

# Sustainability Practices and Financial Performance of Coffee Producers in Nueva Vizcaya

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DOI: <https://dx.doi.org/10.47772/IJRISS.2024.802170>

Received: 16 February 2024 Accepted: 26 February 2024; Published: 26 March 2024

## ABSTRACT

Coffee is one of the largest traded agricultural commodities in the world. Its production is an important component of the overall economy and is essential to the livelihoods of rural households in the developing countries. This study aimed to determine the extent of sustainability practices and financial performance of seven coffee producers from Nueva Vizcaya in different municipalities. The proponents used a structured questionnaire in gathering the data using descriptive correlational and financial performance analysis. The data was analyzed using the following statistical tools: Mean, Standard Deviation, Financial Profitability Ratio, Spearman Rho, and Thematic Analysis using IBM SPSS version 25. Findings reveal that, coffee producers are generally implementing sustainable practices in their operations, and they are achieving good financial performance, as evidenced by their average ROA, ROE, and ROS ratios. These shows a commendable balance between profitability and sustainability efforts. However, it is also revealed that there is no significant relationship between the variables, and a weak negative correlation between them is discovered. Moreover, most of the respondents are confident in their ability to ensure long-term sustainability as they continuously seek for growth and improvement in their efficiency and profitability. For further findings, the researchers recommend that coffee producers continue to implement sustainability practices, and for future researchers to include liquidity and solvency ratios to provide a more comprehensive assessment of financial health.

**Keywords:** Coffee growers, Efficiency, Financial ratios, Livelihood, Profitability, Sustainable

## INTRODUCTION

### Rationale

Coffee is one of the widely traded agricultural commodities on a global scale. It is grown on over 11 million hectares of land worldwide and in over 50 countries. Approximately, 99% of the world's coffee production is made up of the two economically significant coffee species namely, *Arabica* (*Coffea arabica*) and *Robusta* (*C. canephora*), with Arabica accounting for about 60% of that total (Byrareddy et al., 2019). Moreover, coffee is essential to the livelihoods of numerous rural households throughout the developing countries. It makes a considerable contribution to foreign exchange revenues and has a key role in defining employment possibilities and infrastructure development. (Kharel & Adhikari, 2021). Based on the study of Ssekitooleko (2019), coffee is grown in mixed farms including among shade trees, resulting in sustainable coffee production while providing a social, economic, and suitable environment that necessitates the minimum use of agrochemicals such as fertilizers, insecticides, and fungicides.

According to the Ijanu et al., (2020), coffee cultivation began from the ancient coffee forests on the Ethiopian plateau thousands of years ago. Eventually, coffee made its way to the Arabian Peninsula wherein

it was first grown and traded. In the seventeenth century, coffee was introduced in Europe and was suddenly dispersed throughout the continent (Nieber, 2017). Coffee seeds were taken to other places by missionaries and travelers, as well as traders and colonists, resulting to the worldwide cultivation of coffee trees. Hence, coffee has been among the most world's profitable export crops (National Coffee Association of USA, n.d.).

Given the archipelagic and tropical weather of the Philippines, the microclimates and soil conditions that vary from lowland to mountainous regions made the country suitable for growing a range of coffee varieties. This involves the cultivation of all four varieties of coffee namely, Excelsa, Liberica, Robusta and Arabica (Philippine Coffee Board, n.d.). In the eighteenth century, Philippines became one of the top producers and fourth largest exporter of coffee bean in the world. Despite the country's rich history, several impediments such as the rise of coffee rust, dynamic shifts in the global market, and insufficient government support caused the domestic coffee industry to wilt in the recent decades. (Department of Trade and Industry [DTI], 2017).

Nowadays, Philippines is gradually making steps in revitalizing the country's coffee productivity level which includes of taking advantage of its strength in geographic conditions. The Department of Agriculture (DA) and Department of Trade and Industry (DTI), as support, formulated and integrated the Philippine Coffee Industry Roadmap which is a vital instrument that serves as a direction to all concerned stakeholders. The roadmap is an embodiment of how the industry will carry out its plans in building a sustainable and globally competitive Philippine Coffee Industry, that will likewise contribute in attaining food security and poverty alleviation (Business Mirror, 2018).

While coffee production and export remain trivial, the Philippines was still able to establish a vibrant coffee market as the country became a leading importer of instant coffee (DTI, 2017). According to Philippine Statistics Authority [PSA] (2022), the production of coffee, particularly the green coffee beans, improved by 2.3% from its previous output in 2021 of 14.95 thousand metric tons. Moreover, the most produced type of coffee among the four is Robusta, which accounted for 74.9% of the total coffee production during the period. The PSA also stated that the highest coffee producer in the Philippines by the last quarter of 2022 was SOCCSKSARGEN that is composed of the four provinces in Mindanao namely, South Cotabato, Cotabato, Sultan Kudarat, and General Santos. Bangsamoro Autonomous Region in Muslim Mindanao and Davao Region came next with contributions of 22.0% and 16.7% shares of the total production, respectively.

Meeting the growing demand for coffee prompted local farmers to enter into coffee production. Nueva Vizcaya, a province in the Philippines that has an agricultural economy with commerce, trade, and industry, continue to pave its way towards its growth and development. The pleasant climate, a cool to warm tropical temperature, and rich soils, makes the province suitable for coffee cultivation. Hence, local farmers in the area began tilling their land as they seek to boost the industry commercially throughout the country. One of the coffee productions in Nueva Vizcaya began growing coffee trees in 2012 and by the year 2019, they were able to cultivate 40,000 standing coffee crops (Gallibu, 2019). Furthermore, coffee productions in Nueva Vizcaya had seek assistance to the local government unit, and in the Department of Agriculture for the possible expansion of their coffee plantation areas (Philippine Information Agency [PIA], 2020). Currently, coffee farmers in the province were able to cultivate and process the coffee species Arabica, Robusta and Liberica – commonly known as *kapeng barako* (Mayuga, 2021).

Moreover, Gallibu (2018) stated that for the past years, the Departments of Agriculture Regional Field Office 02 (DA RFO 02) and Trade and Industry 02 (DTI 02) have been helping coffee farmers thrive in the production of coffee, processing, trade, roasting or marketing in the region. In a report by Ebreo (2022) for the Philippine Information Agency, it was reported that DTI is currently assisting coffee farmers in Nueva Vizcaya with the goal of transforming them into producers of quality coffee beans in Cagayan Valley Region. One of their initiatives is the provision of technology training specifically the *Intensive Product*

*Development for Coffee* program, which intends to help coffee growers and processors to be equipped with the necessary knowledge and skills to develop and enhance the quality of their coffee products.

With these premises, the study aimed to determine the extent of sustainability practices and financial performance of the coffee producers in Nueva Vizcaya. Moreover, this study had important implications to various groups including the coffee producers, government agencies primarily the Department of Agriculture, Department of Trade and Industry and Local Government Units, school administrators, SMU School of Accountancy and Business, and future researchers. For coffee producers, the findings can help improve quality control and organizational management, and assist in building more resilient agroecosystems. Government agencies can better understand the production needs and resources available in the province as well as give them recommendations for sustainable practices policy implementation. The SMU School of Accountancy and Business can also be benefited by enriching students' academic experience, enhance local relevance, foster practical application of skills, promote interdisciplinary collaboration, and contribute to knowledge generation. These aspects collectively contribute to the educational growth of students and the overall reputation of the school as a center for research and innovation. Overall, this study helped promote sustainable and responsible practices in the coffee industry, which can contribute positive impacts on the economic, social and environmental outcomes, and serve as a basis for future researchers in the same field.

### **Coffee Production**

Coffee, in general, is the most important tropical commodity that is traded globally, and has the capacity to affect biodiversity, forest cover, and human wellbeing, either positively or negatively (Hunt et al., 2020). It is also an important component of the overall economy and the primary source of foreign exchange revenue for several developing countries (Samper & Quiroñes-Ruiz, 2017). Coffee production and commerce are significant components of the global economy, while the sale and consumption of coffee as well as its associated products play an important part in many cultures throughout the world. Coffee production is the process of growing, harvesting, processing, and packaging of coffee beans for consumption. It is a series of complex steps that begin with the cultivation of coffee plants, harvesting, processing up to the distribution of roasted and unroasted coffee beans (Blinová et al., 2017).

Coffee production provide benefits, both for the producers and the consumers. According to International Coffee Organization (ICO), coffee production provides employment to millions of people worldwide. It also contributes to the social development of rural areas by providing jobs, income, and social services to communities. Moreover, coffee production, using an agroforestry system, can help preserve biodiversity, conserve soil and water resources, and reduce greenhouse gas emissions (Rainforest Alliance, n.d.).

Entering into coffee production business, like any ordinary businesses, incorporates several advantages and disadvantages. According to Mordor Intelligence (2021), there is a high demand of coffee across the world which creates a significant market opportunity to coffee producers. Moreover, coffee production can serve as a way to diversify the agricultural portfolio of farmers, it can also be highly profitable for growers, and can help preserve the environment and support the livelihoods of local communities. Furthermore, Wolde et al., (2017) indicates that coffee makes an important contribution to socio-economic development and poverty alleviation.

On the other hand, the disadvantages in coffee production include the high competition in the market, high fluctuation in production (Sarvina et al., 2021), and the growth in pest and disease which indirectly affects coffee cultivation (Pham et. Al., 2019). According to Samper and Quiroñes-Ruiz (2017), coffee production business suffers from the low and volatile prices, and subject coffee producers into different issues

such as social, economic, and environmental aspects. These issues include food security, migration, low productivity, ageing farmer communities, and climate change. He also indicated that most farmers faced inadequate institutional support from the local and national government.

### **Sustainability Practices**

The equitable, moral, and efficient use of natural resources to meet the needs of the current and future generations of human being and to improve their quality of life is known as sustainability (Sakalasoorya, 2021). It is the development that addresses current needs without endangering future generations' ability to meet their own (Dong & Hauschild, 2017) by diligently guarding the environment and non-renewable resources and practicing good stewardship (Jayashree et.al, 2021). Moreover, Mollenkamp (2023) asserts that sustainability refers to the ability of maintaining or supporting a process in a continuous manner over time. In the context of business and policy, sustainability is viewed as a control to prevent the depletion of natural resources in order for them to remain available in the long-run. He also indicated that in this era, many business and governments have already committed themselves in sustainable goals, such as the environmental footprints reduction and conservation of resources.

According to Miller (2020), business executives are becoming increasingly aware of how successful sustainable business methods can be in addressing the world's most pressing issues and guaranteeing their companies' success. The study of Mukherjee et al., (2016) states that adopting sustainability as an organization's goal influences innovation, process, and the ability to sustain. Consequently, an organization's overall activities must be sustainable. However, they likewise indicated that the implementation of sustainability becomes difficult as many factors affect it. Therefore, many concepts of sustainability were proposed having variety of implications for the way of handling issues. But, Mollenkamp (2023) pointed out that the approach called *triple bottom line* is the most widely used by companies, government, and non-government organizations nowadays. This method is well-known for recognizing the various indicators of economic, social, and environmental issues, also known as the three pillars of sustainability. Commonly, these pillars are broken down as 3Ps: profit, planet, and people.

An article by Difference Coffee claimed that the sustainability within the coffee sector is guided by the three main categories: economic, social, and environmental. The balance between the quantity of coffee produced and the quantity consumed is the key to achieving economic sustainability. Social sustainability ensures that coffee farmers are paid enough for their work and goods to maintain a high standard of living for themselves, their families, and their community. Environmental sustainability recognizes that coffee production occurs predominantly in fragile tropical areas, including several biodiversity hotspots, and advocates coffee production that minimizes environmental degradation.

The effects of climate change and global warming are extremely detrimental and disastrous as it results to deforestation, biodiversity destruction, and natural ecosystem imbalance (Ramnath, 2022). With the grave risks of these events, there is a need to instill sustainability in our professional and personal operations. Implementing sustainable practices is important in any industry, specially in the coffee sector as coffee production is known of having a vast impact on the environment. According to Ilgar (2022), fairly traded and sustainably grown coffee avoids overexploitation of natural resources, eliminates slave labor and worker exploitation, and promotes the existence of a sustainable ecology for future generations. Moreover, sustainable practices can help reduce pollution, conserve natural resources and can lead to the adoption of greener technologies (Emeritus, 2022).

Based on the study of Kharel and Adhikari (2021), coffee production can become more sustainable by

incorporating several practices such as better crop management, water use practices, use of more environmental repellants instead of pesticide, and recycling coffee wastes for use as fertilizer. Indeed, a sustainable coffee production provides many benefits not only environmentally and socially, but also economically. A sustainable coffee production led to the development of programs like the poverty reduction in coffee producing companies as producers and their employees are largely dependent on coffee earning for the improvement of their living conditions (Wangi, 2021). Generally, he encapsulates that sustainable coffee production or farming should be implemented as it serves as the best solution to help coffee producers in solving environmental issues such as climate change, and in generating enough profit margins without causing harm to the environment.

## Financial Performance

Financial performance is a process of scanning the financial statements to evaluate profitability, solvency, stability, growth and prosperity of a firm; it indicates the financial health of an organization for a specific period of time (Suresh et al., 2020). Moreover, financial performance is used as a tool in measuring an organization's current development and potential growth (Kim & Thanh, 2021). According to Gungor et al. (2020), the financial performance of businesses plays a key role in achieving value maximization. Consequently, its analysis serves as an effective criterion in evaluating the commercial activity of businesses such as to achieve their goals, to adapt to changing conditions in the market, to improve the way of doing businesses and to be able to take measures against possible problems.

The study of Dalayeen (2017) indicated that firm's financial performance is influenced by several factors such as capital structure, cost, revenue, and the consequential profit margin. Hence, in the study of Kim and Thanh (2021), they stated that there are many indicators that can be used in measuring and evaluating firm's financial performance. According to Maverick (2022), there are four primary elements of financial health that should be evaluated: liquidity, solvency, profitability, and operating efficiency. These metrics must be reviewed concurrently to effectively assess a company's financial health and long-term sustainability. This was supported by his statement that there is no single metric that can indicate a company's overall financial and operational health. However, he also indicated that the degree of a company's profitability may be the most accurate indicator of its health.

Johanns (2019) claims that profitability metrics are crucial for business owners and managers in order to guide their organization in the right direction. Profitability is defined as the company's ability to generate profit from its economic activity by utilizing its resources, and it represents an economic instrument that underpins all of the company's decisions regarding activity management and relationships with business partners; thus, it gains the status of an important criterion used for assessing economic efficiency.

In the Philippines, coffee is a cash crop providing growers with a vital source of farm income. Farmers incur costs throughout the season to produce coffee, with the expectation of recovering these costs by selling the crop at a future date. Coffee farmers are profitable when their revenue from selling coffee is at least equal to their production costs. Farmers must thus be able to cover the full cost of production in order to be economically sustainable in the long run. (Coffee Development Report, 2019).

Thus, in this study, the level of profitability as a financial performance indicator of the coffee producers in Nueva Vizcaya was given focus. It was because profitability ratios enable firms and organizations to determine whether they are growing, declining, or stagnating, as well as to identify whether it's properly using its assets to gain returns for shareholders (Lanier, 2022). Moreover, it includes the ratios of return on equity (ROE) which shows the efficiency of equity, and return on sales (ROS), also known as the net profit margin which reflects the company's effectiveness in terms of cost management (Kim & Thanh, 2021).

## Theoretical Framework

**Figure 1. Theory of Triple Bottom Line of Sustainability (John Elkington, 1994)**

(Source: <https://www.researchgate.net>)



### Theory of Triple Bottom Line of Sustainability

This study, focusing on the sustainability of coffee production industry, is anchored in the theory of Triple Bottom Line (TBL) of Sustainability of John Elkington (1994). Based on the article of Slaper and Hall (2011), TBL is an accounting framework that encompasses the three performance dimensions such as financial, social, and environmental. It includes the environmental and social measures which makes it different from the traditional reporting frameworks as it goes beyond the standard measurements of earnings, return on investment, and shareholder value. Moreover, this theory emphasizes the interconnected relationship of people, planet and profit which aids in the transformation of enterprises and organizations toward a more regenerative and sustainable future. Thus, a single initiative that is related to people, planet or profit will have an impact in the others (UW Extended Campus, 2022). In this study, the use of TBL as a framework, is founded on the concept of sustainability, which refers to coffee production's ability to preserve its features and performance in terms of economic, social, and environmental sustainability.

## Conceptual and Analytical Framework

**Figure 2. Research Paradigm**

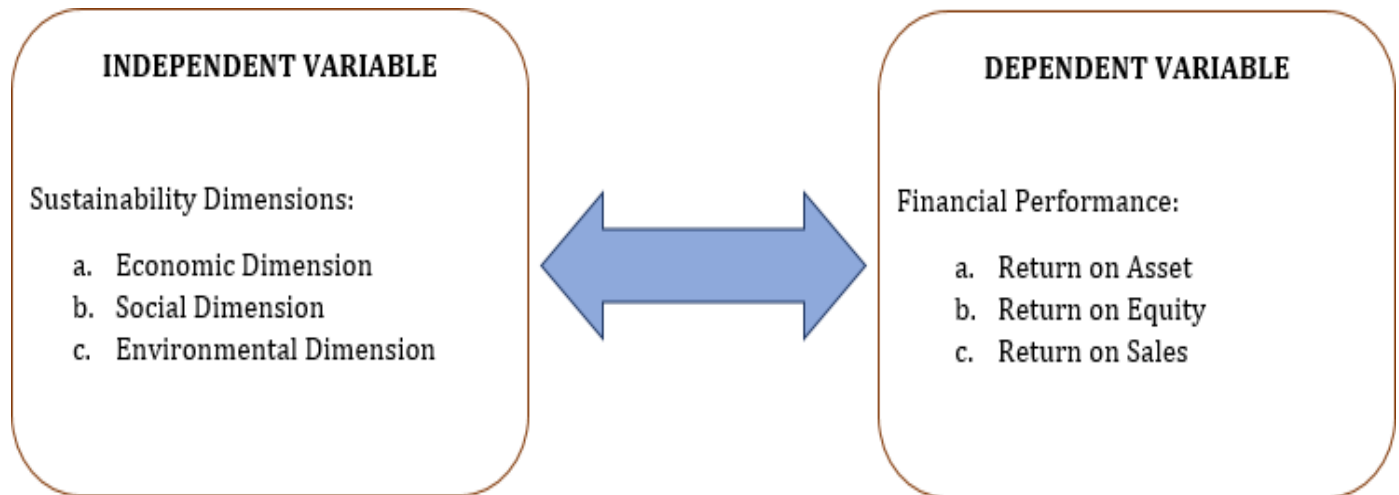


Figure 2 illustrates the interaction between the independent and dependent variables. Moreover, the arrow between the variables indicates that the study opts to determine whether there is a significant relationship between the dependent variables and the independent variables. The independent variables consist of the three sustainability dimensions included in the *Triple Bottom Line Framework* specifically, the economic, social, and environmental dimension. On the other hand, the dependent variable involves the financial performance of coffee producers primarily its analysis on the profitability ratios such as the return on asset (ROA), return on equity (ROE), and return on sales (ROS).

### Sustainability

Sustainability, as used in this study, is defined as the entity's ability to operate in a longer period of time considering the economy, society, and environment. Hence, sustainability is composed of three interconnected dimensions, namely: economic, social, and environmental (Cubillo, 2016). In the study of Nogueira et al. (2022), they defined the three dimensions of sustainability as follows:

*Economic Dimension* is deeply embedded in corporate culture because profit is the primary goal of their operations. It is concerned with the outcome of the business performance of the corporation in the economic system. It also refers to an organization's finances and the generating of profit, as well as cost reduction and risk reduction (Cordoso et al., 2022). In other words, this dimension is concerned in the generation of sufficient operational income through the efficient and responsible use of resources. According to Nguyen and Vo (2021), coffee production is considered as the significant aspect for economic growth and development. In their study, it showed that short-run coffee industry influences economic growth such as on the gross domestic product of the country.

*Social Dimension* refers to the social components of the community and the workforce who serves as the beneficiaries of the business exercise. It is the achievement of good social well-being for the long run. In addition, Muñoz-Pascual et al. (2019) stated that social dimensions can comprise the "measurements of education, equity, and access to social resources, health and well-being, quality of life, and social capital". Based on the study of Martines et al., (2021), there are various challenges faced by coffee cooperatives, including limited access to resources, unequal power dynamics, and difficulties in implementing fair trade practices. On the other hand, the study also shows the potential opportunities available to address these challenges and enhance social sustainability, including strengthening social networks, promoting inclusive governance structures, and facilitating knowledge sharing among cooperatives.

*Environmental Dimension* refers to an organization's impact and responsibilities on the environment. It strives to secure the global systems that sustain life indefinitely. Moreover, this dimension deals with the preservation of the natural resources through its consumption at a sustainable rate. It the enhancement of natural environment conditions and is an important developmental goal in civilizations "provoke weak air eminence and drinking water, polluted soil and aquatic surroundings, deteriorating rainforests, and other depleted natural resources" (Sargani et al., 2020). In the study of Smith et al. (2018), provided valuable insights into the environmental impacts associated with coffee production. Results revealed that coffee production contributes to deforestation, particularly in tropical regions, emphasizing the need for sustainable practices such as shade-grown coffee and agroforestry systems to preserve forest habitats and maintain biodiversity.

## FINANCIAL PERFORMANCE

Measuring a business' financial performance has been a central issue in both the academe and the business world, as firms are challenged to produce effective outcomes (Pham et al., 2021). Based from Belkaoui and Picur (1993), either accounting- or market-based measures are applied in most corporate strategy analysis to operationalize firm financial performance: an accounting indicator is the net profit of a company, while the market measure is the market value of a firm at the end of the fiscal year.

According to an article from Fresh Books Blog Financial performance analysis, particularly the profitability metrics which will be used in this study, involves various ratios that are categorized into two: mainly the Margin and Return ratios. The capacity to convert sales into profits is represented by margin ratios which include the gross profit margin, operating profit margin, and net profit margin. On the other hand, return ratios show how well the business produce wealth for its owners and shareholders. It has two classifications including return on assets and return on equity.

*Return on Asset* (ROA) is an important indicator that shows how much assets are contributing in the generation of net income (Husna & Satria, 2019). Further, ROA provide an adequate measurement of the effectiveness of management as a whole and consider the profitability. It is the quotient between net income and total assets at the end of the period (Fauzan et al., 2019). Thus, the higher the return on asset, the more effective a firm is in utilizing its assets to generate income after tax (Kurniawan, 2021).

*Return on Equity* (ROE) is used to measure a company's ability to generate profit using its own capital. It can also measure the success of management in maximizing the rate of return for shareholders (Hertina & Saudi, 2019). Moreover, ROE is obtained from the firm's net income after tax over the total shareholders' equity (Siregar et al., 2021). According to Adawiyah and Setiyawati (2019), the higher the ROE shows that the company's performance is also high which means the company's performance is getting better, and the company managed well to generate profit from its own capital (Kamar, 2017).

*Return on Sales* (ROS) reflects the firm's profit margin (Myskova & Hajek, 2017) and is calculated by dividing the earnings before income tax from net sales revenue (Diavastis et al., 2016). It illustrates the company's effectiveness in expanding to current or future markets, and has also been used in previous studies (Zhang, 2005).

## STATEMENT OF THE PROBLEM

The study aimed to identify the extent of sustainability practices and the level of financial performance of the coffee producers in Nueva Vizcaya for the 2<sup>nd</sup> Semester for the AY 2022-2023.

Specifically, this study sought to answer the following questions:



1. What is the extent of sustainability practices of coffee producers in Nueva Vizcaya in terms of:
  - a. Economic Dimension
  - b. Social Dimension
  - c. Environmental Dimension
2. What is the financial performance of the coffee producers in Nueva Vizcaya in terms of:
  - a. Return on Asset
  - b. Return on Equity
  - c. Return on Sales
3. Is there a significant relationship between the sustainability practices and the financial performance of the coffee producers in Nueva Vizcaya?
4. What are the implications or perceptions of the respondents in terms of the condition of the coffee production business in Nueva Vizcaya and its capability to sustain in the growing demand in the coffee industry?

### **Statement of Null Hypothesis**

There is no significant relationship between the sustainability practices and the financial performance of the coffee producers in Nueva Vizcaya.

### **METHODOLOGY**

This chapter presents the different methods and procedures that were used by the researchers in this study. It consists of the following sections:

#### **Research Design**

This study employed a quantitative method. Specifically, the descriptive and correlational design were used to determine the extent of sustainability practices of the coffee producers in Nueva Vizcaya. The descriptive design was utilized for analyzing the data to be gathered regarding the sustainability practices of the respondents. While the correlational design was applied to determine the relationship between the sustainability practices and the financial performance of the respondents.

Moreover, in the statement of the problem number four, a thematic qualitative design was employed to elicit different ideas, opinions, or beliefs from the respondents regarding the condition and capability of the coffee production business in Nueva Vizcaya to sustain.

#### **Research Environment**

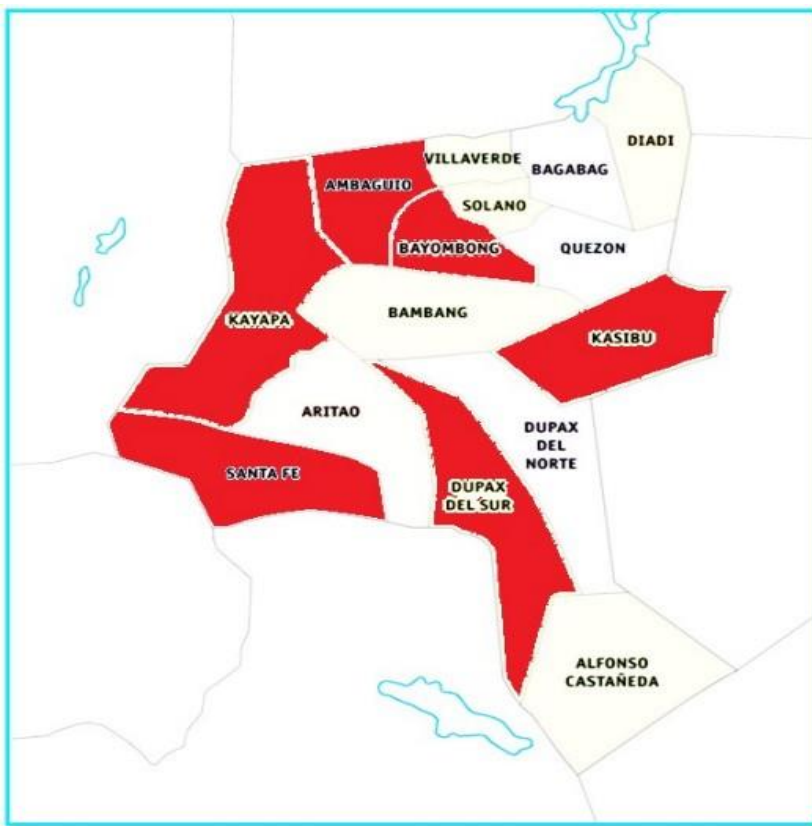
The study was conducted in Nueva Vizcaya, a province in the Philippines which lies within the heart of Northern Luzon. Most of the people of this province derive their livelihood from agriculture. The province is also known for its rich culture and history, vibrant communities, as well as its natural beauty, with many mountains, waterfalls, and rivers. Nueva Vizcaya has favorable climatic conditions and high elevation areas that are suitable for coffee cultivation. Thus, it became known for its coffee production, particularly the Robusta variety. Coffee farms can be found in various municipalities, with farmers dedicating substantial land to coffee plantations.

This study focused on the municipalities of Ambaguio, Bayombong, Kasibu, Dupax del Sur, Santa Fe, and Kayapa in Nueva Vizcaya. Ambaguio is a municipality located in the eastern part of Nueva Vizcaya that is predominantly agricultural, with rice, corn, and vegetables as major crops. Bayombong serves as the provincial capital and is situated in the central part of Nueva Vizcaya, which is also known for its rich cultural heritage and historical significance. Kasibu is a municipality located in the northern part of Nueva

Vizcaya that is known for its unique natural features such as the Capisaan Cave System, which is one of the country's largest cave systems, and Mount Ugo, a popular hiking destination. Dupax del Sur is located in the western part of Nueva Vizcaya, known for its picturesque scenery and the Dupax River that flows through the town. Santa Fe is a 4th class municipality in the province of Nueva Vizcaya with too diverse cultural traditions and religious practices. Kayapa is a municipality located in the southern part of Nueva Vizcaya, known for its mountain ranges and attractions such as the Mount Pulag National Park and the Batad Rice Terraces. One significant aspect of these municipalities is that they all have active coffee growers. These areas are known for producing some of the best coffee beans in the country, with a unique flavor profile that sets them apart from other coffee-growing regions (PNV, n.d.).

### Figure 3. Map of Nueva Vizcaya

(Source: <https://commons.m.wikimedia.org>)



### Research Respondents

The respondents of this study were the coffee producers in Nueva Vizcaya specifically in the municipalities of Ambaguio, Bayombong, Dupax del Sur, Kasibu, Kayapa, and Sta. Fe which are in the form of sole proprietorship, partnership, cooperatives and associations. Purposive sampling was used in selecting the respondents of this study. Moreover, the respondents were selected based on the coffee producers listed and acknowledged by the Department of Trade and Industry (DTI) and Department of Agriculture (DA) of Nueva Vizcaya shown in *table 1*.

### Inclusion Criteria

The respondents of this study involved the coffee producers in Nueva Vizcaya, who cultivate and process coffee tree and beans for at least two years. It involves coffee producers and employees in the managerial level, either male or female. Moreover, the respondents were listed and acknowledged by DTI and DA.

Respondents who opt to answer any part of the questionnaire were still included especially in the collection of financial statement data.

### Exclusion Criteria

Board of Trustees and regular employees of the coffee production business were excluded as respondents in the study.

**Table 1. Number of Research Respondents**

Municipality	Number of Respondents
Ambaguio	2
Bayombong	1
Dupax del Sur	1
Kasibu	1
Kayapa	1
Sta. Fe	1
<b>TOTAL</b>	<b>7</b>

### Research Instrument

The researchers utilized a survey questionnaire as their data gathering tool in conducting the study. The questionnaire consists of four parts: first is the profile of the respondents. Items in the profile section were not form part in the statement of the problem, but were used in the discussion. The second part was the measurement of the sustainability practices of Nueva Vizcaya coffee producers under the three dimensions of sustainability which was in the form of a four-point Likert Scale, adopted from the research study of Sarango-Lalangui et al., (2018) entitled “*Sustainable Practices in Small and Medium-Sized Enterprises in Ecuador*” that requires the respondents to indicate the level of extent with each of the series of statements indicated; the third part was a statement requesting for the copy of the respondents’ financial statements that was used in evaluating their financial performance specifically the Return on Asset (ROA), Return on Equity (ROE), and Return on Sales (ROS); and lastly, the qualitative part which was in the form of an open-ended question about the implications or perceptions of the respondents in terms of the condition and capability of the coffee production business in Nueva Vizcaya to sustain.

**Table 2. Scale of Interpretation for Sustainability Practices**

Mean	Qualitative Description	Interpretation
3.50 – 4.00	Very High Extent	Strongly Implemented Practice
2.50 – 3.49	High Extent	Significant Implemented Practice
1.50 – 2.49	Low Extent	Moderately Implemented Practice
1.00 – 1.49	Very Low Extent	Weak Implemented Practice

### Data Gathering Procedure

The study was guided by the three steps of data gathering procedure. First, the researchers adapted and

modified the research instrument in the form of a survey questionnaire. Next, was the distribution of informed consent form and questionnaire. After the distribution, the informed consent form as well as the questionnaire were retrieved.

### Treatment of Data

The Statistical Package for Social Sciences (SPSS) was utilized to analyze all the data gathered. Further, the researchers used the descriptive statistics. Specifically, mean and standard deviation was used to measure the extent of sustainability of coffee producers. Moreover, the financial profitability ratios were utilized in evaluating the financial performance of the respondents in terms of their level of profitability. It uses the following formulas for the measurement of return on asset (ROA), return on equity (ROE), and return on sales (ROS):

$$\text{ROA} = \text{Net Income After Tax} / \text{Total Assets}$$

$$\text{ROE} = \text{Net Income After Tax} / \text{Total Shareholders' Equity}$$

$$\text{ROS} = \text{Net Income Before Tax} / \text{Net Sales}$$

Also, the Spearman Rho was used to test the relationship between the three dimensions of sustainability when grouped according to the financial performance of the respondents. Lastly, a ` to analyze the implications or perceptions of the respondents in terms of the condition and capability to sustain of the coffee production business in Nueva Vizcaya.

## RESULTS AND DISCUSSIONS

This chapter presents the analysis and interpretation of the gathered data which addressed the study's specific objectives.

### Section 1. The Extent of Sustainability Practices of Coffee Producers in Nueva Vizcaya

**Table 3. The Extent of Sustainability Practices of the Respondents in terms of Economic Dimension**

Statements	Mean	SD	Interpretation
1. The number of clients of the coffee producers has increased.	3.71	.488	Strongly Implemented Practice
2. The coffee production business has increased in the average customer purchase.	3.71	.488	Strongly Implemented Practice
3. It is profitable and well-managed.	3.43	.787	Significant Implemented Practice
4. The business complies with all legal labor obligations regarding the payment of salaries and benefits by law.	3.43	1.134	Significant Implemented Practice
5. The business is recognized for the service given to its customers and caring for the quality of its products and services.	3.57	.535	Strongly Implemented Practice
6. The business has a channel to meet customer/consumer demands.	3.57	.787	Strongly Implemented Practice
7. The business has a financial accounting balance at the final results date.	3.00	.816	Significant Implemented Practice

8. The business employees have increased.	3.00	1.414	Significant Implemented Practice
9. The business has local labor.	3.86	.378	Strongly Implemented Practice
10. The employees are well-paid compared to the competition.	3.14	1.069	Significant Implemented Practice
11. There is provision for employee benefits.	2.86	1.345	Significant Implemented Practice
<b>Overall</b>	<b>3.3896</b>	<b>.64221</b>	<b>Significant Implemented Practice</b>

Legend: 1.00-1.49 – Weak Implemented Practice; 1.50-2.49 – Moderately Implemented Practice; 2.50-3.49 – Significant Implemented Practice; 3.50-4.00 – Strongly Implemented Practice

Table 3 presents the extent of sustainability practices of coffee producers in Nueva Vizcaya in terms of economic dimension. It displays an overall mean of 3.3896 which denotes that practices concerning economic sustainability are significantly implemented. The same table shows that among the eleven statements, five statements are strongly implemented while the rest are significantly implemented. Among the statements, statement 9 obtained the highest mean (3.86) which suggests that local labor is strongly implemented by coffee producers in the Province of Nueva Vizcaya. This indicates that the businesses employ workers that reside within its vicinity or even in nearby communities, thus, empowering local economy within the municipality itself through opportunities of livelihood among the residents of the community.

On the other hand, even though there is a strong implementation in terms of local labor among coffee producers in Nueva Vizcaya, the lowest mean (2.86) is reflected in terms of their provision of employee benefits indicated in statement 11. Even though this still qualitatively denotes to a significant implementation of such practice there can be points of improvement in the part of the coffee businesses to provide certain benefits to their employees in line with what the Philippine labor laws require them to. These benefits include the Social Security System (SSS), health insurance, 13th-month pay, vacation and sick leave, maternity leave, paternity leave, retirement benefits, and special leave benefits.

This aforementioned result is corroborated by the study conducted by Seneduangdeth et al., (2018) which reflects that coffee farming and production offers local employment where in the laborers receive wage income and other benefits from coffee production, thus contributing to local economy. Yet the study suggests that there is a need for government agencies to regulate the coffee businesses in terms of labor to pave way to better pay and better working conditions for their employees and for them to follow national laws and policies on wage.

Furthermore, the study of Sachs et al., (2019) underscores that one of the vital aspects of economic sustainability are decent wages. Although this means an increase in the production costs of the business, a decent wage is considered the most basic benefit of an employee.

**Table 4 The Extent of Sustainability Practices of the Respondents in terms of Social Dimension**

Statements	Mean	SD	Interpretation
1. There is community support.	3.14	1.069	Significant Implemented Practice
2. The business participates with the community.	3.57	.787	Strongly Implemented Practice

3. It promotes work and family life reconciliation among its employees.	3.57	.535	Strongly Implemented Practice
4. It is concerned about its employees' professional and personal development and equality of opportunities.	3.71	.488	Strongly Implemented Practice
5. It has a process of dialogue and participation of the internal and external public in defining the issues that must be addressed in its vision of sustainability.	3.57	.535	Strongly Implemented Practice
6. The business has relationship initiatives with its employees that allows them to be heard.	3.71	.488	Strongly Implemented Practice
7. It defends the interest of society to participate in the development of public policies.	3.00	1.155	Significant Implemented Practice
8. It has formal practices of relationship with its employees, to listen, evaluate, and accompany them in order to incorporate new learnings and knowledge.	3.43	.535	Significant Implemented Practice
9. It includes references to sustainability in the statement documents of vision, mission, and values.	3.14	1.215	Significant Implemented Practice
10. It provides its employees with a safe and healthy environment to work.	3.71	.488	Strongly Implemented Practice
11. There are specific policies to deal with issues related to human rights.	3.43	.787	Significant Implemented Practice
12. The business repudiates exploitation of child labor in its code.	3.43	.787	Significant Implemented Practice
13. It participates in the development of public policies that seek the elimination of forced labor.	3.86	.378	Strongly Implemented Practice
14. There are no discrimination problems.	3.86	.378	Strongly Implemented Practice
15. It provides employees with basic training to carry out their operations.	3.71	.488	Strongly Implemented Practice
16. It complies with current local legislation related to dismissals and retirement processes.	2.71	1.254	Significant Implemented Practice
17. The business regularly conducts training in employee health and safety.	3.14	.690	Significant Implemented Practice
18. It respects employees' daily working hours.	3.71	.488	Strongly Implemented Practice
<b>OVERALL</b>	<b>3.4683</b>	<b>.41432</b>	<b>Significant Implemented Practice</b>

Legend: 1.00-1.49 – Weak Implemented Practice; 1.50-2.49 – Moderately Implemented Practice; 2.50-3.49 – Significant Implemented Practice; 3.50-4.00 – Strongly Implemented Practice

Table 4 displays is the extent of sustainability practices of coffee producers in Nueva Vizcaya in terms of Social Dimension. An overall mean of 3.4683 signifies that the sustainability practices under the social dimension are significantly implemented. This implies that the coffee producers of the Province of Nueva

Vizcaya bestow importance to social responsibility. Specifically, among eighteen statements, eight are significantly implemented while the ten practices are strongly implemented with the highest mean of 3.86 obtained.

Statement number 13 indicates that the coffee producers participates in the development of public policies that seek the elimination of forced labor. This means that no forms of coercion or involuntary servitude exist in terms of employment in the business. All workers or employees are not compelled against their will to be of service for the business. Moreover, statement number 14 presents that there exist no issues of discrimination among the employees and within the workplace. This insinuates that the coffee producers of Nueva Vizcaya treat their employee fairly; wherein no employee is being treated less favorably merely because of his ethnic origin, color, religion, sex, sexual orientation, or even disability. Moreover, results signify that coffee producers put high regard to a positive and friendly workplace culture.

The aforementioned results are backed up in a study conducted by Rahmah et al., (2023) which examined the social sustainability practices within West Java’s coffee industry management systems. The study revealed that coffee industries managed by private sectors have an excellent performance in many social indicators, such as in freedom of association, collective bargaining, and eradication of forced labor. On the other hand, coffee industries managed by farmer groups showed high social performance scores in equal opportunity and discrimination.

However, the study conducted by Watts et al., (2021) counter the results because it presents unfavorable working conditions, even child labor in the work environment of coffee production or plantations. To elucidate this data provided in the study of Watts, if there exists child labor in a workplace setting, discrimination and inequality amplifies in the society as a whole, thus manifesting failure on the aspect of social dimension of a business’s sustainability practices.

**Table 5 The Extent of Sustainability Practices of the Respondents in terms of Environmental Dimension**

Statements	Mean	SD	Interpretation
1. The business cares for and protects the environment	3.86	.378	Strongly Implemented Practice
2. It seeks to know the possible impacts on climate change for its business	3.71	.488	Strongly Implemented Practice
3. It is recognized for excellence in cleaner production and in pollution prevention management	3.57	.535	Strongly Implemented Practice
4. The business carries out specific initiatives to reduce materials	3.86	.378	Strongly Implemented Practice
5. It carries out specific initiatives to reduce water consumption	3.86	.378	Strongly Implemented Practice
6. It carries out specific initiatives to reduce energy consumption	3.43	1.134	Significant Implemented Practice
<b>OVERALL</b>	<b>3.7143</b>	<b>.34311</b>	Strongly Implemented Practice

Legend: 1.00-1.49 – Weak Implemented Practice; 1.50-2.49 – Moderately Implemented Practice; 2.50-3.49 – Significant Implemented Practice; 3.50-4.00 – Strongly Implemented Practice

Table 5 presents the extent of sustainability practices of coffee producers in Nueva Vizcaya in terms of

environmental dimension. It displays an overall mean of 3.7143 which corresponds to strongly implemented practice. It also displays that five statements obtained a qualitative description of strongly implemented practice and only statement number six acquired a mean which denotes to significant implemented practice. This result signifies that coffee producers in the Province of Nueva Vizcaya exemplify care and concern for the environment.

Inferring from the nature of the business itself, coffee production is under farming or the agricultural sector which fundamentally relies on the environment and its natural resources such as water, soil, climate, and even renewable energy, thus, justifying the necessity for coffee producers to give importance and impart efforts that will contribute to safeguarding the environment and promoting sustainability. Though a 3.43 mean still corresponds to a high score, it can be a point of consideration and discourse between the coffee producers of Nueva Vizcaya and the Local Government Unit to take a closer look on methods and alternatives that can help reduce energy consumption in the field of farming and agriculture such as solar-powered irrigation system, greenhouse farming or even investing in research and development that will bring about new methods to a more energy efficient coffee roasting procedures.

A research conducted by Syofya (2023) present that there are certain environmental sustainability practices that coffee producers have adopted, such as shade cultivation and organic farming. Not only that these practices will help preserve biodiversity, it will also contribute in combating climate change. However, it is emphasized that limited resources and knowledge hinder broader adoption of these practices.

In a study conducted by Smith, et. al. (2022), participatory interviews with coffee producers in order to better understand the challenges faced in coffee production. Results of such study underscored the following answers that were given by the respondents: pests and diseases, climate change, nurseries and transplants, and technical assistance. If these areas were addressed it shall pave way to long-term sustainability, especially in terms of environmental dimension.

## Section 2. Financial Performance of Coffee Producers in Nueva Vizcaya

**Table 6. Financial Performance of the Respondents in terms of ROA, ROE, and ROS**

Financial Performance	Median	Mean	Std. Deviation
Return on Asset	4.350	7.768	9.866
Return on Equity	10.480	12.440	13.277
Return on Sales	18.335	18.373	14.792

Table 6 shows the average financial performance of coffee producers in Nueva Vizcaya in terms of Return on Asset (ROA), Return on Equity (ROE), and Return on Sales (ROS). Data reveals that ROA obtained a mean of 7.768 wherein respondent 2 has the highest percentage of return of 22.22% (*See Appendix F*). This signifies that, on average, respondents are efficiently utilizing their assets to generate profits. On the other hand, ROE has a mean of 12.44 indicating that the respondents are generating a high return on the equity invested by shareholders or owners. This implies a reasonably profitable operation in relation on the equity provided and that the business is getting better. Lastly, the table reveals that ROS has obtained a mean of 18.335 which indicates that, on average, the coffee producers of the Province of Nueva Vizcaya are able to generate a profit of 18.34% per peso of sales. Furthermore, this indicates that coffee producers are operating efficiently.

In the context of sustainability practices, these findings suggest that the coffee producers are striking a



commendable balance between profitability and sustainability efforts. However, these figures represent averages, and individual producers may exhibit significant variations (*See Appendix G*).

Financial Performance refers to the extent to which a company has achieved its financial goals. Evaluating financial performance is of significant importance in both academe and business world as companies face imperative to generate successful results. In analyzing corporate strategies, two primary approaches are commonly employed to quantify a firm’s financial performance: (1) an accounting metric involves assessing the company’s net profit while (2) a market-oriented measure entails evaluating the firm’s market value at the conclusion of the fiscal year (Belkaoui & Picur, 1993; Pham, et al., 2021).

In a recent study by Martinez (2023) which focused on the Profitability of Robusta Coffee farm in Quirino Philippines, it was found that most coffee farmers used their own money to run their farms. Surprisingly, many of these farmers did not keep records of their transactions and did not prepare financial reports, similar to a study from 1996. Furthermore, these farmers mentioned that they sell their coffee to traders who came to their area. However, the results showed that these farmers were actually losing money because of high cost involved in running their farms, especially for labor and supplies.

One important way to check how well the coffee industry is doing financially is by looking at profitability ratios. These ratios indicate if the industry is able to generate money or not. From 2015 to 2017, the net profit margin (ROS) for the coffee industry in Quirino province was 63.21%, which is lower than the industry standard by Php4,432.22 per hectare. Eventually, in the years 2017 to 2022, the typical farm made an average profit of Php19,236.00 per hectare (Department of Agriculture’s Bureau of Plant Industry, 2017). However, it is important to note that not all parts of the coffee process benefit when coffee prices go up. This is due to the increasing labor cost for harvesting and the prices of fertilizers (Gillison et al., 2004; Martinez, 2023).

**Section 3. Relationship Between the Sustainability Practices and Financial Performance of Coffee Producers in Nueva Vizcaya**

**Table 7. Significant Relationship of Sustainability Practices and Financial Performance of the Respondents**

Variables		Return on Asset	Return on Equity	Return on Sales
Economic Dimension	ρ	-.400	-.400	-.400
	p-value	.600	.600	.600
	N	4	4	4
Social Dimension	ρ	-.400	-.400	-.400
	p-value	.600	.600	.600
	N	4	4	4
Environmental Dimension	ρ	-.400	-.400	-.400
	p-value	.600	.600	.600
	N	4	4	4

Legend: ρ – Spearman’s rho

Table 7 presents the relationship between each dimension of sustainability [Economic (EC), Social (SC), and Environmental (EN) and financial performance (Return on Asset, Return on Equity and Return on Sales) of coffee producers in Nueva Vizcaya. Data shows that the obtained *p* value is .600 on all areas which

is more than 0.05 therefore, the null hypothesis is accepted.

This further indicates that there exists no significant relationship between the sustainability practices and the financial performance of the coffee producers in the Province of Nueva Vizcaya, which is opposed by an empirical study conducted by Pham et al., (2021) entitled: *The impact of sustainability practices on financial performance: empirical evidence from Sweden*. Where in the research findings indicate a positive relationship between sustainability and financial performance that is measured by return on asset, return on equity and return on capital employed.

Moreover, the result is refuted by the study of Phan et al., (2020), which examined the relationship between a firm’s sustainable development practices and its financial performance. Through a multi-dimensional construct, the results obtained show that sustainable development practices have a direct and positive impact on financial performance of a business, indicating that its implementation does not decrease financial performance, rather it will generate financial gains in terms of profitability and even growth.

Ekström & Malmström (2022) also presented results that corroborate the studies of Pham et al., (2021) Phan et al., (2020), since its results showed that there is a positive relationship between performance regarding sustainability and return on invested capital. This implies that businesses that invest in sustainable development increase their financial performance.

Although contradicted by the above-mentioned studies, the results of this study imply that, implementation of sustainability practices has potential challenges associated in it (Ociti, 2023) leading to its insignificant relationship with financial performance. To back up this result, a study conducted by Rahi et al., (2021) identified a negative relationship between sustainability practices and financial performance.

Karlsson & Bäckström (2015) indicated that businesses incorporating sustainability activities in their operations incur more costs, resulting to the aggravation of their ability to generate positive financial outcomes. Furthermore, entities engaged in environmental and social responsibility often lose focus on profitability (Yu & Zhao, 2015), when resources are channeled towards less profitable sustainable activities (Rivera et al., 2017).

#### Section 4. Condition of Coffee Production Business in Nueva Vizcaya and Its Capability to Sustain

**Table 8. Implications or Perceptions of the Respondents in the Condition of Coffee Production Business in the Province**

	Frequency	Percentage
Optimism	3	43%
Pessimism	4	57%
<b>Total</b>	<b>7</b>	<b>100%</b>

The table presents the sentiment of the respondents in terms of the condition of coffee production business in the province. It shows that 57% of the respondents has a pessimistic outlook in the coffee industry which is due to several key factors. To begin with, the respondents indicate that there is a notable scarcity of labor in the region for coffee cultivation. Additionally, coffee production in Nueva Vizcaya as mentioned by a respondent is: *“Decreasing, sa kadahilanang ang kape ay seasonal compare mo sa ibang produkto...”* (Decreasing, because coffee is a seasonal crop compared to other crops). Moreover, the absence of advanced technology further complicates their work, making it less efficient. Furthermore, the province faces a challenge in terms of the availability of coffee beans for planting, necessitating sourcing from other

provinces. Despite this prevailing pessimism, there is a minority of three respondents who hold a more positive view of the industry. Their optimism is rooted in Nueva Vizcaya’s reputation as a supplier of high-quality coffee, and they recognize the strong demand for coffee in the market as a potential opportunity. ( See Appendix H)

This aligns with a study conducted by Das et al., (2020) in India, which delves into the challenges faced in achieving sustainability in agricultural management. Their findings underscore the significant obstacles encountered in Indian sustainable agricultural management plans, including climate change impacts, limited resource availability, a lack of advanced technical expertise, managerial difficulties, and the pressing demands of a growing population. Given that sustainable development entails the responsible stewardship of natural resources for both current and future generations, it necessitates meticulous planning across various levels, encompassing individual, organizational, and institutional dimensions. Moreover, their research emphasizes that attaining the objective of sustainable agricultural development requires optimal utilization of human and natural resources, prudent capital allocation, technological advancement, and effective management practices.

**Table 9 Capability of the Respondents Business to Sustain in the Long-Run**

	Frequency	Percentage
Meet the growing consumers’ demand	3	33%
Attend trainings and seminars	1	11%
Provide coffee grounds to various establishments and retail outlets	1	11%
Expand and beautification of plantation and operation areas	1	11%
Provide seedlings, fertilizers, and farming equipment to coffee farmers	1	11%
Acquire more coffee beans	1	11%
The business is not capable for sustainability	1	11%
<b>Total</b>	<b>9</b>	<b>100%</b>

Table 9 reveals that almost all the respondents express a strong belief in their ability to ensure long-term sustainability in their business endeavors. Their justifications for this confidence vary significantly, but a prevailing theme centers on their capacity to meet the ever-increasing demands of consumers, which they regard as a fundamental pillar of their long-term success.

This result is congruent to a research study conducted by Luat et al. (2022) from the University of Santo Tomas in the Philippines, various factors such as domestic consumption, coffee yield, harvest area, and irrigated service area exhibit positive correlations with local coffee production. Given that domestic consumption is one of these variables positively associated with local coffee production, it can be inferred that the sustainability and potentially the growth of local coffee production are likely to endure over the long term. As long as domestic consumption continues to increase, local coffee production is expected to follow suit, given their positive relationship.

Furthermore, the respondents cite several other key factors contributing to their sustained viability. These include their active participation in training sessions and seminars aimed at enhancing their knowledge and skills. As per responses, “As long as there are people who...drink coffee, then the coffee industry including my business will sustain.”; “Our goal is to expand more coffee farms by providing free seedlings, fertilizers and farming equipment to interested farmers. In that way, we can increase the production to sustain the business.”. Additionally, they engage in the distribution of coffee grounds to various establishments and

retail outlets, expanding their plantations and operational areas, and proactively seeking to acquire additional sources of coffee beans. Accordingly, these diverse strategies collectively underpin their optimistic outlook for the long-term sustainability of their businesses within the coffee industry.

## CONCLUSIONS AND RECOMMENDATIONS

This chapter presents the drawn conclusions as well as the recommendations in the study regarding the sustainability practices and financial performance of coffee producers in Nueva Vizcaya.

### Conclusions

The goal of this analysis was to determine the extent of sustainability practices of coffee producers in Nueva Vizcaya. In addition, the study aimed to discuss the financial performance of the respondents, with return on asset (ROA), return on equity (ROE), and return on sales (ROS) as key indicators.

Accordingly, the coffee producers in Nueva Vizcaya are generally implementing sustainability practices across the economic, social, and environmental dimensions. However, there are still areas for improvement, such as providing more employee benefits, reducing energy consumption, and addressing the challenges faced in coffee production, such as pests and diseases, climate change, nurseries and transplants, and technical assistance. Additionally, the respondents are achieving good financial performance, as evidenced by their average ROA, ROE, and ROS ratios. These suggests that coffee producers are striking a commendable balance between profitability and sustainability efforts. However, there is significant variation in financial performance among individual producers caused by several key factors such as labor cost.

After further analysis, the study found that there is no significant relationship between sustainability practices and the financial performance of coffee producers in Nueva Vizcaya. The study also discovered that there is a weak negative correlation between the two variables, which suggests that as sustainability practices improve, financial performance indicators may tend to decrease. This is likely due to the fact that implementing sustainability practices can be costly and time-consuming, and it may take some time for businesses to see the financial benefits of these practices.

Despite the lack of a clear relationship between sustainability and financial performance, the study revealed that most coffee producers in Nueva Vizcaya are confident in their ability to ensure long-term sustainability. This confidence is based on a number of factors, including their ability to meet the increasing demands of consumers, their participation in training and seminars, and their engagement in various strategies to improve their efficiency and profitability.

### Recommendations

Based on the findings of the study, a recommendation addressed to the coffee producers is to continue the implementation of sustainability practices in all three dimensions, as sustainability is important for the long-term health of the coffee industry and the environment. The coffee producers should give more focus on addressing the effects of climate change through the reduction of energy consumption. This can be done by using solar-powered irrigation systems, greenhouse farming, or investing in research and development for more energy-efficient coffee roasting procedures. Moreover, coffee producers in Nueva Vizcaya should continue to focus on improving their financial performance by increasing sales, reducing costs, and improving efficiency.

The government, primarily the Provincial and Municipal Local Government Unit can also play a vital role in supporting the sustainability efforts of coffee producers by providing financial assistance and technical support to them. Moreover, through regulating the coffee industry to ensure that labor laws are followed and

promoting sustainable coffee production to consumers. By working together, the coffee producers, the government, and consumers can help ensure the long-term sustainability of the coffee industry in Nueva Vizcaya.

For the School of Accountancy and Business to apply the results of the study in their course discussion such as the organizational management and total quality management, and governance, business ethics, risk management and internal control. To continue to provide unwavering support for research initiatives like this, as this not only enhances the overall quality of education but also allows the institution to actively address the pressing concerns of the local community. Moreover, the school shall reinforce its commitment to academic excellence and community engagement, ultimately contributing to a more informed, innovative, and socially responsible society.

While the recent study has provided valuable insights, there remains a wealth of unexplored territory within this field. To foster a more comprehensive understanding of the industry, future researchers should consider delving into the intricacies of the supply chain, from coffee bean cultivation to final product distribution. Additionally, insights into market dynamics, consumer trends, and regulatory frameworks are crucial for a holistic assessment. In addition to profitability ratios, future studies should include liquidity and solvency ratios to provide a more comprehensive assessment of financial health. This will offer a more nuanced understanding of a coffee business's ability to meet short-term obligations and maintain long-term sustainability.

## REFERENCES

1. Adawiyah, N. & Setiyawati, H. (2019). The effect of current ratio, return on equity, and firm size on stock return (study of manufacturing sector food and beverage in Indonesia Stock Exchange). *Scholars Bulletin*, 5(9), 515-520. DOI: 10.21276/sb.2019.5.9.4
2. Belkaoui, A., & Picur, R. (1993). An analysis of the use of accounting and market measures of performance, Ceo experience and nature of the deviation from the analysts' forecasts in Ceo. *Managerial Finance*, 19(2), 20–32. <https://doi.org/10.1108/eb013712>
3. Blinová, L., Sirotiak, M., Bartosova, A., & Soldan, M. (2017). Review: Utilization of waste from coffee production. <https://doi.org/10.1515/rput-2017-0011>
4. Business Mirror. (2018). DTI sees bright prospects ahead for Philippine coffee industry. Retrieved from <https://industry.gov.ph/dti-sees-bright-prospects-ahead-for-philippine-coffee-industry/>
5. Byrareddy, V., Kouadio, L., Mushtaq, S., & Stone, R. (2019). Sustainable production of robusta coffee under a changing climate: A 10-year monitoring of fertilizer management in coffee farms in Vietnam and Indonesia. *Agronomy*. <http://dx.doi.org/10.3390/agronomy9090499>
6. Cordoso, R., Reis, J., Sampaio, N., & Barros, J. (2022). Sustainable quality management: unfoldings, trends and perspectives from the triple bottom line. *Proceedings on Engineering Sciences*, 4(3), 359-370. <http://dx.doi.org/10.24874/PES04.03.013>
7. Cubillo, G. (2016). Analysis of coffee-based cropping systems in upland Cavite, Philippines toward improved sustainability. *Journal of US-China Public Administration*, 13(6), 407-418. <http://dx.doi.org/10.17265/1548-6591/2016.06.004>
8. Dalayeen, B. (2017). Financial performance appraisal of selected companies in Jordan. *Open Journal of Business and Management*, 5(1). <http://dx.doi.org/10.4236/ojbm.2017.51012>
9. Das, J., Jha, S., Goyal, M. & Surampalli, R. (2020). Challenges of Sustainability in Agricultural Management. 10.1002/9781119434016.ch16.
10. Department of Agriculture's Bureau of Plant Industry. (2017). BPI 2017-2022 STRATPLAN LAUNCHED. <https://www.buplant.da.gov.ph/index.php/na/1409-bpi-2017-2022-stratplan-launched>
11. Department of Trade and Industry. (2017). *DTI Policy Briefs*. Department of Trade and Industry–Bureau of Trade and Industrial Policy Research (BTIPR). <https://industry.gov.ph/wp-content/uploads/2017/11/DTI-Policy-Brief-2017-10-The-Philippines-in-the-Coffee-Global-Value->

Chain.pdf

12. Diavastis, I., Anagnostopoulou, E., Drogalas, G. & Karagiorgos, T. (2016). The interaction effect of accounting information systems user satisfaction and Activity-Based Costing use on hotel financial performance: Evidence from Greece. *Accounting and Management Information Systems*, 15(4), 757.
13. Difference Coffee Company (n.d.). Sustainability in the coffee world: How Difference Coffee defines sustainability. <https://us.differencecoffee.com/blogs/our-world/sustainability-in-coffee>
14. Dong, Y., Hauschild, M. (2017). Indicators for environmental sustainability. *Procedia CIRP*, 61. <https://www.sciencedirect.com/science/article/pii/S2212827116313336>
15. Ebreo, B. (2022). DTI helps CagVal coffee farmers. *Philippine Information Agency*. <https://pia.gov.ph/news/2022/12/06/dti-helps-cagval-coffee-farmers>
16. Ekström, L. & Malmström, C. (2022). Sustainability performance relation to financial performance: A quantitative study of companies in the textile industry within the European and North American markets. <https://urn.kb.se/resolve?urn=urn:nbn:se:hj:diva-56995>
17. Emeritus. (2022). *Why is sustainability in business important and how to achieve it*. <https://emeritus.org/blog/sustainability-why-is-sustainability-important/>
18. Fatihudin, D. Jusni, Mochklas, M. (2018). How measuring financial performance. *International Journal of Civil Engineering and Technology*, 9(6), 553-557. [https://www.researchgate.net/publication/326141100\\_How\\_Measuring\\_Financial\\_Performance](https://www.researchgate.net/publication/326141100_How_Measuring_Financial_Performance)
19. Fauzan, F., Ayu, D., & Nurharjanti, N. (2019). The effect of audit committee, leverage, return on assets, company size, and sales growth on tax avoidance. *Riset Akuntansi dan Keuangan Indonesia*, 4 (3). <https://journals.ums.ac.id/index.php/reaksi/article/view/9338/5084>
20. Fresh Books Blog. (n.d.). *The 5 most important profitability ratios you need for your small business*. <https://www.freshbooks.com/blog/profitability-ratios>
21. Gallibu, M. (2018). *DA, DTI launch 11 coffee brands in Cagayan Valley*. Department of Agriculture. <https://cagayanvalley.da.gov.ph/2018/04/30/da-dti-launch-11-coffee-brands-in-cagayan-valley/>
22. Gallibu, M. (2019). *Kapeng umuusok sa malayong bundok*. Department of Agriculture. <https://cagayanvalley.da.gov.ph/2019/02/18/kapeng-umuusok-sa-malayo-ng-bundok/>
23. Gillison, A.N., Liswanti, N., Budidarsono, S., van Noordwijk, M., Tomich, T.P. (2004). Impact of cropping methods on biodiversity in coffee agroecosystems in Sumatra, Indonesia. *Ecology and Society* 9 (2), 16. <http://www.ecologyandsociety.org/vol9/iss2/art7>. ISSN: 1708-3087.
24. Gungor, B., Kaygin, C., & Gun, M. (2020). Researches on financial performance. Nobel Akademik Yayıncılık. [https://www.researchgate.net/publication/346657208\\_RESEARCHES\\_ON\\_FINANCIAL\\_PERFORMANCE](https://www.researchgate.net/publication/346657208_RESEARCHES_ON_FINANCIAL_PERFORMANCE)
25. Hertina, D. & Saudi, M. (2019). Stock return: Impact of return on asset, return on equity, debt to equity ratio and earning per share. *International Journal of Innovation, Creativity and Change*, 6(12). [https://www.researchgate.net/publication/336732637\\_Stock\\_Return\\_Impact\\_of\\_Return\\_on\\_Asset\\_Return\\_on\\_Equity\\_Debt\\_to\\_Equity\\_Ratio\\_and\\_Earning\\_Per\\_Share](https://www.researchgate.net/publication/336732637_Stock_Return_Impact_of_Return_on_Asset_Return_on_Equity_Debt_to_Equity_Ratio_and_Earning_Per_Share)
26. Hofstrand, D. (2019). Understanding profitability. *AG Decision Maker*. <https://www.extension.iastate.edu/agdm/wholefarm/html/c3-24.html>
27. Husna, A. & Satria, I. (2019). Effects of return on asset, debt to asset ratio, current ratio, firm size, and dividend payout ratio on firm value. *International Journal of Economics and Financial Issues*, 9 (5), 50-54. <https://doi.org/10.32479/ijefi.8595>
28. Hunt, D., Tabor, K., Hewson, J., Wood, M., Reymondin, L., Koenig, K., Schmitt-Harsh, M., & Follet, F. (2020). Review of remote sensing methods to map coffee production systems. *Remote Sens*, 12(12). <https://doi.org/10.3390/rs12122041>
29. Ijanu, E.M., Kamaruddin, M.A. & Norashiddin, F.A. (2020). Coffee processing wastewater treatment: a critical review on current treatment technologies with a proposed alternative. *Appl Water Sci*, 10(11). <https://doi.org/10.1007/s13201-019-1091-9>
30. Ilgar, O. (2022). *The sustainability problems percolating in the coffee supply chain*. Forbes. <https://www.forbes.com/sites/sap/2022/09/29/the-sustainability-problems-percolating-in-the-coffee-supply-chain/>

31. International Coffee Organization. (n.d.). *What is coffee production*. <https://www.ico.org/what-is-coffee-production>
32. International Coffee Organization. (2019). *Coffee development report 2019*. <http://www.ico.org/documents/cy2021-22/coffee-development-report-2019.pdf>
33. Jallow, M., Masazing, M., & Basit, A. (2017). The effects of mergers & acquisitions on financial performance: Case study of UK Companies. *International Journal of Accounting & Business Management*, 5(1). [https://www.researchgate.net/publication/325734958\\_International\\_Journal\\_of\\_Accounting\\_Business\\_Management\\_THE\\_EFFECTS\\_OF\\_MERGERS\\_ACQUISITIONS\\_ON\\_FINANCIAL\\_PERFORMANCE\\_CASE\\_STUDY\\_OF\\_UK\\_COMPANIES](https://www.researchgate.net/publication/325734958_International_Journal_of_Accounting_Business_Management_THE_EFFECTS_OF_MERGERS_ACQUISITIONS_ON_FINANCIAL_PERFORMANCE_CASE_STUDY_OF_UK_COMPANIES)
34. Jayashree, S., Reza, M., Malarvizhi, C., & Mohiuddin, M. (2021). Industry 4.0 implementation and Triple Bottom Line sustainability: An empirical study on small and medium manufacturing firms. *Heliyon*, 7(8). <https://doi.org/10.1016/j.heliyon.2021.e07753>
35. Johanns, A. (2019). Understanding profitability. Iowa State University of Science and Technology. <https://www.extension.iastate.edu/agdm/wholefarm/html/c3-24.html>
36. Kamar, K. (2017). Analysis of the effect of return on equity (roe) and debt to equity ratio (der) on stock price on cement industry listed in Indonesia Stock Exchange (Idx) in the year of 2011-2015. *Journal of Business and Management*, 19(5), 66-76. [https://www.researchgate.net/publication/317112884\\_Analysis\\_of\\_the\\_Effect\\_of\\_Return\\_on\\_Equity\\_Roe\\_and\\_Debt\\_to\\_Equity\\_Ratio\\_Der\\_On\\_Stock\\_Price\\_on\\_Cement\\_Industry\\_Listed\\_In\\_Indonesia\\_Stock\\_Exchange\\_Idx\\_In\\_the\\_Year\\_of\\_2011-2015](https://www.researchgate.net/publication/317112884_Analysis_of_the_Effect_of_Return_on_Equity_Roe_and_Debt_to_Equity_Ratio_Der_On_Stock_Price_on_Cement_Industry_Listed_In_Indonesia_Stock_Exchange_Idx_In_the_Year_of_2011-2015)
37. Karlsson, J., & Bäckström, S. (2015). Corporate sustainability and financial performance: The influence of board diversity in a Swedish context. *Semantic Scholar*. <https://api.semanticscholar.org/CorpusID:85444206>
38. Kharel, K. & Adhikari, D. (2021). A competitive perspective of sustainable coffee production practices. *Quest Journal of Management and Social Science*, 3(1), 101-111. <https://doi.org/10.3126/qjmss.v3i1.37600>
39. Kim, N. & Thanh, H. (2021). Determinants of financial performance of listed firms manufacturing food products in Vietnam: regression analysis and Blinder-Oaxaca decomposition analysis. *Emerald Insight*. <http://dx.doi.org/10.1108/JED-09-2020-0130>
40. Kurniawa, A. (2021). Analysis of the effect of return on asset, debt to equity ratio, and total asset turnover on share return. *Journal of Industrial Engineering & Management Research*, 2(1). <https://doi.org/10.7777/jiemar>
41. Lanier, S. (2022). *Profitability ratios: An explainer*. <https://blog.hubspot.com/the-hustle/profitability-ratios>
42. Luat, Y., Mendoza, J., To, M., & Cabauatan, R. (2022). A study on the economic sustainability of local coffee production in the Philippines. *International Journal Of Social, Policy And Law*, 2(5), 12-26. <https://doi.org/10.8888/ijospl.v2i5.76>
43. Martinez, J. B. A. N. (2023). Profitability of Robusta Coffee (*Coffea canephora* L.) at farm level in Quirino, Philippines. *International Journal of Multidisciplinary: Applied Business and Education Research*, 4(7), 2558-2565. <https://doi.org/10.11594/ijmaber.04.07.32>
44. Maverick, J. (2022). *What is the best measure of a company's financial health?*. <https://www.investopedia.com/articles/investing/061916/what-best-measure-companys-financial-health.asp>
45. Mayuga, J. (2021). Nueva Vizcaya farmers develop own brand of brewed Robusta coffee. *Business Mirror*. <https://businessmirror.com.ph/2021/06/03/nueva-vizcaya-farmers-develop-own-brand-of-brewed-robusta-coffee/>
46. Miller, K. (2020). *The Triple Bottom Line: What it is & why it's important*. Business Insights. <https://online.hbs.edu/blog/post/what-is-the-triple-bottom-line>
47. Mollenkamp, D. (2023). What is sustainability? How sustainabilities work, benefits, and example. *Investopedia*. <https://www.investopedia.com/terms/s/sustainability.asp>
48. Mordor Intelligence. (2021). *Coffee Market – Growth, Trends, COVID-19 Impact, and Forecasts*

- (2021 – 2026). <https://www.mordorintelligence.com/industry-reports/coffee-market>
49. Mukherjee, A., Kamarulzmana, N., Vijayan, G., & Vaiappuri, S. (2016). Sustainability: A Comprehensive Literature. *Handbook of Research on Global Supply Chain Management*, 248-268. DOI: 10.4018/978-1-4666-9639-6.ch015
  50. Muñoz-Pascual, L., Curado, C., Galende, J. (2019). The Triple Bottom Line on sustainable product innovation performance in SMEs: A mixed methods approach. *Sustainability*, 11(6), 1689. <https://doi.org/10.3390/su11061689>
  51. Myskova, R. & Hajek, P. (2017). Comprehensive assessment of firm financial performance using financial ratios and linguistic analysis of annual reports. *Journal of International Studies*, 10(4), 96-108. Doi: <http://dx.doi.org/10.14254/2071-8330.2017/10-4/7>
  52. National Coffee Associations of USA. (n.d.). The history of coffee. *National Coffee Associations of USA, Inc.* <https://www.ncausa.org/about-coffee/history-of-coffee>
  53. Nieber, K. (2017). The impact of coffee on health. *Planta Med*, 83(16), 1256-1263. doi: 10.1055/s-0043-115007
  54. Nguyen, T., & Vo, T. (2021). The role of the coffee industry in sustainable economic development in Vietnam. *Accounting*, 7, 683-690. <http://dx.doi.org/10.5267/j.ac.2020.12.008>
  55. Nogueira, E., Gomes, S., & Lopes, J. (2022). The key to sustainable economic development: A Triple Bottom Line Approach. *Resources*, 11(5), 46. <https://doi.org/10.3390/resources11050046>
  56. Ociti, I. (2023). Correlation between sustainability practices and financial performance in companies across various industries. [https://www.linkedin.com/pulse/correlation-between-sustainability-practices-financial-innocent-ociti?fbclid=IwAR3UTqs\\_m-8hJkfPDIC0QYWjCGw\\_aEM8PAQYZwrS4szKE6Z-YiEMYMIDcaA](https://www.linkedin.com/pulse/correlation-between-sustainability-practices-financial-innocent-ociti?fbclid=IwAR3UTqs_m-8hJkfPDIC0QYWjCGw_aEM8PAQYZwrS4szKE6Z-YiEMYMIDcaA)
  57. Pham, D., Do, T., Doan, T., Nguyen, T., & Pham, T. (2021). The impact of sustainability practices on financial performance: Empirical evidence from Sweden. *Cogent Business & Management*, 8(1). Doi:1080/23311975.2021.1912526
  58. Pham Y., Reardon-Smith K., Mushtaq S., & Cockfield G. (2019). The impact of climate change and variability on coffee production: A systematic review. *Climate Change*, 156, 609-630. <https://doi.org/10.1007/s10584-019-02538-y>
  59. Phan TTH, Tran HX, Le TT, Nguyen N, Pervan S, Tran MD. (2020). The relationship between sustainable development practices and financial performance: A case study of textile firms in Vietnam. *Sustainability* 12(15):5930. <https://doi.org/10.3390/su12155930>
  60. Philippine Coffee Board. (n.d.). *Philippine coffee*. <https://philcoffeeboard.com/philippine-coffee/>
  61. Philippine Information Agency. (2020). *Ambaguio coffee farmers seek expansion of plantation areas*. <https://www.bignewsnetwork.com/news/263697531/ambaguio-coffee-farmers-look-for-expansion-of-plantation-areas>
  62. Philippine Statistics Authority. (2022). *Major non-food and industrial crops quarterly bulletin, October-December 2022*. <https://psa.gov.ph/non-food/coffee>
  63. Rahi, A.F., Akter, R. and Johansson, J. (2022). Do sustainability practices influence financial performance? Evidence from the Nordic financial industry. *Accounting Research Journal* 35(2), 292-314. <https://doi.org/10.1108/ARJ-12-2020-0373>
  64. Rahmah, D., Purnomo, D., Filianty, F., Ardiansah, I., Pramulya, R., & Noguchi, R. (2023). Social life cycle assessment of a coffee production management system in a rural area: A regional evaluation of the coffee industry in West Java, Indonesia. *Sustainability* 15(18), 13834. <https://doi.org/10.3390/su151813834>
  65. Rainforest Alliance. (n.d.). *The benefits of sustainable coffee production*. Retrieved from <https://www.rainforest-alliance.org/articles/the-benefits-of-sustainable-coffee-production>
  66. Ramnath, J. (2022). *Why is sustainability vital in the coffee industry?*. <https://timesofindia.indiatimes.com/blogs/voices/why-is-sustainability-vital-in-the-coffee-industry/?source=app&frmapp=yes>
  67. Rivera, J.M., Munoz, M.J., Moneva, J.M. (2017). Revisiting the relationship between corporate stakeholder commitment and social and financial performance. *Sustainable Dev.* 25, 482–496.



68. Sachs, J.D., Cordes, K., Rising, J., Toledano, P., & Maennling, N. (2019). Ensuring economic viability and sustainability of coffee production. *Columbia Center on Sustainable Investment*. <http://dx.doi.org/10.2139/ssrn.3660936>
69. Sakalasooriya, N. (2021). Conceptual analysis of sustainability and sustainable development. *Open Journal of Social Science*, 9(3). <https://doi.org/10.4236/jss.2021.93026>
70. Samper, L., & Quinones-Ruiz, X. (2017). Towards a balanced sustainability vision for the coffee industry. *Resources*, 6(2), 12. <https://doi.org/10.3390/resources6020017>
71. Sarango-Lalanhui, P., Alvarez-Garcia, J. & Del Rio-Rama, M. (2018). Sustainable practices in small and medium-sized enterprises in Ecuador. *Sustainability*, 10(6), 2105. <https://doi.org/10.3390/su10062105>
72. Sargani, G., Zhou, D., Raza, MH., & Wei, Y. (2020). Sustainable entrepreneurship in the agriculture sector: The nexus of the triple bottom line measurement approach. *Sustainability*, 12(8), 3275. <https://doi.org/10.3390/su12083275>
73. Sarvina Y., June, T., & Nurmalina, R. (2021). Why should climate smart agriculture be promoted in the Indonesian coffee production system?. *Journal of Sustainability Science and Management*, 16(7), 347-363. <http://dx.doi.org/10.46754/jssm.2021.10.024>
74. Seneduangdeth, D., Ounmany, K., Phommayong, S., Phouxav, K., Hathalong, K. 2018. Labor Employment Opportunities in Coffee Production in Southern Lao People's Democratic Republic. *J. Asian Rur. Stud.* 1(2): 16-36
75. Siregar, Q., Rambe, R. & Simatupang, J. (2021). The effect of debt to equity ratio, net profit margin and return on equity on stock prices in property and real estate companies listed on the Indonesia Stock Exchange. *Jurnal Akmami Akuntansi, Manajemen, Ekonomi*, 2(1). <https://doi.org/10.53695/ja.v2i1.124>
76. Slaper, T. & Hall, T. (2011). The Triple Bottom Line: What is it and how does it work?. *India Business Review*, 86(1). <https://www.ibrc.indiana.edu/ibr/2011/spring/article2.html>
77. Smith E, Antoshak L, Brown PH. (2022). Grounds for Collaboration: A model for improving coffee sustainability initiatives. *Sustainability* 14(11),6677. <https://doi.org/10.3390/su14116677>
78. Smith, J., Johnson, A., Davis, M., & Brown, K. (2018). Environmental sustainability in coffee production: A global analysis. *Journal of Sustainable Agriculture*, 42(3), 245-260.
79. Ssekitooleko, J. (2019). Profitability of coffee production among the youth in Kirumba Sub County, Kyotera District. <http://hdl.handle.net/20.500.12281/6580>
80. Suresh, R., Huq, S., Nandhini, S., & Arunachalam, L. (2020). A study on financial performance analysis with reference to super auto forge Pvt Ltd. *Elementary Education Online*, 19(3) 4715-4721. <http://ilkogretim-online.org> doi: 10.17051/ilkonline.2020.03.735625
81. Syofya, H. (2023). The effect of environmental sustainability and value chain concept in the context of local economy on value added of coffee commodities in Kerinci. *West Science Business and Management*, 1(3), 107-117, doi:10.58812/wsbm.v1i03.84.
82. UW Extended Campus. (2022). Triple Bottom Line. *University of Wisconsin extended campus*. <https://uwex.wisconsin.edu/stories-news/triple-bottom-line/>
83. Wangi, J. (2021). Benefits of sustainable coffee farming. *Global Coffee Masters*. <https://globalcoffeemasters.com/?p=2103>
84. Watts, M., Dreoni, I., Schaafsma, M. & Mathews, Z. (2021). The social impacts of coffee trade: A systematic review. *UKRI GCRF TRADE Hub*.
85. Wolde, Z., Tefera, A., Yared, S., Gezahagn, T., & Tadesse, T. (2017). A review on coffee farming, production potential and constraints in Gedeo Zone, Southern Ethiopia. *Journal of Natural Sciences Research*, 7(23). [https://www.researchgate.net/publication/323278573\\_A\\_Review\\_on\\_Coffee\\_Farming\\_Production\\_Potential\\_and\\_Constraints\\_in\\_Gedeo\\_Zone\\_Southern\\_Ethiopia](https://www.researchgate.net/publication/323278573_A_Review_on_Coffee_Farming_Production_Potential_and_Constraints_in_Gedeo_Zone_Southern_Ethiopia)
86. Yu, M. and Zhao, R. (2015). Sustainability and firm valuation: an international investigation. *International Journal of Accounting & Information Management* 23(3), 289- 307. <https://doi.org/10.1108/IJAIM-07-2014-0050>
87. Zhang, M. J. (2005). Information systems, strategic flexibility and firm performance: an empirical



investigation. Journal of Engineering and Technology Management, 22(3), 163-184.  
<https://www.sciencedirect.com/science/article/abs/pii/S0923474805000172>