depth exploration of the local coffee farming sustainability in Barangay Tigbanaba Sitio-Buyuan Igbaras, Iloilo focusing on the local coffee farming practices, sustainability issues and proposed solutions.

Specifically, the study aims to answer the following questions:

1. What are the practices involved in local coffee farming?
2. What are the sustainability issues in coffee farming?
3. What are the farmers proposed sustainability solutions in coffee farming?

LITERATURE REVIEW

Theoretical Framework

This study is anchored on the theory of sustainability. Based on the work of Nasrin R. Khalili, sustainability is an economic state in which the demands placed upon the environment and natural resources by people and commerce can be met without reducing the capacity of the environment to provide for future generations.

Solow defined sustainability as “an obligation or injunction to conduct ourselves so that we leave to the future the options and the capacity to be as well- off as we are, not to satisfy ourselves by impoverishing our successors.”

In addition, based on the study of Peterson K. Ozili, (2022), “Sustainability and Sustainable Development Research around the World”, Sustainability was defined as the philosophy approach or practice that guides the use of today's resources in an efficient manner to ensure that resources are available and sufficient to meet today's needs and the needs of future generations (Greenland, 1997; Grant, 2010). It is also defined as the ability to make responsible decisions in using and allocating resources to economic and non-economic activities in an effort to achieve certain desired social, economic and environmental outcomes (Grant ,2010).

Furthermore, in the work of Nasrin R. Khalili it states that, Sustainability has become increasingly evident as the ecological crisis has been further linked to human activities and, similarly, the environmental crisis was connected with the economic, social, political, and cultural crises. Because natural, economic, and social systems are all interdependent, it is logical that they must all be addressed when creating sustainable solutions to the environmental crisis. Due to its integrated nature, sustainability has been classified into three systems: *social*, *economic*, and *environmental*.

According to Ross (2013), Social sustainability refers to equality, well-being, and balance across quality of life from one generation to the next.

Another aspect is Economic sustainability according to Khalili (2019), this can be described as the “maintenance of the capital” or “nondeclining capital” in which capital is referred to as man-made capital. It also focuses on the portion of the natural resource base that provides physical input, both renewable and exhaustible, into the production process.

Lastly, Environmental sustainability, is another aspect which emphasizes environmental life-support systems such as atmosphere, water, and soil. It holds that, environmental service capacity must be maintained in order to support economic and social sustainability; accordingly, with the continuous depletion and damage by human activities to irreversible and non-substitutable environmental services would be incompatible with the thrust of environmental sustainability (Khalili,2011).

Synthesis of The Reviewed Literature and Studies

Coffee farming is an important agricultural activity both locally and internationally, particularly in regions with favorable climates. The sustainability of local coffee farming encompasses social, economic, and environmental aspects. The increasing domestic consumption of coffee highlights the importance of supporting local coffee farmers for sustainable production and economic growth. Coffee farming benefits families and the environment, providing a source of livelihood and maintaining the balance of biodiversity. Further, maintaining coffee quality are of utmost importance due to the fact that increase in sales depends upon the quality and volume of coffee production. To

produce coffee of good quality and to remain competitive on the world market, proper processing of coffee is necessary. There are local and national initiatives made by the government to ensure the betterment of the coffee industry in the country, by means of allocating funds to subsidized the programs, activities and projects as well as implementing policies to strengthen the improvement of the industry. The continuous support and investment of local governments in coffee farming create better development in the industry. The use of local knowledge in coffee farming is important to maintain the culture and local practices passed by the ancestors, these knowledge plays a vital role in sustainable management especially in coffee farming. Moreover, the emphasis on regenerative agricultural practices can help for the sustainability and resilience in the coffee farming sector. These approaches reduce waste, enhance soil health, protect biodiversity, mitigate climate change and empower coffee producing communities. Furthermore, in the aspect of social and economic challenges it focuses on improving the profitability of coffee agroforestry and the livelihood of low-income rural communities, which is essential for ensuring the long-term sustainability of local coffee farming and have understandings on why coffee farmers are identified as poor. However, on the environmental challenges emphasizes the vulnerability of coffee production to climate change, pests and other disease that might infected the coffee plants which has implications for the long-term sustainability of coffee farming.

Numerous knowledge gaps exist in coffee production, consumption, processing, farming initiatives, sustainability, and distinct practices. These gaps include understanding factors affecting fluctuating coffee production in the Philippines, exploring marketing strategies to boost coffee consumption, identifying processing methods for better coffee quality, evaluating the impact of government support on farming sustainability, assessing capacity-building initiatives, studying challenges in the local coffee farming sector, investigating climate change impacts, developing sustainable strategies, integrating traditional and modern practices, examining regenerative farming benefits, and assessing the effectiveness of sustainability standards. Further research in these areas can significantly improve the sustainability and productivity of coffee farming in the Philippines. Thus, a deeper understanding of coffee farming practices is necessary. Furthermore, exploring the challenges faced by coffee farmers in relation to sustainability.

RESEARCH METHOD

Research Design

This study is qualitative in nature and employs the case study approach. According to Creswell (2014), qualitative research is an inquiry process of understanding based on distinct methodological traditions of inquiry that explore a social or human problem.

Further, as defined by Creswell (2014), case study is an "in-depth exploration of a bounded system (e.g., an activity, event, process, or individuals) based on extensive data collection. Creswell recommends case study as a methodology if the problem to be studied "relates to developing an in-depth understanding of a 'case' or bounded system" and if the purpose is to understand "an event, activity, process, or one or more individuals." Hence, in this research, case study is the appropriate approach to explore the local coffee farming practices, sustainability issues and proposed solutions of local coffee farmers in Barangay Tigbanaba Sitio-Buyan Igbaras, Iloilo.

Participants of The Study

This study utilized purposeful sampling. Purposeful sampling involves identifying and selecting individuals or groups of individuals that are especially knowledgeable about or experienced with a phenomenon of interest (Cresswell & Plano Clark, 2011).

It is also called judgmental sampling; this sampling method relies on the researcher's judgment when identifying and selecting the individuals, cases, or events that can provide the best information to achieve the study's objectives (Nikolopoulou, 2022).

In this study, five participants were purposefully selected to ensure that they could provide quality and relevant information to satisfy the objectives of the study. They were chosen based on the following criteria:

- a) Must be a Coffee farmer from Sitio-Buyan Tigbanaba, Igbaras, Iloilo;
- b) Must be a member of the Coffee Growers Association for 5 years or more;
- c) With 5 years of experience in coffee farming or more;
- d) Must be willing to participate in the study; and,
- e) Must be available for an in-person interview at a location that is convenient for them.

Participants Socio-Demographic Profile

Table 1 shows the Socio- Demographic Profile of participants

Participant	Sex	Age	Civil Status	Number of years engaged in Coffee Farming	Number of years as member of Coffee Growers Association	Estimated Annual Income from Coffee Framing
Bert	Male	63	Married	40 years	7 years	78,500.00
Nono	Male	48	Married	38 years	7 years	40, 000.00
Mars	Male	45	Married	33 years	7 years	20,000.00
Nicnic	Female	52	Married	17 years	7 years	10,000.00
Ron	Female	36	Married	19 years	7 years	15,000.00

Table 1 shows the Socio- Demographic Profile of participants which are the member of Coffee Growers Association to serve as the participants of the study. Three are Males and two are females they are all pioneer members of the association, two of them are former presidents, one is the current president and the rest of the two are members and they are qualified in the criteria set by the researchers. The oldest participant was 63 years old, and the youngest was 36 years old. All participant were married individuals. Bert possessed 40 years of experience, Nono had 38 years, Mars had 33 years, Ron had 19 years, and Nicnic had accumulated 17 years of experience. All participants are active member of coffee growers' association for seven years. Moreover, for the annual income of the participants Bert earn 78,500.00, followed by Nono with 40,000.00, Mars with 20,000.00, Ron with 15,000.00, and Nicnic with the lowest annual income of 10,000.00. The variation in income of the participants was due to the differences on the land area of their coffee farms as well as on the number of years they are engaged in coffee farming.

The Research Locale

This study was conducted at the Municipality of Igbaras, Iloilo, specifically at Sitio-Buyan, Barangay Tigbanaba, Igbaras, an agricultural area. The municipality has a land area of 148.72 square kilometers or 57.42 square miles which constitutes 2.98% of Iloilo's total area. The main agricultural product is rice; other agricultural products are corn, garlic, peanuts and legumes. Coffee is one of the known products in Barangay Tigbanaba Igbaras by its natural aroma and distinct fragrance which is slowly known by people and coffee shops in the Municipality of Igbaras. This barangay was chosen because of the sufficient numbers of coffee farmers (40) and also this is one of the barangays in the Municipality of Igbaras practiced coffee farming as an alternative source of their livelihood. The population as determined by the 2020 Census was 916. This represented 2.84% of the total population of Igbaras. As the location of Barangay Tigbanaba is situated at approximately 10.7683, 122.1997, in the island of Panay. Elevation at these coordinates is estimated at 1,138.6 meters or 3,735.5 feet above mean sea level. In order to reach Sitio-Buyan coffee growers association it took 17 minutes in riding “Habal- Habal” (motorcycle) around 9 kilometers. While coffee farmers from Sitio-Buyan as their area of residence they travel through walking and it took almost an hour to reach their coffee farms some farms are located in Igatmun, Igbolo and other parts of Tigbanaba Igbaras mountainous area. In which the elevation is suited for the coffee trees to grow.



Figure 1. Instrument of the study

The researchers used a semi-structured interview guide which consists of open-ended interview questions. This was developed by the researchers based on the research questions and was validated by the Social Sciences Professors. Further, all questions were translated into the local dialect (Kinaray-a) to ensure that the participants will be able to comprehend them.

Data Collection Procedure

In this study, data were gathered through semi-structured interviews using interview guide as the research instrument. The interview guide is composed of open-ended questions. According to Creswell & Plano Clark (2011), semi-structured interviews are designed to allow the researcher to address certain topics while allowing space for the interviewee to embellish or add information as needed.

Prior to the conduct of the interviews, the researchers conducted site visitation and initial observation in the coffee farms. After which, the researchers secure the approval of the Campus

administrator through a written letter to conduct the study. Also, the researchers sent a letter to the Punong Barangay of Barangay Tigbanaba and Coffee Growers Association President to request permission to conduct the study especially the interviews. Part of the request is to ask for assistance in selecting the participants of the study who fit in the set criteria. Moreover, after the selection of the participants, researchers individually send a letter inviting the participants to be part of the study.

During the first day of the interview, three out of five participants were available to be interviewed. Relevant information were shared by the participants. The interview took almost one hour for each participant. On that day, the researchers also asked for a copy of the coffee growers association and coffee farming history of Sitio- Buyuan Tigbanaba for supplemental data. Further, the researchers were given a chance to observe the associations' facility and the existing machineries. The interview of two other participants were set on another date based on their availability. Similar to the previous participants, their interviews also took almost one hour.

The focus of these interviews is to delve into the participants' perspectives and insights on the sustainability of local coffee farming. The interviews were conducted face-to-face to establish a personal connection and rapport, ensuring conducive environment for meaningful discussions. Additionally, to maintain accuracy and capture the conversations, the interviews were audio-recorded with the consent of the participants. Notes were also taken during the interviews to supplement the recorded data and ensure a thorough analysis of the information gathered.

Data Analysis Method

The collected data from the interviews were transcribed and underwent thematic analysis. Thematic analysis is a widely used qualitative analysis method that involves identifying patterns, themes, and commonalities in the responses of the participants. It provides a systematic approach to analyzing qualitative data, allowing for a comprehensive exploration of the local coffee farming practices, sustainability issues, and proposed solutions.

The data collected from the interviews were specifically analyzed using Braun and Clarke's thematic analysis method, this process consisting of six steps: (1) becoming familiar with the data, (2) generating codes, (3) generating themes, (4) reviewing themes, (5) defining and naming themes, and (6) locating exemplars. This method will allow for the identification of patterns and themes in the data.

The researchers carefully reviewed the interview transcripts, observational notes, and any other relevant data sources to become familiar with the data. Initial codes are generated to capture the key ideas, concepts, and recurring patterns in the data. These codes are then being organized into potential themes, which further refined and reviewed to ensure their coherence and relevance to the research questions.

Throughout the analysis process, the researchers are engaged in discussions and reflections to enhance the rigor and validity of the findings. Exemplars, or illustrative quotes, are selected to support and enrich the identified themes. This provides a concrete evidence and context to support the interpretation of the data.

RESULTS AND DISCUSSION

Research case:

Coffee, known for its cultural significance and economic importance, plays a crucial role in the lives of millions of people worldwide. In the Philippines, which has a rich coffee heritage, there has been a resurgence in the cultivation of high-quality coffee varieties.

Recent initiatives and competitions, such as the Philippine Coffee Quality Competition, have highlighted the country's potential to produce exceptional coffee beans. Further, collaboration with government agencies and organizations has helped Western Visayas, particularly Igaras, move towards sustainable coffee farming. The Coffee Growers Association in Sitio-Buyan Tigbanaba Igaras, Iloilo, continuously striving for more development in their organization to offer more valuable coffee products and efficient coffee farming. Despite challenges related to the environment, society, and the economy, coffee farming remains an essential economic activity in the community, providing employment and income. To unite coffee farmers and effectively manage the sustainability and production of coffee plantations, the Municipal Agriculture Office of Igaras, led by Mr. Jose Ebalan and his subordinate, Mr. Arnold Mosquera, established the Sitio Buyuan-Baras Abaca and Coffee Growers Association on April 1, 2016. Initially comprising of 25 farmers, the association was led by its founding president, Mr. Marcial Eluzo, until January 2020. Mr. Teddy Echalar has since taken charge, with an additional 29 farmers recently joining. This case study focuses on the coffee farming practices, sustainability issues, and proposed solutions of coffee farmers in Barangay Tigbanaba Sitio-Buyan Igaras, Iloilo.

Practices Involved in Local Coffee Farming

Despite the arduous nature of the job in coffee farming, coffee farmers of Sitio-Buyan Tigbanaba practice this kind of work as their source of livelihood. This is participated by both men and women. There are several stages or phases involved in order to achieve quality production of coffee.

Stage 1: "Cultivating Coffee Plants"

The first stage in coffee farming is **planting**. Participants begin by selecting the best seedlings of coffee plants, known as "*wildlings*", which are found near existing old coffee trees in the area. According to Mars, "*Halin sa pagtanum sang una bala ginagabot lang bala sa area man kang kape. Kay ang iba bay nagahulog ang ana nga bunga teh nagatubo sa dalum ang luto nga wala makuha. Tapos kuha-on kang transfer sa iba nga area na wala matamnan kang kape.*" The participants carefully choose seedlings with straight roots, believing this can yield more coffee beans compared to curved ones. Additionally, the participants dig a hole, considering both the size and depth, the hole measures 2x2 or 3x3 in size, while its depth should be 2 feet. Moreover, the seeds are planted in a shaded area to protect them from direct sunlight, as coffee seedlings are sensitive to heat. In coffee plant cultivation, the process of **clearing or cleaning** is essential to give the coffee seedlings with space for growth, enabling them to develop better and continue to thrive. When the plant matures, coffee farmers do the **pruning or trimming** of the twigs of the coffee tree. The process of pruning involves breaking the main stem known as "*Gina-baak*". This will give space for the new stem to sprout. Further, pruning is efficiently done with the use of tools like a bolo or "*binangon*," or "*sanghay*," and a baby chainsaw in pruning can help coffee farmers do their work. This process can

give the coffee trees way to efficiently absorbs nutrients, particularly water use to enhance the development of its fruits.

Stage 2: "Harvesting Time"

The next stage in coffee farming is **harvesting**. After four to five years of cultivating the coffee plants the developed coffee beans are now ready to be harvested. The harvest usually takes place from December to January, and the term "Pupu-anay" signifies the harvest season. The harvested beans are placed in the basket or "dawin" and in the plain and unpainted sacks. According to Nono "kun maghanggod run kag mamunga amo run ra pag harvest, sa pag harvest ibutang mo sa dawin (basket) kag sa sako nga wala ti pinta."

Stage 3: "Coffee Processing Procedures"

After the coffee farmers have picked the coffee fruits, it will then undergo the **floating**, process known as "*pagpakutaw*." This process is a form of sorting using water and container to separate bad and good coffee beans. Coffee beans that floats are bad beans, while the sunken beans are the good ones. According to Bert, "*premiro pakutawan hugasan anay bag-o ibulad tapos ang guba na ra nga reject mangibabaw ra ilainon mo tapos pillion mo ang hilaw kag luto*". During floating, it only takes a few minutes for the bad beans to float, indicating the time to separate the bad and good beans into containers. After the floating process the next step is **depulping** known as "*pag-pagaling*," using depulping machine where the hulls of the beans are removed to facilitate faster drying. Participants dry the coffee beans on bamboo beds called "*papag*," where they separate the bad coffee beans, and good which are green, and red beans on each bed. They employ a natural drying process that typically lasts for about two weeks, depending on the intensity of the sun's heat.

Stage 4: "Coffee Milling Process"

After the **drying** process the coffee beans is ready to be polished by removing its parchment or its silver skin using the hulling machine, this is the coffee milling process or "*pag-pagaling*." To thoroughly clean the beans, farmers used electric fan or through winnowing, known as "*tahup*," using a winnowing basket called "*karakaw*," to coffee beans. After the dehulling, the **sorting** process takes place and this was done manually. According to Nicnic "*gina mano-mano namun ra gina sort antis namon ibaligya sa asosasyon*." This essential process is carried out meticulously to separate and categorize the green and red beans accordingly. Sorting ensures that the beans are properly classified based on their quality between damaged and good beans. By meticulously sorting the green and red beans, coffee farmers can maintain the quality and consistency of their coffee beans.

Stage 5: "Preserving Coffee's Essence in Packaging"

Finally, the last stage is **packaging**, this happens when the coffee are ready for distribution. Participants mentioned that using a clean jute sack can help preserve the coffee beans for up to one year.

In addition, after packaging it should be stored in its proper place to prevent from contamination. As mentioned by Bert, "Tapos sulod sako una plastic sulod sako tapos hindi pagtung-tung sa lupa kung sa lupa mo butang lupa man ra dapog na".

Sustainability Issues in Coffee Farming Human/Social Issues

“Aching Fields: The Physical and Mental Health Struggles of Coffee Farmers”

One significant concern of the participants is with regards to their health, both physical and mental. Participants mentioned that it is challenging for them to carry out their duties as coffee farmers due to body pain, headaches, and wounds. Further, the distance of the coffee farm which is far from their houses also contributes to their physical health. It takes 3 hours to reach the coffee farm through walking. This situation can lead to lacking of time to do their tasks, causing exhaustion. Aside from physical health, mental health is also their concern when they feel stressed or pressured to meet the demands of the customers, as mentioned by Nono, *“Kung sa lawas mo syempre gabakabaka kaw mung amo man ra gihapon garing dara man ra sa lawas kag utok mo kis-a hindi karon kapangina-on kay halimbawa may mabu-ol kang order nga kape wara pa ma sort imo ra responsibilidad kay ikaw ang president.”*

“Threats in the Fields: Security Challenges Facing Coffee Farmers”

Another challenge faced by coffee farmers is with regards to security, specifically insurgencies. This concern becomes a threat to the coffee farmers especially during the times that they are in their farms. Coffee farms are accessible to everyone, becoming the main pathway which sometimes becomes an area of encounter between the rebel groups and armed forces, hence farmers are put into danger. Mars mentioned that, *“Halimbawa bay sa may palibot mo may delikado paryo kara wara man ginapangayo na kung sin-o maabutan ta sa bukid kis-a di bay ta kamaan gulpi ta abutan kang iban taho to nga may mga dara tapos sa piyak lain man nga taho mabutang ta sa tunga-tunga”*. The insurgencies prevented the participants from harvesting on the farm and have caused a decrease in the production of coffee products. Additionally, during the harvest season, if there is an encounter in the field, the production may be temporarily stopped.

“The Membership Crisis in Coffee Farming Associations”

The organization is indeed facing the challenge of insufficient members, leading to a shortage in the production of a large coffee supply relative to the demand. Nono highlighted that in the Philippines, specifically in Manila and Iloilo, there is a consumption of 15,000 cups of coffee per day. With two or three cups being consumed per day by each individual, this reveals a significant demand for coffee.

“Less Interest of Younger Generation to Engage in Coffee Farming”

Another challenge is on how to encourage the youth to engaged in coffee farming. Participants mentioned that they are becoming old and they wanted to pass their practices and experiences to the younger ones to follow their steps in coffee farming. However, as this new generation becomes addicted with social media the association as well as the coffee farmers have their hard time finding ways on how to encourage youth of today.

“Leadership Challenges and Non-Compliance Issues”

In terms of managing the members, Nono, as the former president of the association, faced numerous challenges such as crab mentality. Despite his best efforts he feels that the members did not appreciate his work, making it difficult for him to lead the association. Another issue within the organization is non-compliant members who are uncooperative during meetings and neglect their

responsibilities. While some members fulfill their duties, many fail to follow even simple tasks. Nicnic shared an example where their coffee for the Philippine Coffee Quality Competition (PCQC) was returned due to defects found, highlighting that some members did not properly sort the coffee beans.

“Bearing the Burden: Financial Struggles of Coffee Farmers”

The financial aspect is a real challenge because without money, accessing supplies and meeting financial needs for the coffee farm becomes impossible. According to Mars, “*Kulang gid sa pinansiyal kis-a di kaw ka kadto sa kapehan mo kung wala kaw kuwarta bakal dapli kag pinansiyal mo nga kinanlanon.*” Despite hard work, the annual income from coffee harvest is not sufficient to meet the needs of the family. Scarcity of resources presents significant challenges in meeting needs of the participants. Due to financial constraints, participants explore cultivating additional crops to generate extra income while awaiting the next coffee harvest season.

Economic Issues

“Inadequate tools and equipment in Coffee Farming”

In coffee farming it is necessary to have some machinery and tools involved in order to make the process efficient. In the case of Coffee Growers Association in Sitio-Buyuan Tigbanaba Igabaras they have modern machineries involved in coffee farming like baby chainsaw or pruning shears used for pruning, depulper for removing the hulls of the coffee, dehuller for removing the last skin of the coffee, grinder for brewing the coffee, blower and electric fan for cleaning the coffee, ultra violet (UV) plastic for drying, sacks for packing and zip lock used for the final products that was being marketed by the association. However, participants hoping for additional equipment such as, grass cutter to be used in cleaning or clearing the area of coffee farms and other machineries that can help in the development of the coffee association.

“Organizational financial challenges”

As the Coffee Growers Association in Sitio-Buyuan Tigbanaba Igbaras, Iloilo is gradually developing, still it faces struggles especially in the financial aspect, according to Ron, “*Bilang miyembro kang asosasyon sa budget namon daw kulang gid katama te kung ano man lang ihatag te amo lang ra ehh..., kay gina rolling lang man namon ang capital.*” Nono mentioned that, in the past, there were only two municipal agencies involved, the Department of Social Welfare Development (DSWD) and the Department of Agriculture (DA). The association was supposed to be under the DA, but the DSWD was the one who first provided support for the establishment of the association. However, there was a conflict between the two agencies, affecting us coffee farmers and a member of coffee growers association in looking for support to these two important agencies for the development of local coffee farming industry in Sitio-Buyuan Tigbanaba Igbaras, Iloilo.

“Strained Finances: The Financial Struggles of the Coffee Growers Association”

The Coffee Growers Association of Sitio-Buyuan, Tigbanaba Igbaras, Iloilo, also encountered financial challenges. Participants highlighted that the organization lacks financial resources, and they often use their own money to cover expenses related to coffee farming processes. Nicnic

mentioned that as association member, the budget always seems insufficient. Financial issues within the association arise due to budget constraints, leading to challenges and they are aiming for additional funds. As the association purchase coffee from sellers, the budget fall short because the coffee was not yet delivered to the main buyer. If the association cannot reach the buyers, it becomes a problem. Similarly, the association has stock to sell, but without buyers, it will resort to borrowing the money of the sellers until the association can make deliveries.

Environmental Issues

In coffee farming, it is crucial to choose the appropriate month to plant seedlings to ensure optimal growth. Participants noted that the rainy season usually begins from June to July and extends until November, emphasizing the importance of timing. Early rain, from May to August, is advantageous for planting as continuous rainfall benefits the crops. Furthermore, the cool weather in August provides an ideal environment for productive work, with seedlings experiencing abundant growth during this period. However, as the time goes by there are disturbances and changes in the climate and weather leading some environmental issues affecting the coffee farming.

"Climate Crisis: Challenges in Coffee Farming"

The impact of climate change poses a significant challenge to the production and growth of coffee, causing concern among coffee farmers about the future of production. According to Nicnic, *"Climate change, kay sa sobra ka init tulad ang tinamnan mo kung hindi shady may tendency nga mapatay. Bisan bahul run ra sa sige-sige nga init nga hindi gid mauranan."* It is crucial to have the right balance of temperature. If the season is not rainy enough, the coffee plants struggle to bear fruit. Conversely, excessive rain can lead to the shedding of flowers and fruits. It is essential to monitor and ensure that the weather conditions are favorable for proper fruiting. In hot and dry conditions, the coffee yield may decrease, affecting the overall production. According to the participants, experts recommend that coffee plants prefer a balanced environment with some shade and rocky soil, rocks provide coolness during hot weather. Moreover, severe weather events like storms and extreme heat can damage coffee trees. Further, during droughts coffee plants may wither, and excessive rain can lead to fruit loss. Additionally, the impact of climate change, with excessive heat and drought, can result in the death of seedlings, especially in areas without sufficient shade. The elevation and shade play a crucial role in protecting the plants from extreme heat and ensuring their survival. Heavy rainfall can affect the coffee cherries, causing them to swell and turn black. On the other hand, excessive heat can lead to premature ripening, where the outside appears red while the inside remains green, indicating over ripeness due to high temperatures. Stress caused by heat can make the beans to shrink, affecting their price and production volume. The beans' size and quality impact their market value, with smaller beans often have lower prices and leading to differences in income based on production size.

During hot weather, the coffee cherries may not absorb enough moisture, resulting in reduced fruit size due to water loss. These challenges have a direct impact on production, affecting the association's income as some beans may not meet commercial standards, leading to rejection or lower selling prices.

AGRICULTURAL ISSUES

“Combatting Coffee Pests”

Pests like insects that feed on coffee cherry pulp can significantly impact the quality of coffee product. The presence of coffee borer, a small insect that pierces coffee cherries, can lead to damage. Coffee cherries with holes are no longer suitable for quality control and are often categorized as rejects or low-grade. It is challenging to eradicate these pests as they hide inside the coffee cherry, making it difficult to eliminate them without harming the coffee plant. According to Nicnic, “Sa coffee borer may gina introduce ra nga pang spray pero wara pa man te kay daw sa Mindanao kuno gina bu-ol.”

“Safeguarding Coffee Plants from Invasive Weeds”

According to the participants, overgrowth weeds can compete with coffee plants for nutrients and sunlight, hindering their growth. Additionally, these weeds can spread rapidly and suffocate the coffee plants if not managed properly. It is crucial to control and remove these weeds to prevent them from harming the coffee plants. Even young seedlings will die if they are not properly cleared or pruned.

In addition, even large coffee plants can be affected by overgrowth weeds, leading to their death. It is essential to regularly maintain and clear the area to ensure the healthy growth of coffee plants and prevent them from being overwhelmed by invasive vegetation.

Farmers Proposed Sustainability Solutions In Coffee Farming

"Empowering Farmers with Essential Medical Supplies for Farm Wellness"

For the participants, medical supplies are essential to address health issues of coffee farmers. It is necessary to have medicine kits containing medicines for headache and other essential supplies for first aid. With this, farmers can help manage their health concerns.

"Additional Health and Social Security Benefits"

Having additional financial assistance and support can greatly benefit the sustainability of coffee farming. Access to financial support can help address various needs and challenges that may arise in coffee farming. Participants mentioned that, having benefits like PhilHealth or SSS can provide additional security and assistance in terms of their healthcare and social security, contributing to the overall well-being of the farmers.

"Enhancing Farm Efficiency through Improved Transportation and Water Access"

According to the participants, ensuring proper water supply for the coffee plants is crucial, especially in dry and hot conditions. Hence, it is beneficial to have financial support to purchase a hose for watering the coffee plants. Further, roads can make transportation of the products easier and lessen the time to travel from homes to their farms. As told by the participants, it is challenging to transport the coffee products especially if there are no concrete roads. Thus, having government support for transportation can alleviate this burden. Having a tramline can streamline transportation and reduce the need for manual carrying, making the process more efficient. Access to this kind of transportation vehicle is essential for smooth transportation of coffee products.

"Financial assistance to purchase insecticides and pesticides"

To manage the growth of weeds, consistent cleaning and clearing of farm area can help control weeds growth effectively. As mentioned by the participants they are looking forward to have the availability of insecticides for the coffee borer pest. Additional advices from experts for pest control is also a need to manage not to damage the coffee production and its quality.

"Acquisition for additional machineries"

Machineries for transporting harvested products can significantly ease the workload, Coffee farmers aim for additional dehuller or "*galingan*" to be placed at their farm for easier work also machine for sorting can make the process more efficient. These machines can improve productivity and efficiency in coffee farming operations.

"Safety Shield: Equipping Farmers with Essential Tools to Secure in Coffee Farming Operations"

Ensuring safety on the farm is crucial. Participants mentioned that having gloves and boots for rainy weather are essential for protecting them while working. Addressing additional needs like screens, tarps, and UV plastic for drying process and other protective gear is important for maintaining a safe working environment.

"Improvement of Coffee Growers Association Facility"

It is important to have a well-planned infrastructure for the association. Participants aim to have a double-story building where coffee shop on the second floor and machineries on the ground floor. Having sufficient space for the association can enhance the facility's functionality. Additionally, considering the expansion of the facility and introducing improvements can contribute to the association's growth in the coffee industry.

RESULTS AND DISCUSSION

Local coffee farming practices in Sitio-Buyuan Tigbanaba Igbaras, Iloilo are highly participated by both men and women coffee farmers who are actively managing the tasks in this kind of laborious activity. They ensure good quality of the coffee and contribute to the success of coffee industry. Based on the interview with the participants, there are different stages involved in coffee farming which was practiced by coffee farmers. These stages entails thorough and step by step processes which are necessary to produce quality coffee products. Similarly, the work of Misgana Banti and Eba Abraham (2021), states that factors affecting coffee quality is through its processing method. As a background, according to Emano (2023), coffee farming in Igbaras has already been practiced way back in 1950's using traditional practice of tilling and harvesting coffee beans. In the harvesting phase, coffee farmers usually do the manual process of collecting the coffee beans. This process is also done by the indigenous people of Ecuador who employ selective harvesting to meticulously picking only the ripest by hand, to ensure quality over quantity and maintain the integrity of the crop as stated in study of Simpkins (2023). Additionally, it can be noted that in the milling process they

manually clean the coffee beans with the use of winnowing known as “*kararaw*” and then manually sort the good coffee beans from the bad ones.

Based on the responses of the participants, it was found out that there is an integration of technology in their coffee farming practices with the help of the Coffee Growers Association. Farmers were taught to use modern equipment in farming such as dehuller, depulper, grass cutter and baby chainsaws. These enable coffee farmers to perform their work efficiently. Likewise, the study of Camacho *et al.* (2016), also underscores the importance of integrating the traditional practices with modern sustainability efforts like tools and equipment to ensure the sustainability of coffee farming in the Philippines. Additionally, the study of Corpuz, J.T. (2023), emphasizes that technology dissemination and farmer education help improve and attain agricultural success. Further, to efficiently apply these agricultural technologies there must be cooperation between technology companies, governmental organizations and local communities. However, the work of Quinley (2023), highlighted that many coffee farmers in the Philippines have inadequate knowledge in using technology. This is evident in the study of Corpuz, J.T. (2023) which states that it is challenging to implement new technologies in rural areas because some of the farmers lack resources such as finances, access to infrastructure, and training to employ these technologies effectively. In addition, the study of Barbara (2022) highlighted that in order to increase the sustainability of coffee production in the Philippines, local coffee farmers should be supported by the government in making improvements in their coffee farming and production. Further, they should apply innovative techniques to contribute to the country's economy.

In this study, findings shows that sustainability issues in coffee farming encompasses human/social, economic and environmental dimension which impacts the livelihoods and productivity of coffee farmers. In the social aspect, physical and mental health concerns become a primary challenge among coffee farmers which hinders them to work efficiently. Other problems they faced were security challenges especially during insurgencies, membership crisis in the organization, less interest of younger generation to engage in coffee farming and also, the non-compliance of the members and their financial struggles. The physical and mental health concerns as well as the financial struggles of coffee farmers can be understood using Maslow's Hierarchy of needs theory. It states that man need to satisfy their physiological needs before they can proceed to the other needs in the hierarchy. Physical and mental health concerns lower their productivity and affects their livelihood. Further, farmers struggle financially since their income could not fully satisfied their physical needs. These issues contradict the goals of sustainability in the social dimension which aims for equality, well-being, and balance across quality of life from one generation to the next (Ross, 2013). The study of Alvarez (2016) reveals that the lack of interest of younger generation to engage in agriculture affects the coffee industry. Further, Adelabu *et al.*, (2020), highlights the need to address social challenges for sustainability. In the economic aspect, coffee farmers and the organization are facing financial constraints which leads to decrease of income that affects the organization and the livelihood of the coffee farmers. This is contrary to the aim of economic sustainability which emphasizes the importance of maintenance of capital (Khalili, 2011). As mentioned in the work of Kufa (2010), the reasons for the declining market of coffee are inadequate market access, inefficient policy frameworks, inadequate access to improved technologies and services, lack of incentives and climate-associated risks. This economic concern was also mentioned in the study of Alvarez (2016), which states that the financial instability of

farmers leads them to borrow money to sustain their family needs. Additionally, according to Mirera and Ngugi (2020), coffee farmers have received some empowerment activities, but they are still identified as poor because of failure to improve their skills of farmers in planting, caring for, picking, and processing post-harvest coffee (Hasdiansyah *et al.*, 2020; Wahyuni, 2010) which pushes the farmers to shift to other crops (Department of Agriculture, 2018). Moreover, inadequate tools and equipment also were identified as problem in coffee farming which affects their production. According to the study of Alvarez (2016), due to very limited access to processing machineries, farmers were not able to add more value to primary processed coffee beans.

As with the environmental issues, such as the impact of climate change which affects crop growth and production, the work of Krishnan (2017), highlighted that the direct impact of climate change to coffee, causes stress in the growth of coffee trees that leads to limited flowering and berry development. Additionally, it can increase the spread of diseases to coffee leaves and coffee berries that results in poor yield and quality of coffee beans. Moreover, the study of Le *et al.* (2021), stated that, coffee is highly vulnerable to climate change thus impacting the farmers' livelihood. Further, the study of Killeen and Harper (2016), reveals that coffee production area changed because suitable areas become too warm or prone to drought. Dekens and Bagamb (2014) added that the most suitable area becomes unsuitable because of climate variation. The influence of this climate variation makes the farmers indebted, which reduce their ability to invest in production and reduce their income generation (Läderach *et al.*, 2010). Hence, in the work of Le *et al.* (2021) it was suggested that regenerative Farming should be practiced and organic farming as means of climate change mitigation. Likewise, agricultural issues are connected with environmental concerns, including pest infestations and weed management, which give additional hurdles for coffee farmers. Coffee plants are prone to diseases. According to Coste and Myhrvold (1999), parasites that attack coffee plant is the berry borer (*Stephanoderes hamjei*) which damages the seeds of coffee. Thus, Bacon *et al.* (2012), highlights the need to address environmental concerns in diversified farming systems which was also emphasized on the aspect of environmental sustainability prioritizing the environmental life-support systems such as atmosphere, water and soil. According to the study of Krishnan (2017), in order to make coffee production sustainable, and to improve its quality, it should be engaged in sustainable and environmentally friendly cultivation practices.

To address sustainability challenges in coffee farming, farmers have proposed solutions to these problems. These includes medical supplies, health and security benefits, and additional machineries. According to the Department of Agriculture (2018), some of the strategies and policies to ensure sustainability of the coffee industry are: the accessibility of credit facilities, guarantee funds, crop insurance for coffee farmers, providing incentives and coffee farm establishment. Additionally, strengthening financial support systems could give more opportunities to the farmers. As emphasized in the work of Hille *et al.* (2020), the role of cross-sector partnerships drives the sustainability of coffee nationally. Moreover, coffee farmers aim for the solution to improve leadership skills and equipping them to use tools and equipment to secure their farming operations. Based on the prioritized activities and programs of the Department of Agriculture that was included in the Philippine Coffee Industry Roadmap 2017-2022, training at all levels of coffee sectors/groups and providing them with a post-harvest coffee facility especially to the coffee producing groups was included. In addition, Quirino State University (2024), emphasized the importance of hands-on training of coffee farmers. Further, as suggested by the coffee farmers, in order to combat the pest

infestations, there should be an additional financial support for pest management and trainings on how to properly apply the insecticides, pesticides and herbicides without damaging the coffee quality. Hence, it was suggested that the Department of Agriculture collaborate with universities to provide seminars, training programs and technical support for an updated and latest management strategies (Sustrina *et al.*, 2021). Moreover, improving transportation and water access was also proposed by the coffee farmers as the solution to alleviate the burden especially in transporting the coffee products, access farm to market roads and mitigate climate change. Further, the study of Corpuz, J.T. (2023), indicated that with the collaboration of multi-stakeholders, the LGUs and NGOs, sustainable agriculture can be attained. These proposed solutions are recommended by the local coffee farmers to address the existing issues and to attain the sustainability of local coffee industry.

CONCLUSION

Coffee farming in Sitio Buyuan-Tigbanaba, Igbaras, Iloilo involves the following stages: 1) Cultivating coffee plants which includes planting, cleaning, and pruning. 2) Harvesting time, 3) Coffee processing procedures that involves floating, depulping, and drying, 4) Coffee milling process which involves dehulling and sorting of the coffee beans, and 5) Preserving the coffee's essence in packaging.

It could be observed that modern sustainability techniques were incorporated in the practices of the farmers. With the help of coffee growers association, the coffee farmers acquired knowledge through training on how to improve coffee farming techniques such as the process of drying the coffee beans. Moreover, they learned the use of technologies such as baby chainsaw, dehuller, and depulper.

However, the industry faced challenges pertaining to sustainability. In the social aspect, they encountered several issues concerning their physical and mental health, security challenges, membership crisis, less interest of young generation in coffee farming, leadership challenges and financial struggles. Economically, the coffee farmers struggle because of inadequate tools and equipment used in coffee farming, organizational financial challenges, and financial struggles of the coffee grower association. As to the environmental concerns, climate crisis and agricultural issues such as pests and invasive weeds were identified as problems.

To address these challenges, coffee farmers recommended several solutions to enhance the efficiency of coffee farming. These includes medical support, health and social security benefits, improvement of transportation and water access, financial assistance to purchase insecticides, pesticides and herbicides, additional machineries, additional tools for farming operations and improvement of facility that can help for the sustainability of the local coffee farming industry in Sitio-Buyan Tigbanaba Igbaras, Iloilo.

With the foregoing findings, the researchers conclude that coffee farming is a resource-intensive and labor-intensive activity which involves both men and women farmers. It follows a thorough and arduous process to ensure the production of quality coffee. Further, traditional practices and proper integration of modern techniques are needed to improve sustainability in their coffee farming. Sustainability issues were also encountered by coffee farmers which are social, economic and environmental in nature. These problems are multifaceted and requires solutions which involves collaboration and cooperation of various stakeholders.

RECOMMENDATIONS

Based on the findings, the researchers recommend the following:

Department of Environment and Natural Resources (DENR)

The agency shall continue to promote agroforestry practices and sustainable land management in coffee farms. Further, they should enforce environmental regulations to prevent deforestation and promote biodiversity conservation. Lastly, the agency shall support reforestation efforts to restore forest cover and enhance ecosystem resilience.

Department of Agriculture (DA)

The Department of Agriculture in the Municipality of Igbaras shall continue to be a leading agency in addressing the concerns of the coffee farmers such as problems on coffee plants like pests and weeds. The agency may provide trainings on proper application of fertilizers and non-destructive or sustainable means to prevent and control pests and weeds.

Department of Trade and Industry (DTI)

This agency shall continue to provide technical assistance and training on sustainable agricultural practices to local coffee farmers. Further, they shall continue to promote their products locally and internationally. Additionally, this agency shall collaborate with other organizations and strengthen the implementation of Philippine Coffee Roadmap to increase the amount of land for coffee farms.

Department of Social Welfare and Development (DSWD)

This agency shall implement social protection programs and livelihood support initiatives for vulnerable coffee farming households and facilitate community development projects that could benefit coffee farmers and their families.

Local Government Unit of Igbaras

Local Government Unit of Igbaras shall continue to support the development of local coffee industry and work harmoniously with their partner agencies to address the issues of coffee farmers such as the improvement of farm-to-market roads, irrigation systems, and post-harvest facilities. Additionally, the LGU of Igbaras shall propose local policies and programs that support local coffee farming practices, environmental conservation, and community development in the town.

Coffee Growers Association

The Association shall advocate for the interests of local coffee farmers and represent their concerns to relevant authorities. Also, by organizing a capacity-building workshops, knowledge-sharing sessions, and cooperative initiatives among members.

Academe

The institution shall advocate and serve as the arena of more opportunities to strengthen local coffee farming industry by including coffee production and management in some agricultural courses. Also, the University shall conduct more research on sustainable coffee farming practices, climate change adaptation, and market trends. Further, seminar and training programs on mental health, stress and coping mechanisms may be offered to help farmers managed their mental health. Extension services through trainings on leadership, financial literacy and management may also be conducted.

Community

The community shall engage in sustainable land use practices, waste management, and environmental conservation efforts to support coffee farming sustainability. Furthermore, participating in community-led initiatives to promote local coffee products and strengthen community ties and continuously leading the younger generation to support local products and development of coffee industry.

Students

Students are suggested to engage in community service projects, internships, and volunteer work to support local coffee farmers and learn about sustainable agriculture. They could also help in raising awareness about the importance of sustainable farming practices and environmental conservation among peers and the community.

Future Researchers

Future researchers are recommended to conduct more in-depth studies on the socio-economic, environmental, and technological aspects of local coffee farming to generate insights for sustainable development. Further, it is suggested that there should be collaboration with local farmers and organizations to address key challenges and opportunities in the coffee industry through research.

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