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RECORDING THE HARVEST, CULTIVATING THE FUTURE THROUGH SUSTAINABILITY ACCOUNTING IN CLOVE FARMING

Hasnidar[*1], Vina Olivia Pebrianty[2], La Ode Muhammad Arfan Samrin[3], Taufan Sufatriansa Awal[4], Dzulkifli Abdillah[5]
[1,2,3,4,5] Universitas Halu Oleo, Kota Kendaari, Indonesia
[*]Corresponding Author: hasnidar@uho.ac.id

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Abstract: *This study aims to identify record-keeping practices related to production outcomes and financial management in clove farming, analyze the challenges in implementing sustainable accounting, and formulate a simple recording model to support farm sustainability. The research employs a qualitative descriptive approach using a case study method through observation, interviews, questionnaires, and documentation. Data analysis is conducted thematically to reveal patterns of record-keeping practices, key problems, and opportunities for the application of sustainable accounting. The results indicate that clove farming has considerable potential; however, it is highly influenced by harvesting periods and weather conditions. Farmers' financial recording practices remain basic and seasonal, are often mixed with household finances, and do not yet include the recognition of biological assets or environmental aspects. The main constraints include low accounting literacy, limited access to digital facilities, price fluctuations, and the absence of practical recording formats. Therefore, this study proposes a simple sustainable accounting model based on a chart of accounts (COA) framework and economic, environmental, and social performance indicators to enhance transparency, efficiency, and the sustainability of clove farming.*

Abstrak: Penelitian ini bertujuan mengidentifikasi praktik pencatatan hasil dan pengelolaan keuangan usahatani cengkeh, menganalisis tantang an penerapan akuntansi berkelanjutan, serta merumuskan model pencata tan sederhana untuk mendukung keberlanjutan usaha tani. Metode penelitian menggunakan pendekatan deskriptif kualitatif dengan studi kasus melalui observasi, wawancara, kuesioner, dan dokumentasi. Anali sis data dilakukan secara tematik untuk mengungkap pola pencatatan, permasalahan, dan peluang penerapan akuntansi berkelanjutan. Hasil penelitian menunjukkan bahwa usahatani cengkeh memiliki potensi besar, namun sangat dipengaruhi oleh waktu panen dan kondisi cuaca. Praktik pencatatan keuangan petani masih sederhana, bersifat musiman, bercampur dengan keuangan rumah tangga, serta belum mencatat aset biologis dan aspek lingkungan. Hambatan utama meliputi rendahnya literasi akuntansi, keterbatasan sarana digital, fluktuasi harga, dan ketiada an format pencatatan praktis. Oleh karena itu, penelitian ini mengusulkan model akuntansi berkelanjutan sederhana berbasis kerangka akun (COA) dan indikator kinerja ekonomi, lingkungan, serta sosial untuk meningkat kan transparansi, efisiensi, dan keberlanjutan usahatani cengkeh.

INTRODUCTION

Agriculture is a vital sector that serves as a primary pillar of Indonesia's economy, particularly in rural areas. Plantation commodities such as clove (Syzygium aromaticum) play a strategic role as a source of community income and as a driver of regional economic growth. Indonesia is among the world's leading producers and exporters of cloves, contributing significantly to the national plantation sector (BPS, 2024; Mooduto et al., 2021). Consequently, clove farming is one of the most important agricultural activities in Indonesia, contributing to farmers' income and overall welfare.

Clove is a strategic plantation commodity with high economic potential and a substantial role in the agrarian economy across much of Indonesia (Muis & Abubakar, 2025). However, challenges such as price fluctuations, climate change, and limited access to technology and information make the sustainability of clove farming a critical issue that must be addressed seriously (Nurmala & Asse, 2020). In Kolaka Regency, particularly in Puu Lawulo Village, clove farming serves as the main livelihood for most residents, yet it still faces challenges in terms of production record-keeping and financial management.

Table 1. Number of Individual Agricultural Enterprises by the Ten Most Commonly Cultivated Agricultural Commodities in Kolaka Regency (units)

No	Agricultural Commodities	Number of Individual Agricultural Enterprises Engaged in the Commodity (units)	Rank
1	Clove	15.01	1
2	Cocoa	4.238	2
3	Coconut	3.875	3
4	Beef Cattle	3.002	4
5	Hybrid Paddy	2.903	5
6	Non-Hybrid Paddy	2.878	6
7	Native Chicken	2.839	7
8	Oil Palm	2.529	8
9	Other Durian	1.755	9
10	Pepper	1.553	10

Source: (Badan Pusat Statistik Indonesia, 2023)

Table 1 shows that clove farming dominates with a total of 15,010 individual agricultural enterprises, far exceeding other commodities. Cocoa and coconut rank second and third, with approximately 4,000 units each. Meanwhile, commodities such as beef cattle, rice (hybrid and inbred varieties), and native chickens range between 2,800 and 3,000 units. Other commodities such as oil palm, durian, and pepper show relatively smaller numbers, below 2,600 units. The dominance of clove farming underscores its importance as a key driver of Kolaka's local economy and highlights the urgency of implementing sustainability accounting in clove farming to ensure systematic financial

management that supports long-term sustainability. In practice, most local clove farmers have not yet implemented adequate financial record-keeping systems. Records of harvest yields, operational expenses, and cash flow management are still conducted in a simple and often informal manner. In fact, a well-structured accounting system can serve as a solid foundation for better decision-making, reduce the risks associated with market price fluctuations, and strengthen farmers' economic resilience (Amin et al., 2023). From the perspective of sustainable development, accounting serves not only as a tool for recording transactions but also as a strategic instrument for evaluating, planning, and maintaining the balance among economic, social, and environmental dimensions. Sustainability accounting emphasizes transparency and accountability in business management, including in the agricultural sector, to ensure business continuity and the welfare of future generations (Gray, 2010; Schaltegger & Burritt, 2017).

Sustainability accounting, as an approach that integrates economic, social, and environmental aspects into farm record-keeping and reporting, represents an important innovation to promote transparency and sustainability in agricultural enterprises(Amelisa & Sisdianto, 2024). ts implementation enables farmers to systematically record production outcomes while also assessing the environmental and social impacts of their farming activities. This approach is highly relevant for clove farming in Puu Lawulo, where efficient resource management and accountable business reporting are essential for improving competitiveness and ensuring sustainability. The application of sustainability accounting in clove farming can help farmers maintain systematic records while fostering future-oriented planning and long-term sustainability. The lack of even basic accounting practices at the farmer level results in weak control over production costs, revenues, and long-term business planning. In contrast, a structured record-keeping system can help farmers understand the financial condition of their farms, determine production strategies, and manage market uncertainties more effectively.

The concept of sustainability accounting emerges as an approach that goes beyond merely recording economic transactions it also considers social and environmental aspects in decision-making(Gray, 2010). mplementing sustainability accounting in small-scale farming has the potential to strengthen farmers' resilience to risks while improving the efficiency and sustainability of their operations. According to T. Agustina et al., (2022); Y. Agustina & Augustine (2024) business sustainability refers to an enterprise's ability to maintain its existence over time, uphold its core values or organizational culture, and achieve stable or even continuously increasing profits.

Business sustainability also requires accounting information that helps organizations evaluate their financial performance (Arifianti & Widianingsih, 2023; Badan Pusat Statistik Indonesia, 2023).

Based on this background, this study aims to examine how clove farmers in Puu Lawulo Village record their financial activities, identify the challenges they face in implementing sustainability accounting, and explore how sustainability accounting can support the long-term sustainability of clove farming. The case study in Puu Lawulo Village is particularly relevant because it illustrates the real conditions of record-keeping and financial management practices in smallholder farming, the challenges in adopting sustainability accounting, and the opportunities to design a simple model suited to the local context. This research is expected to contribute theoretically to the development of sustainability accounting in the agricultural sector and practically by providing an applicable financial record-keeping guide for clove farmers in Kolaka.

METHOD

Qualitative research is a type of research that prefers to describe phenomena and problems using words rather than numerical data. This method is used to obtain deep, meaningful, and authentic data (Sugiyono, 2019). The qualitative approach was chosen because it allows for a more comprehensive and holistic understanding of the observed phenomena, enabling the researcher to explore the views, attitudes, and perceptions of clove farmers in depth. The research was conducted in clove farming areas located in Puu Lawulo Village, Samaturu District, Kolaka Regency, Southeast Sulawesi. The research informants were clove farmers in Puu Lawulo Village, selected based on specific criteria relevant to the study's objectives. The sampling technique used in this research was saturation sampling (census sampling).

In qualitative studies, sampling typically continues until the point of data saturation, which is when no new information or themes emerge from the data. Therefore, in qualitative research, it is essential that the sample provides sufficient information to answer the research questions (Kusumastuti & Khoiron, 2019). This aligns with Sugiyono (2019), who states that in qualitative research, the number of informants is not predetermined but is adjusted until the data are considered saturated. This study falls under the category of qualitative descriptive research with a case study as the main strategy. The goal is to gain an in-depth understanding of farmers' practices and perceptions regarding sustainability accounting. The qualitative descriptive method was

used to explore and understand clove farmers' perceptions and practices of sustainability accounting as an effort to promote sustainable agriculture.

Data collection was carried out through direct observation of the farms and farmers' households, as well as interviews. The interviews were guided by an interview protocol containing open-ended questions that allowed respondents to answer freely, thus providing more detailed and in-depth insights into their views and practices related to sustainability accounting. The collected data were analyzed based on interview results and field observations of clove farming activities. Descriptive qualitative analysis was employed to provide clear descriptions and generate a comprehensive understanding aimed at answering the research questions: how do clove farmers in Puu Lawulo Village record their financial activities; what challenges do they face in implementing sustainability accounting; and how can sustainability accounting support the sustainability of clove farming.

RESULTS AND DISCUSSION

Results

Puu Lawulo Village, located in Samaturu District, Kolaka Regency, has a population of approximately 1,770 people, with a higher number of males (975) than females (795). The majority of the village's residents rely on the agricultural sector, particularly clove farming, which serves as the main commodity. In addition, the community is also engaged in small-scale livestock farming, such as raising native chickens and ducks, as well as fishing activities supported by traditional fishing tools. Although agriculture and livestock farming contribute significantly to the village economy, the community faces major challenges, particularly limited access to adequate healthcare and educational facilities. Basic infrastructure, such as village roads and public safety facilities, is still under development. With a relatively large population and a livelihood that primarily depends on the agrarian sector, Puu Lawulo Village, Samaturu District, Kolaka Regency, continues to strive toward improving community welfare through infrastructure development and enhancement of public facilities (Badan Pusat Statistik, 2020).

This study focuses on clove farming in Puu Lawulo Village to address research questions related to the implementation of Sustainability accounting in clove farming enterprises. A total of four respondents participated in this study Mr. Dg. Matiro, Mr. Dg. Mangile, Mr. Bedu, and Mr. Yalla all of whom are experienced clove farmers with years of involvement in managing their farming businesses. These respondents demonstrated

a high level of willingness to provide the information required for the study. They openly shared their experiences and data related to the accounting practices applied in their clove farming operations, including the challenges they faced and how the implementation of sustainability accounting influences the continuity of their businesses. Their active participation greatly assisted the researcher in obtaining accurate and relevant information to comprehensively answer the research questions. Data collection in this study was conducted using two main approaches: direct observation and interviews. Direct observation was carried out by visiting the clove farmers' fields and homes in Puu Lawulo Village to observe firsthand the farming practices and accounting applications within their business activities. This approach aimed to gain a more comprehensive understanding of their agricultural practices and the extent to which accounting is applied in their operations.

In addition to observation, interviews served as a key data collection method. The interviews were conducted using an interview guide containing open-ended questions that allowed respondents to answer freely. This approach provided respondents with the opportunity to share their views, experiences, and perceptions regarding sustainability accounting practices in clove farming. Through this method, the researcher was able to obtain more in-depth and detailed data, offering richer insights into the challenges, benefits, and implementation of sustainability accounting among clove farmers in Puu Lawulo Village. The data collected in this study were analyzed using descriptive qualitative analysis was conducted to gain deeper insights into how financial record-keeping practices are applied by clove farmers, the obstacles they face in implementing sustainable accounting, and how the adoption of sustainability accounting can support the long-term sustainability of clove farming.

1. Financial Record-Keeping Practices of Clove Farmers

Based on interviews with clove farmers in Puu Lawulo Village, it was found that financial record-keeping practices in clove farming remain simple and unstructured. Most farmers do not maintain a formal bookkeeping system; instead, they rely on personal memory, handwritten notes in notebooks, or irregular records to document expenses and harvest revenues. The majority of farmers do not consider financial record-keeping a primary priority in managing their farms, as their main focus is on crop productivity and the harvesting process. As a result, information related to net income, profit margins, or cost efficiency cannot be accurately identified from the farmers' perspective. The types of expenses incurred by clove farmers can generally be divided

into two categories: primary expenses and additional expenses. Primary expenses focus on the purchase of materials and agricultural tools directly used in farming activities, such as fertilizers, grass-cutting machines, and labor wages. Meanwhile, additional expenses are related to operational and supporting needs, such as electricity, fuel, and other miscellaneous materials.

Table 2 Details of Clove Farmers' Expense Sources

No	Item	Units	Cost (IDR)	Description
Primary expenses				
1	Daily Clove Picker	1 Person	100,000 - 150,000	Daily wage for harvesting workers
2	Piece-Rate Picker	1 Liter	5,000	Payment per liter of harvested cloves
3	Fertilizer	50 Kg	165,000 - 250,000	Subsidized and non-subsidized (retail)
4	Herbicide	10L	330,000	Used for an area of 1 hectare
5	Clove-Picking Ladder	1 Pc	350,000	Average need of 10–40 ladders per harvest season
6	Ladder Rope	2 Kg	100,000	Required for each picking ladder
7	Food Supplies	1 Week	500,000 - 2,000,000	Depends on the number of workers during the harvest season
Additional expenses				
1	Tarpaulin (3x4 m)	1 Pc	75,000	30–50 tarpaulins needed per harvest season
2	Sack	1 Pc	4,000	Holds 65–80 kg of dried cloves
3	Raffia Rope	1 Roll	20,000	One roll weigh approximately 1 kg
4	Plastic Bag (80×120 cm)	1 pc	10,000	Used to protect cloves during rainy season (50–100 pcs per season)
5	Fuel (Gasoline)	1 Liter	10,000	For two operational motorcycles, 10 liters per week
6	Electricity	1 Month	200,000	For farmhouse electricity needs
7	Water Tower (Storage Tank)	1 pc	1,500,000	Farmers typically require at least 2 units
8	Water Drum	1 pc	400,000	Farmers typically require at least 4 units
9	Sprayer Machine (Steam)	1 Pc	2,000,000	Used for spraying purposes
10	Water Hose	50 Mtr	500,000	Used with the water pump
11	Other Expenses	1 Bulan	4,000,000	Unexpected costs such as machine maintenance, entertainment, or house repairs

Source: Field observation and interviews, 2025.

Table 2 above illustrates the various expenses associated with clove farming in Puu Lawulo Village, which are divided into primary expenses and additional expenses. The primary expenses include labor costs, such as daily wages for clove pickers ranging from IDR 100,000 to 150,000 per person per day, and piece-rate payments based on the volume of cloves harvested, amounting to IDR 5,000 per liter. According to the interviewed clove farmers, on average, each picker can harvest between 30 liters and 80 kilograms per day during the clove harvesting season. In addition, primary expenses also cover the purchase of fertilizer, which ranges from IDR 165,000 to 250,000 per 50 kg,

and herbicide used for one hectare of farmland at a cost of around IDR 330,000 for 10 liters. Other expenses include the purchase of clove-picking ladders priced at IDR 350,000 per unit, ladder ropes costing IDR 100,000 per ladder, and food supplies for workers ranging from IDR 500,000 to 2,000,000 per week, depending on the number of workers employed. Meanwhile, additional expenses include various tools and materials used to support farming activities. For instance, a 3×4 m tarpaulin costs about IDR 75,000 per unit, with an average requirement of 30 to 50 tarpaulins per harvest season. Sacks used for storing dried cloves are priced at IDR 4,000 each, while raffia rope costs IDR 20,000 per roll and is used for tying cloves. Plastic bags for maintaining clove quality during the rainy season cost IDR 10,000 each, with 50 to 100 bags needed per season.

Other operational expenses include fuel for motorcycles used in farming operations (IDR 10,000 per liter), electricity costs of IDR 200,000 per month for the farmhouse, and the purchase of water towers and water drums, priced at IDR 1,500,000 and IDR 400,000 per unit, respectively. Additional costs also cover sprayer machines priced at IDR 2,000,000, water hoses costing IDR 500,000 per 50 meters, and miscellaneous expenses such as machine maintenance, entertainment, and house renovations totaling around IDR 4,000,000 per month. Overall, these expenses reflect the costs required to ensure the smooth operation and sustainability of clove farming in Puu Lawulo Village, Kolaka Regency, encompassing labor, agricultural materials, equipment, and other operational needs.

Table 3 Details of Clove Farmers' Income Sources

No.	Item	Units	Cost (IDR)	Description
Main Income				
1	Fresh Cloves	1 Kg	21,000 - 30,000	Main product sold before drying process
2	Dried Cloves	1 Kg	80,000 - 115,000	Main product sold after drying process
3	Dried Clove Stems	1 Kg	9,000 - 15,000	By-product sold after separating from cloves
4	Dried Clove Leaves	1 Kg	1,800 - 2,200	Usually sold to local buyers for essential oil processing
Additional Income				
1	Petai	1 Kg	30,000	Prices fluctuate according to middlemen's buying prices (estimated for 2025)
2	Rambutan	1 Kg	5,000	
3	Langsat	1 Kg	3,000	
4	Montong Durian	1 Pc	60,000	
5	Local Durian	1 Pc	10,000	
6	Kelapa Tua	1 Pc	5,000	
7	Cocoa	1 Kg	80,000 - 110,000	
8	Oil Palm Fruit	1 Kg	2,000 - 2,500	

Source: Field observation and interviews, 2025.

Table 3 details the various commodities that serve as income sources for farmers in Puu Lawulo Village, categorized into main and additional income, with prices projected to fluctuate in 2025. The main income comes from clove-related commodities, including the prices of fresh cloves (IDR 21,000–30,000 per kg), dried cloves (IDR 80,000–115,000 per kg), dried clove stems (IDR 9,000–15,000 per kg), and dried clove leaves (IDR 1,800–2,200 per kg). These prices are expected to fluctuate depending on market conditions and purchasing prices, which may be influenced by production factors and market demand. The additional income is derived from other commodities that, while not as significant as cloves, still contribute to household earnings. These include petai (IDR 30,000 per kg), rambutan (IDR 5,000 per kg), langsat (IDR 3,000 per kg), and local durian varieties Montong durian priced at IDR 60,000 per fruit and local durian priced at IDR 10,000 per fruit as well as mature coconuts sold at IDR 5,000 per fruit.

In addition, among the four respondents in this study, Mr. Harisa is the only farmer who owns oil palm as a supplementary crop besides his primary clove farming. Oil palm is estimated to be priced at IDR 2,000–2,500 per kg in 2025, although this price may also fluctuate depending on market conditions and demand. As an oil palm owner, Mr. Harisa gains additional income from palm harvests, which helps strengthen his household economy particularly in facing the uncertainty of clove prices. The presence of oil palm as an additional commodity provides him with the advantage of income diversification, reducing dependency on a single crop. Overall, the commodities listed in this table reflect the diverse income sources available to farmers in Puu Lawulo Village, which depend on the variety of agricultural products they cultivate. As noted by(Mooduto et al., 2021) although cloves remain the primary and relatively stable commodity, the cultivation of other crops offers opportunities for supplementary income that help reduce dependency on a single commodity and mitigate the risks of price fluctuations.

Findings on Clove Farming Accounting Practices in Puu Lawulo Village

Based on the collected data, the financial recording system in clove farming in Puu Lawulo Village remains very simple and limited. Most records are kept on a cash and seasonal basis, where financial transactions are only documented during the harvest season from July to November, depending on the yield. Outside the harvest period, transactions are rarely recorded, leading to a lack of systematic financial management throughout the year.

Financial records are typically kept using basic tools, such as notebooks or handwritten receipts, without a more formal or structured bookkeeping format that

includes cash flow statements, inventory records, or accounts payable/receivable. This shows that financial management at the farmer level still relies heavily on manual note-taking, without an organized accounting system. Furthermore, there is no clear separation between household and business finances. Daily household expenses such as rice, fuel, and phone credit are often mixed with farm-related costs, including fertilizers, pesticides, and clove picker wages. This overlap indicates that farmers do not differentiate between personal and business funds, making it difficult to monitor and manage costs efficiently.

Another issue lies in the unrecorded inventory and assets. Items such as fertilizers, sacks, and ropes are treated as consumables and not recorded, creating ambiguity in asset ownership. Likewise, biological assets such as clove trees are not registered or depreciated. Agricultural tools such as saws, harvesting poles (dodos), ladders, and sprayers are also not recorded as fixed assets, neglecting the importance of asset valuation and depreciation for more accurate financial analysis. In terms of labor costs and profit-sharing, wage calculations for clove pickers and profit distribution to workers are done globally per harvest, without classification based on product quality (wet/dry) or per plot/hectare of land. This makes it difficult to analyze costs in detail and to determine the exact expense associated with each product type.

Regarding pricing and harvest quality, although the weight (in kilograms) and price of cloves are recorded, farmers rarely differentiate based on quality for example, between high-quality dried cloves and lower-quality ones (such as “white cloves” caused by poor drying during the rainy season) or by plantation location. This lack of classification reduces the farmers’ ability to evaluate product quality and determine appropriate pricing. Another issue identified is the inconsistent recording of debts and advances with traders or middlemen. Although farmers often take on credit for farming inputs or receive advance payments from collectors, these balances are rarely recorded systematically. This adds uncertainty to financial management, as there is no clear record of outstanding liabilities.

In addition, farmers do not prepare periodic financial reports, such as monthly or annual summaries, Break-Even Point (BEP) analyses, or cash flow projections. This demonstrates that financial management among farmers remains limited to basic record-keeping, which does not provide a clear picture of the overall financial condition of their farming business. The current format used by most farmers such as a “harvest cash book” typically includes the date, quantity of wet cloves, conversion to dried cloves, price per kilogram, total revenue, picker wages (daily or per liter), and net income received.

However, there is no systematic monthly recap for expenses such as fertilizer or pesticide purchases, which would help farmers better control their spending. Overall, the financial recording system applied by clove farmers in Puu Lawulo Village remains highly rudimentary, with no clear distinction between household and business finances. This highlights the need for improvement in the bookkeeping system toward a more structured and standardized model, enabling farmers to manage their finances more efficiently and maximize the potential of their clove farming enterprises.

General Analysis of Clove Farming

Mature clove trees in Puu Lawulo Village are estimated to produce around 3 tons of cloves per hectare during a single harvest season. Clove trees begin bearing fruit at around five years of age and can remain productive for up to 40 years, making clove farming a long-term and potentially profitable agricultural investment. However, productivity largely depends on weather conditions and the quality of plant maintenance. At maturity, each clove tree can yield 20–30 kilograms of dried cloves per year, depending on tree size and fertility. Under optimal conditions, a single clove tree can produce 100–200 liters of fresh cloves. Since 1 kilogram of dried cloves is equivalent to about 5–7 liters of fresh cloves, the total amount of fresh cloves produced per tree ranges between 100 and 210 liters per year.

Harvest Period and Weather Influence

The normal clove harvest period typically lasts 3 to 4 months, starting around June or July, depending on seasonal patterns. During this time, harvesting efficiency is high if the weather is favorable. Under normal (dry) weather conditions, cloves can be dried within 3 to 4 days after picking. However, during the rainy season, the drying process may take much longer up to 10 days depending on the intensity and duration of rainfall.

If weather conditions are unfavorable or if harvesting is delayed, the harvest period can extend to 5 to 7 months, which can negatively affect both the quality and the selling price of the cloves. Cloves that are not harvested at the peak ripening time due to bad weather or delays become overripe, resulting in lower quality and significantly reduced market value compared to cloves harvested at the ideal time.

The Importance of Harvest Time Management

Timely harvesting is crucial to ensuring both the quality and market price of cloves. If harvesting is delayed, the cloves become old and lose their commercial value due to a sharp decline in quality. Furthermore, since the growth period from budding to full

maturity takes around 5 to 6 months, unstable weather conditions during this phase can significantly affect the final yield. If heavy rain or poor weather persists during this growth period, the development of the cloves may be hindered, thereby reducing the total production for that season.

Environmental Factors Affecting Clove Production

Weather and environmental conditions play a major role in determining the productivity and quality of clove yields. As a crop that is highly sensitive to climatic variations, clove trees are vulnerable to extreme weather changes whether droughts or excessive rainfall. Therefore, effective climate monitoring and adaptive management strategies are essential in clove farming. Farmers must closely observe weather patterns and take preventive measures to minimize potential negative impacts, such as delayed harvesting or reduced clove quality, ensuring that production remains stable and sustainable.

2. Barriers to Implementing Sustainability Accounting

Based on data obtained from interviews and field observations, several challenges were identified among clove farmers in Puu Lawulo Village regarding the implementation of accounting practices. These challenges are related to knowledge, operational, economic, market, environmental, and social aspects.

a. Knowledge and Perception Barriers

Most farmers believe that accounting is only relevant for large companies and not applicable to small-scale farming activities. As a result, they do not fully recognize the long-term benefits of proper accounting practices in managing farm finances. During an interview, Mr. Dg. Mangile, one of the clove farmers in Puu Lawulo Village, stated: "*It's difficult for us to make those records because we think it's only about money coming in and going out and the money that comes in is used for operations during the clove season*." This statement reflects the views of many farmers in the village, who perceive financial record-keeping merely as simple cash flow tracking recording income and expenses primarily during the harvest season. This issue is also linked to the technical language and format of accounting, where terms such as Chart of Accounts (COA), biological assets, depreciation, and provisions are unfamiliar and difficult for farmers to understand. Consequently, they struggle to comprehend and implement structured bookkeeping practices. This reluctance to record transactions in greater detail hinders the development of a more effective and organized financial

system, which in turn limits their ability to manage farming operations more efficiently and sustainably.

b. Operational Barriers

According to Mr. Yalla, another clove farmer in Puu Lawulo Village: *"The clove season normally lasts three months, but sometimes it gets longer due to the weather. This year (2025), the harvest time is uncertain it could even last until early next year (2026)."* This statement illustrates that although the clove harvest season typically lasts for about three months (July/August to October/November), weather conditions can affect its duration, sometimes extending it until the following year. This creates seasonal and timing challenges, as farmers' main workload occurs during the harvest period when labor demand is extremely high. Consequently, financial record-keeping is often delayed or neglected. Under such circumstances, maintaining consistent and organized financial management becomes difficult because farmers prioritize operational activities and harvesting, while systematic accounting is often overlooked. Limited Access to Digital Tools: Although most farmers own mobile phones, they are not accustomed to using digital applications (such as the LinkTani financial app) or Excel files for bookkeeping. Moreover, limited internet connectivity in plantation areas further restricts the use of efficient digital systems for recording and reporting transactions. Fragmented Land Plots: Some farmers' plantations are spread across multiple plots, making it difficult to compile financial records for each block without a simple and practical recording template. This fragmentation complicates efforts to maintain structured and transparent financial documentation.

c. Economic and Market Barriers

High Price Fluctuations: The frequent fluctuations in clove prices cause farmers to prioritize immediate cash inflows over detailed financial documentation. This leads to a lack of comprehensive records and weak control over long-term financial planning. Access to Financing: Agricultural financing programs often require even basic financial reports. However, since farmers lack structured financial documentation, they are forced to rely on loans from middlemen or collectors at higher interest rates. This deepens their dependence on informal and costly sources of funding.

d. Environmental and Social Barriers (Specific to Sustainability Accounting)

a) Environmental Data Not Recorded.

Farmers have not been documenting data related to pesticide use, mulching, shade trees, or soil erosion all of which are critical components of sustainable accounting.

This limits the implementation of sustainability principles in clove farming. According to Julianti et al., (2024), continuous environmental recording contributes to sustainable agriculture, which is essential for maintaining ecological balance and natural resources. Therefore, accounting should not only record economic transactions but also serve as a strategic tool for promoting agricultural sustainability through transparent reporting of environmental impacts. In the context of clove farming in Puu Lawulo, this principle can be applied by recording fertilizer and pesticide usage, as well as soil conservation activities, as part of a sustainability accounting framework.

b) Social Costs Not Accounted.

Social costs such as worker safety during tree climbing, personal protective equipment (PPE), working hours, and seasonal insurance are not included as cost components in farmers' financial records. These costs, however, are essential for ensuring business sustainability and worker welfare.

c) Concern about "Increased Complexity".

Farmers often worry that implementing a sustainability accounting system will complicate their existing routines. Hence, they prefer simplified templates and short training sessions to help them understand how to record and report relevant information without adding to their workload.

Overall, these challenges indicate that clove farmers in Puu Lawulo Village require a simpler and more comprehensible approach to implementing accounting practices. Moreover, support in the form of short training programs and user-friendly digital tools would greatly assist in overcoming existing barriers, enabling farmers to gradually adopt sustainability accounting practices that enhance both their economic resilience and environmental stewardship.

3. Sustainability Accounting supporting the Sustainability of Clove Farming

In sustainable clove farming, the implementation of a simple and relevant Chart of Accounts (COA) is essential to ensure transparency and better financial management. Based on the data collected, the following outlines the key components that should be considered in the bookkeeping and sustainability accounting framework for clove farming enterprises

Table 4 Minimal Relevant Chart of Accounts (COA)

No.	Account	Description
1. Income		
1.1	Dried Clove Sales (A1)	Main income from the sale of dried cloves produced from the plantation. Prices are expected to fluctuate according to market conditions.
1.2	Loss/Grade-Down (A2)	Income lost due to quality degradation of cloves that cannot be sold at normal prices, such as cloves dried naturally or affected by rain.
2. Direct Costs		
2.1	Harvesting Wages (B1)	Labor costs for workers hired to pick cloves.
2.2	Drying (B2)	Expenses for the clove-drying process, either by oven or sun-drying.
2.3	Sacks & Rope (B3)	Costs for purchasing sacks and ropes used for storing and transporting cloves.
2.4	Transportation (B4)	Expenses for transporting cloves from the farm to drying areas or collectors.
3. Agronomic Costs		
3.1	Organic/Inorganic Fertilizer (C1)	Expenses for purchasing fertilizers to maintain soil fertility.
3.2	Pesticides (C2)	Expenses for purchasing pesticides to protect clove trees from pests and diseases.
3.3	Mulch & Green Manure (C3)	Costs for using mulch to maintain soil moisture and suppress weeds.
3.4	Shade Trees (C4)	Costs for planting shade trees to help maintain the microclimate balance within the plantation.
3.5	Pruning (C5)	Expenses for pruning clove trees to improve productivity.
3.6	Terrace & Anti-Erosion Maintenance (C6)	Expenses for maintaining terrace structures and soil erosion control.
4. Safety & Social Costs		
4.1	Climbing PPE (D1)	Expenses for purchasing personal protective equipment for workers climbing clove trees.
4.2	Occupational Safety Training (D2)	Costs for providing occupational health and safety (OHS) training to workers.
4.3	Seasonal Work Insurance (D3)	Costs for providing insurance coverage to workers during the harvest season.
4.4	Worker Consumption (D4)	Expenses for food and daily needs of workers during the harvest season.
5. Assets and Rehabilitation		
5.1	Equipment (E1)	Expenses for purchasing agricultural tools and machinery, depreciated according to their useful life.
5.2	Tree Rejuvenation Fund (E2)	Funds allocated for replanting and rejuvenating unproductive clove trees.
5.3	Farm Roads & Water Channels (E3)	Costs for maintaining infrastructure such as farm roads and irrigation systems that support agricultural operations.
6. Financial Accounts		
6.1	Loan Interest (F1)	Interest expenses from loans used as farming capital.
6.2	Exchange Rate/Price Variance (F2)	Income or expenses related to fluctuations in exchange rates or commodity prices.
6.3	Accounts Receivable/Payable (F3–F4)	Recording of receivables arising from transactions with collectors or suppliers, and payables that must be settled.

Easily Recorded Sustainable Key Performance Indicators (KPIs)

To ensure that clove farming operations are managed sustainably, several Key Performance Indicators (KPIs) should be monitored regularly:

1) Economic: Measure the cost per kilogram of dried cloves, Break-Even Point (BEP), profit margin per plot, and the debt-to-income ratio each season.
2) Environmental: Track fertilizer and pesticide use per hectare, the number of shade trees per hectare, and the total workdays dedicated to soil conservation.
3) Social/Occupational Health and Safety (OHS): Monitor the number of accident-free workdays, the number of workers trained in safe climbing techniques, and the availability of personal protective equipment (PPE) for workers.

Sustainability Accounting Practices and Direct Benefits

The adoption of sustainability accounting practices provides several direct benefits for farmers, including:

1) Cost Allocation per Plot & Activity: Enables identification of plots that are inefficient in pesticide use or particularly productive, supporting more accurate decisions in pruning, fertilization, and planting shade trees.
2) Tree Rejuvenation Fund (Provision): Encourages farmers to allocate a portion of income during high-price periods as a rejuvenation reserve fund, which can later be used for replanting or heavy pruning without relying on seasonal debt.
3) Quality and Shrinkage Tracking: Differentiating between oven-dried and sun-dried cloves helps improve profit margins and ensures consistent quality.
4) Documented OHS Practices: Reduces work-related accidents and provides an advantage for farmers seeking access to financing or partnerships, as documentation demonstrates responsible management.
5) Environmental Stewardship Record: Practices such as planting shade trees and implementing soil conservation measures help maintain land resilience and ensure long-term productivity.

One-Page Seasonal Record Package

To simplify and systematize financial documentation, farmers can use a simple one-page record package each season that includes:

1) Harvest Cash Book: A log of all financial transactions during the harvest season.
2) Agronomic Cost Card per Plot: A record of all agronomic expenses for each plantation block.

3) OHS & Social Log: A record of worker safety and social welfare activities.
4) Seasonal KPI Summary: A concise report of seasonal KPIs, including BEP, cost per kilogram, and profit margin per plot.
5) Farm Savings (Rejuvenation Fund): A record of allocated deposits for tree rejuvenation or replanting.

Simple Journal Illustration (Optional)

Simple yet effective accounting can be implemented through a basic journal format, recording transactions such as:

Transaction	Journal Entry
Clove Sales	(Dr) Cash ..... xxxx (Cr) Clove Sales xxxx
Payment of Picker Wages	(Dr) Harvest Expense ..... xxxx (Cr) Cash xxxx
Purchase of Sprayer	(Dr) Equipment ..... xxxx (Cr) Cash / Accounts Payable xxxx
Monthly Depreciation	(Dr) Depreciation Expense ..... xxxx (Cr) Accumulated Depreciation xxxx
Tree Rejuvenation Fund	(Dr) Rejuvenation Expense ..... xxxx (Cr) Rejuvenation Fund (Liability/Equity) xxxx

Frequency and Institutional Roles

Accounting records are maintained at frequencies that align with the farming activities, including daily, monthly, seasonal, and annual recordings. Farmer groups or cooperatives play an important role in providing mentorship, short training sessions, and light audits to facilitate collective access to financing. With a more structured bookkeeping and accounting system, clove farmers can manage their operations more efficiently, improve productivity, and ensure the long-term sustainability of clove farming in the future.

CONCLUSION

Clove farming in Puu Lawulo Village holds significant potential, with an estimated yield of 3 tons per hectare for mature trees. However, the success of this farming activity greatly depends on harvest time management and weather conditions. Unexpected weather changes can prolong the harvest period and reduce clove quality, ultimately affecting selling prices. Therefore, farmers must manage harvest timing carefully and monitor weather conditions to ensure optimal yields and prevent quality deterioration that could lead to financial losses. Based on the research findings, it can be concluded that the financial recording system used by farmers remains simple, seasonal, and not

separated from household finances. Recording activities are generally carried out only during the harvest season, while outside of it, no systematic documentation is maintained. Moreover, biological assets, equipment, and environmental data such as fertilizer and pesticide usage or soil conservation activities are not recorded in the bookkeeping system, resulting in incomplete documentation of financial and environmental information.

The main challenges faced by farmers include low literacy levels and limited understanding of accounting importance, the perception that bookkeeping is only for large enterprises, and time constraints due to heavy workloads during harvest seasons. In addition, inadequate digital infrastructure, high clove price fluctuations, and the absence of practical record-keeping formats further widen the gap in sustainability accounting implementation. Consequently, financial, asset, and environmental management in farming is still carried out intuitively, without analytical support to ensure long-term sustainability. To improve financial management effectiveness and the sustainability of clove farming, a simple and adaptive sustainability accounting model suited to farmers' conditions is needed. Farmers are encouraged to begin using a basic Chart of Accounts (COA) that includes key components such as income, direct costs, agronomic costs, occupational safety (OHS), and business assets. In addition, the introduction of Key Performance Indicators (KPIs) covering economic, environmental, and social aspects is recommended so that farmers can evaluate the efficiency and impact of their operations comprehensively. This approach is expected to enhance financial transparency, cost efficiency, and awareness of environmental and social aspects, enabling clove farming in Puu Lawulo Village to develop into a competitive and sustainable smallholder agricultural enterprise.

Furthermore, this study has several limitations that should be noted. First, the small number of respondents only four farmers make the findings descriptive and not generalizable to all clove farmers in Puu Lawulo or other regions. Second, most of the data collected were qualitative, relying on interviews and field observations, and therefore did not capture comprehensive quantitative aspects such as block-level productivity, transaction volumes, or profit margin variations per hectare. Third, environmental and social variables in the context of sustainability accounting were not fully measurable due to the absence of historical data on pesticide use, soil conservation, and occupational safety practices.

Therefore, future research is recommended to involve a larger number of respondents, apply a mixed-methods approach combining qualitative and quantitative

techniques, and develop a digital bookkeeping template based on COA and KPI that can be directly tested in field practices. With such advancements, future studies are expected to provide a more comprehensive and applicable sustainability accounting model for clove farmers and other smallholder agricultural sectors.

REFERENCES

Agustina, T., Dwianto, S., Trenggana, A., Khairani, E., Laksmana, K., Anisah, H., Sianipar, M., Widati, E., Saputra, M., Susanti, N., Vikaliana, R., & Harto, B. (2022). BUSINESS SUSTAINABILITY: CONCEPTS, STRATEGIES AND IMPLEMENTATION. Penerbit Media Sains Indonesia.

Agustina, Y., & Augustine, Y. (2024). TOWARDS A MATURITY MODEL FOR ACCOUNTING AND FINANCIAL SUSTAINABILITY IN INDONESIAN MSMES: INSIGHTS FROM A SYSTEMATIC LITERATURE REVIEW. Indonesian Jou of Sustainability Accounting and Management, 8(1), 336–368.

Amelisa, D., & Sisdianto, E. (2024). INDIKATOR LINGKUNGAN PADA TINGKAT PERTANIAN: RELEVANSI DAN IMPLEMENTASI AKUNTANSI HIJAU DI EROPA. Jurnal Intelek dan Cendikiawan Nusantara, 1(6), 9192–9201.

Amin, A., Hala, Y., Ibrahim, I., Diana, F., & Hatidjah, S. (2023). PENINGKATAN KAPASITAS PETANI MELALUI PELATIHAN PEMBUKUAN SEDERHANA DI DESA KABBA KABUPATEN PANGKEP. Journal of Training and Community Service Adpertisi (JTCSA), 3(1), 1–6.

Arifianti, N. P., & Widianingsih, L. P. (2023). KUALITAS PENGUNGKAPAN SDGS: APAKAH BERPENGARUH TERHADAP KINERJA KEUANGAN PERUSAHAAN SEKTOR ENERGI DAN BAHAN BAKU DI INDONESIA? Jurnal Reviu Akuntansi dan Keuangan, 13(2), 269–288.

Badan Pusat Statistik. (2020). KECAMATAN SAMATURU DALAM ANGKA 2020. https://ppid.kemendagri.go.id/storage/dokumen/Vyihf56CQ5MSR6kVElZo6Iquv1Wxon3zDDHDk9uS.pdf

Badan Pusat Statistik Indonesia. (2023). HASIL PENCACAHAN LENGKAP SENSUS PERTANIAN 2023. Sensus Pertanian, 28.

Biduri, S., Wardani, D. P. K., Hermawan, S., & Hariyanto, W. (2021). SKEPTISME PELAKU USAHA MIKRO TERHADAP STANDAR AKUNTANSI. Jurnal Akuntansi Multiparadigma, 12(2), 431–448.

BPS. (2024). STATISTIK PERKEBUNAN INDONESIA: KOMODITAS CENGKEH 2022–2024.

Dolorosa, E., Suswati, D., Nusantara, R. W., & Sawerah, S. (2025). OPTIMALISASI PENYUSUNAN LAPORAN KEUANGAN GAPOKTAN SEBAGAI INSTRUMEN STRATEGIS PENGAMBILAN KEPUTUSAN USAHA TANI. GERVASI: Jurnal Pengabdian Kepada Masyarakat, 9(2), 1054–1069.

Gray, R. (2010). IS ACCOUNTING FOR SUSTAINABILITY ACTUALLY ACCOUNTING FOR SUSTAINABILITY… AND HOW WOULD WE KNOW? Accounting, Organizations and Society, 35(1), 47–62.

Hubbard, G. (2009). MEASURING ORGANIZATIONAL PERFORMANCE: BEYOND THE TRIPLE BOTTOM LINE. Business Strategy and the Environment, 18(3), 177–191.

Julianti, A., Irfan, A., Widiyanti, E., & Mahdiyyah, S. (2024). IMPLEMENTATION OF SUSTAINABLE ACCOUNTING: ANALYSIS OF TRENDS AND CHALLENGES IN ENVIRONMENTAL IMPACT REPORTING.

Kusumastuti, A., & Khoiron, A. M. (2019). METODE PENELITIAN KUALITATIF. Lembaga Pendidikan Sukarno Pressindo (LPSP).

Mooduto, A., Boekoesoe, Y., & Bakari, Y. (2021). ANALISIS PENDAPATAN USAHATANI CENGKEH DI DESA ILOHELUMA KECAMATAN POSIGADAN KABUPATEN BOLAANG MONGONDOW SELATAN. AGRINESIA: Jurnal Ilmiah Agribisnis, 5(2), 91–100.

Nurmala, N., & Asse, M. (2020). ANALISIS KONTRIBUSI PENDAPATAN USAHATANI CENGKEH TERHADAP PENDAPATAN RUMAH TANGGA TANI. Jurnal Agrotech, 10(1), 9–14.

Sari, A. R., & Hwihanus, H. (2023). PERANAN SISTEM INFORMASI AKUNTANSI TERHADAP PERKEMBANGAN USAHA MIKRO KECIL MENENGAH (UMKM). Journal of Management and Creative Business, 1(1), 162–174.

Schaltegger, S., & Burritt, R. (2017). CONTEMPORARY ENVIRONMENTAL ACCOUNTING: ISSUES, CONCEPTS AND PRACTICE. Routledge.

Sugiyono. (2019). METODE PENELITIAN KUANTITATIF, KUALITATIF DAN R&D. Alfabeta.

Suryantara, A. B., & Ridhawati, R. (2023). PENTAGONAL RESISTENSI: FAKTOR PENYEBAB RENDAHNYA IMPLEMENTASI AKUNTANSI PADA UMKM. JPEK (Jurnal Pendidikan Ekonomi & Kewirausahaan), 7(2), 543–552.

Wheelen, T. L., & Hunger, J. D. (2012). STRATEGIC MANAGEMENT AND BUSINESS POLICY: CONCEPTS AND CASES.