A Comparative Analysis of Costs and Returns of Selected Agricultural Commodities in Jose Abad Santos, Davao Occidental

ABSTRACT

This study employed a descriptive survey research design to examine the profitability of major agricultural crop commodities in Jose Abad Santos, Davao Occidental. Data were gathered through a structured and validated questionnaire administered to 100 respondents across five (5) selected barangays. The study focused on four key commodities—abaca, banana, corn, and coconut—and analyzed their production costs and returns using descriptive statistics and cost-and-return analysis. Findings revealed that coconut farming yielded the highest net return and profitability, followed by corn and banana, while abaca production resulted in a negative net return due to high production and harvesting costs. Most respondents were landowners who practiced traditional farming methods with minimal use of fertilizers and pest control. The primary challenges encountered by farmers included limited capital, inadequate farm-to-market roads, and pest infestations. The study recommends the provision of financial assistance, access to high-quality planting materials, infrastructure development, and capacity-building programs on modern and sustainable agricultural practices to improve productivity and profitability across all crop sectors.

Keywords: *Profitability Analysis, Agricultural Commodities, Cost and Return*

INTRODUCTION

Farming is an essential part of our lives, providing us with food and other vital resources. However, farmers today face numerous challenges that make their work increasingly difficult. One of the biggest issues is climate change, which causes rising temperatures, unpredictable weather patterns, and extreme weather events that lead to crop failure, reduced yields, and increased costs. It also intensifies pest infestations and disease outbreaks, further lowering productivity and profits.

Another major concern is the damage caused by pests and diseases such as aphids, mites, blight, and rust, which not only destroy crops but also force farmers to spend more on pesticides and fungicides. Soil degradation, resulting from over-cultivation, erosion, and poor land management practices like overgrazing and monocropping, has also reduced soil fertility and long-term productivity. Moreover, many small-scale farmers struggle with limited access to markets, forcing them to sell their produce at low prices and limiting their income potential.

Financial constraints add to the problem, as many lack access to credit or funding to purchase quality seeds, fertilizers, and modern equipment needed to improve yields. Despite these challenges, agriculture remains vital to human survival, as it provides the commodities that feed billions of people worldwide. Without agricultural production, the world would face starvation; thus, investing in and understanding the profitability of agricultural crop commodities is crucial. In this context, the present study aims to provide a better understanding of the profitability of agricultural crop commodities in Jose Abad Santos, Davao Occidental.

Statement of the Problem

This study was conducted to determine the profitability of agricultural commodities in Jose Abad Santos, Davao Occidental. Specially, the study sought to answer the following questions;

1. What is the profile of respondents, in terms of;
    1.1. Age;
    1.2. Gender;
    1.3. Civil Status;
    1.4. Educational Attainment;
    1.5. Ethnicity;
    1.6. Religion;
    1.7. Number of Children and;
    1.8. Years of farming?
2. What is the profile of farm, in terms of;
    2.1. Number of Hectares;
    2.2. Tenurial Status;
    2.3. Crops Planted;
    2.4. Cropping System;
    2.5. Practices Management and;
    2.6. Topography?
3. What is production Mmanagement; in terms of;
    3.1 Land Preparation;
    3.2 Planting;
    3.3. Plant care and management;
    3.4. Harvesting and;
    3.5. Materials and Equipment?
4. What are the marketing Sstrategies of farmers?
5. What is the cost and return to selected agricultural commodities in JAS Davao Occidental?
6. what are the problem encountered by the farmers?

Scope and Limitation of the Study

This study aimed to provide a better understanding about the profitability of agricultural crops commodities in Jose Abad Santos, Davao Occidental. This study covered only 100 respondents of agricultural crops on selected barangay.

Significant of the Study

The Southern Philippines Agri-Business and Marine Aquatic School of Technology (SPAMAST) may also benefit from the result that may aid as reference and literature. Furthermore, other researchers who may have specific meanings for the use of the study. The definition of these terms is provided.

Definition of Terms

The following terms enumerated refers to have specific meanings for the use of the study. The definition of these terms is provided

Profitability- is a measure of an organization's profit relative to its expenses. Organizations that are more efficient may realize more profit as a percentage of its expenses than a less-efficient organization, which must spend more to generate the same profit.

Profit- an economic profit is the difference between the revenue a commercial entity has received from its outputs and the opportunity cost, including both explicit and implicit costs.

Production management- also called operation management, planning and control of industrial process to ensure that they move smoothly at the required level. Techniques of production management are employed in service as well as in manufacturing industries.

Marketing management- is the organizational discipline which focuses on the practical application of marketing orientation, techniques and methods inside enterprises and organizations and on the management of a firm's marketing resources and activities

Cost and return- cost-return analysis needs detailed input and output data, it is defined as the quantity of production multiplied by the unit farm price of output.

REVIEW OF RELATED LITERATURE

Profile of Farmers

Abaca (*Musa textilis*) thrives in environments with evenly distributed rainfall ranging from 2,000–3,200 mm annually, an average temperature of 27°C, and a relative humidity of about 80% (Vaughan, 2011). It grows best in slightly acidic to neutral soils (pH 6.0–7.0) rich in organic matter, potassium, calcium, and magnesium (Capuno, 2012). The crop is highly sensitive to drought, waterlogging, and strong winds, and both extreme cold and heat are harmful to its growth. Abaca propagation may be done by seeds or vegetative means such as suckers, corms, or tissue culture, though seed propagation is now limited to breeding purposes due to poor true-to-type reproduction (Bande, 2012). Planting materials are spaced at 2–3 m intervals, with densities ranging from 1,100–2,500 plants per hectare, depending on the cultivar (Vaughan, 2011).

In the coconut industry, Miraflor (2020) reported that farmers remain among the poorest in the agricultural sector, with incomes declining further due to fluctuations in global coconut oil prices. About 95% of the 3.5 million hectares of coconut farms in the Philippines are devoted to copra production, but the continuing drop in copra prices has deepened farmers' poverty. Despite minor price recoveries reported by the Philippine Coconut Authority, the overall profitability of coconut farming remains low, reflecting the sector's vulnerability to world market instability.

Several studies emphasize that yield and productivity are directly linked to farmers' knowledge, age, gender, and education. Sopheap et al. (2012) identified poor soil quality, improper harvesting, and weak weed management as major constraints to yield, while Adebiyi and Okunlola (2013) and Lugando (2013) found that male-headed households are generally more inclined to adopt modern agricultural technologies. Female farmers, however, often face social and institutional barriers that limit their adoption of such innovations (Uwagboe et al., 2012). Education also plays a critical role in improving agricultural productivity, as it enhances farmers' capacity to adopt and effectively utilize improved technologies (Field & Wall, 2011). In Ghana, Bempomaa et al. (2014) found that land, labor, fertilizer use, education, and farming experience significantly affect maize yield, underscoring the importance of continuous training and access to resources for improving farm efficiency.

Agricultural Crops Farming Profile

Abaca (*Musa textilis* Nee.), native to the Philippines, produces the internationally known Manila hemp fiber. The country's favorable climate and volcanic soils make it ideal for abaca cultivation. The fiber is used for cordage, textiles, handicrafts, and specialty papers such as currency notes and tea bags. As a major export commodity, abaca has been a significant foreign exchange earner, generating around US$80 million annually between 1996 and 2000 and accounting for 97% of the world's supply. With increasing global demand for biodegradable and sustainable materials, abaca continues to play an important role in both domestic and international markets (Lalusin et al., 2015).

Despite its economic significance, the abaca industry still depends largely on traditional varieties that are vulnerable to diseases. Plant breeding and biotechnology are being utilized to develop new varieties with higher yields, better fiber quality, and resistance to major diseases. Through molecular techniques, resistance genes can be isolated from abaca or its wild relatives to produce improved varieties suitable for commercial cultivation. These advancements, along with sound management and marketing strategies, promise to strengthen the abaca industry and sustain its competitiveness in global markets (Lalusin et al., 2015).

Coconut (*Cocos nucifera* L.) is another vital crop cultivated for its wide range of uses and economic value. It provides various products such as coconut water, copra, oil, shell-based materials, leaves, and coir pith, all of which have food, medicinal, and industrial applications. Coconut kernel and water contain essential nutrients and possess antibacterial, antifungal, antiviral, antioxidant, and hepatoprotective properties, making them valuable for human health. Because of its many benefits, the coconut palm is often referred to as the *Kalpavriksha* or "the all-giving tree" in traditional literature (DebMandal et al., 2011).

Banana and corn are also significant crops in tropical agriculture. Bellamy (2013) noted that banana and plantain farmers adopt agroecological practices such as crop rotation, compost fertilization, and mechanical pest control to maintain soil fertility and yield sustainability. Quality management, including proper post-harvest handling and natural coating methods, helps maintain fruit color and texture for export (Yilmaz & Cekmecelioglu, 2013). However, banana weevil infestations remain a major yield threat (Irulandi et al., 2012). Meanwhile, corn (*Zea mays* L.) production provides a profitable livelihood for Filipino farmers due to its high demand and relatively low labor cost. Recent studies suggest that transplanting methods can improve both agronomic and economic yields compared to direct seeding (Escaninas, 2019; Tampus, 2019).

Production Management of Agricultural Crops

Abaca (*Musa textilis* Nee.), a plant native to the Philippines, is renowned as the source of the world-famous Manila hemp. Within 24 hours after harvest, its usable leaf sheaths are peeled and grouped according to position in the pseudostem, as fibers differ in quality—outer sheaths producing coarser fibers ideal for cordage and inner sheaths yielding finer fibers suitable for papermaking. The process, known as "tuxying," involves stripping leaf sheaths into ribbons which are cleaned to extract fibers (Vaughan, 2011). The spindle stripping method uses an engine-driven spindle to separate the fibers, while mechanical decortication crushes the entire pseudostem, resulting in a lower-grade fiber. Field studies identified the Magino hybrid as the best-performing abaca variety under coconut intercropping systems, showing superior yield and economic returns compared to other varieties like Tangongon and Maguindanao (Eroy, 2012).

Coconut (*Cocos nucifera* L.) is widely regarded as the "tree of life" due to its extensive uses in food, construction, and industry. Every part of the coconut palm serves a purpose—its coir is used for ropes and mats, leaves for roofing and weaving, and meat for oil, milk, and copra (Moneyworld, 2020; Shahbandeh, 2022). The coconut also holds medicinal and nutritional importance, containing lauric acid, fiber, and minerals beneficial to health. Globally, coconuts are cultivated across tropical and coastal regions such as the Philippines, Indonesia, and India, with production reaching 60 million metric tons annually (Burton, 2021). Virgin coconut oil, in particular, has become a high-value product used in food, cosmetics, and pharmaceuticals.

Improving coconut productivity requires integrated management practices such as irrigation, fertigation, and intercropping systems. Sustainable approaches like cultivating fodder grass and integrating livestock under coconut farms enhance soil fertility and profitability (Thomas et al., 2018). Intercropping coconuts with compatible crops such as abaca can maximize land use and income while promoting biodiversity and soil conservation. However, improper intercropping may lead to pest and nutrient competition (Watchira et al., 2013). Thus, adopting balanced farming systems is essential for sustainability and long-term productivity.

Banana and maize, two of the most important staple crops, also face challenges in production. Climate change, pest infestation, and drought significantly affect banana yield and quality, with temperature and ripening conditions influencing color, sweetness, and texture (Ramirez et al., 2011; Nunes et al., 2013; Nikolova, 2013). Maize (*Zea mays* L.), a vital food and industrial crop, originated in Central Mexico and remains a global staple due to its high starch and energy content (Marketline, 2016). Despite its value, maize production is hampered by pests, diseases, and price

fluctuations, prompting the need for sustainable practices and technological interventions to ensure food security and economic resilience (Ariyo, 2011).

Problem in Agricultural Crops Production

Capuno (2012) reported that abaca exports have declined by 28% annually, mainly due to decreasing average yields. The annual growth of abaca fiber production was only 0.37%, largely influenced by the processing sectors such as pulp, cordage, yarns, twines, and fiber crafts manufacturing. The industry continues to face challenges including natural calamities, pest infestations, theft losses, low productivity, and illegal logging. Similarly, Climaco (2010) identified that coconut-based farming system (CBFS) adopters in lanzones production encountered issues like pest and disease infestations and natural disasters. Interestingly, farmers with higher educational attainment and institutional access were less likely to adopt CBFS, suggesting that older, less experienced, and smaller-scale coconut farmers should be prioritized in policy interventions.

In banana production, Anap et al. (2014) identified major challenges among growers in Maharashtra, India, including irregular electricity supply, high temperature losses, fertilizer costs, and inefficient labor performance. Farmers also faced difficulties due to inadequate government policies and subsidies for banana suckers. Chandrakar et al. (2015) further revealed that banana farmers in Chhattisgarh dealt with high production costs, lack of improved varieties, absence of processing facilities, storage problems, price fluctuations, and unregulated marketing systems, all of which constrained productivity and profitability in banana supply chains.

Pawar et al. (2016) found that banana growers in the Marathwada region of Maharashtra struggled with frequent power interruptions during irrigation, unavailability of planting materials, and high input costs such as fertilizers and labor. To address these constraints, they suggested improved irrigation scheduling, wider availability of tissue-cultured plants, government support for composting facilities, low-cost pesticides, and timely agricultural advisories through SMS alerts. Farmers also emphasized the need for better-quality planting materials and reduced fertilizer costs to enhance adoption of banana production technologies.

Zuber et al. (1979) highlighted aflatoxin contamination as a critical issue in corn production, caused by the fungus *Aspergillus flavus*, which infects corn kernels before and after harvest. Infection occurs when the pericarp is damaged, often due to insect activity such as that of the corn borer or earworm. Environmental stress, particularly drought, increases vulnerability to fungal infection and toxin production. Effective management strategies include using resistant hybrids, controlling ear-damaging insects, and minimizing plant stress through proper cultivation timing. Although partial genetic resistance exists, no corn genotype completely eliminates aflatoxin contamination.

Profitability of Agricultural Crops

Eroy (2012) studied the performance of four abaca varieties and hybrids—Tangongon, Maguindanao, Magino, and Bongtang—grown under mature Laguna tall coconuts in Bago Oshiro,

Davao City from 2006 to 2010. Results showed that the Magino hybrid, a cross between Maguindanao and Inosa, consistently produced the highest fiber yield and economic returns due to its strong suckering ability and larger plant size. Maguindanao and Bongtang hybrids showed comparable performance, while Tangongon recorded the lowest yield, making it the least profitable. Historically, abaca was once the Philippines' main source of cloth before European colonization. Capuno (2012) noted that despite its decline during World War II, the Philippines regained its position as the leading abaca producer post-war. The industry remains vital to rural livelihoods, supporting around 140,000 workers, 78,000 small farmers, and more than 430,000 dependents.

Coconut farming, one of the oldest and most profitable agricultural ventures, remains essential to many tropical economies. Known as *Kalpavriksha* or the "tree of heaven," the coconut tree provides food, drink, timber, fiber, and oil, all of which are valuable in trade and daily life. RF ROGYS FARM (2021) reported that India ranks third globally in coconut production, with millions of families relying on it for their livelihood. Every part of the coconut tree is economically useful—ranging from coir fiber for ropes and mats to coconut oil, water, and wood products—making it an indispensable crop for both household and commercial purposes.

Across tropical and subtropical regions, bananas are one of the most significant cash crops, particularly for small-scale farmers. The Food and Agriculture Organization (FAO, 2020) valued global banana exports at around USD 8 billion annually, with Ecuador and the Philippines as the top exporters. According to Workman (2020), banana production has expanded across the Americas, Africa, and Asia. However, Olchondra (2012) emphasized that the banana industry faces challenges in maintaining quality standards for export markets. Technological innovations, such as electronic sorting systems, have been introduced to enhance product quality and consumer satisfaction, ensuring the fruit maintains its top rank among the world's traded commodities.

Maize, or corn, remains one of the world's most economically important grains, with global revenues reaching USD 219.5 billion in 2015 (Marketline, 2016). The United States dominates production and trade, primarily for animal feed and ethanol fuel, with only a small percentage consumed directly by humans (Ranum, 2014; Wallington et al., 2012). In Africa, however, maize serves as a dietary staple, with consumption exceeding 50 grams per person daily in 27 nations (Ranum, 2014). Agricultural growth, as Zhao (2021) and Gu (2020) noted, depends heavily on improving production efficiency and technical innovation. Qian (2021) stressed that enhancing corn production efficiency through targeted policy and management practices is essential for sustaining global food security.

METHODOLOGY

Research Locale

This study was conducted in Jose Abad Santos, Davao Occidental. The researcher selected Jose Abad Santo as its research area breakdown the study that was conducted in it. Jose Abad Santos, officially the Municipality of Jose Abad Santos, Davao Occidental.

The province is bordered on the northwest by Davao Del Sur, on the west by Sarangani and northeast by Davao Gulf. Davao Occidental covers a total area of 2,163.45 square kilometer

(835.31 sq mi.). Davao Occidental has vast agricultural lands, through mountainous but could grow almost all kinds of crops. It has rich fisheries and marine resources, aside from its lengthy coastlines where beautiful beaches can be found. It is basically blessed by nature that yields sufficient food for its people.

Research Design

This study used an expert sampling which is a form of purposive sampling used when research requires one to capture knowledge rooted in a particular form of expertise. It is common to use this form of purposive sampling technique in the early state of research process, when the researchers is seeking to become better informed about the topic at hand before embarking on the study. Doing this kind of early state expert-based research can shape research questions and research design I important ways (Croossman, 2018).

Sampling Design and Technique

The study used non-profitability sampling technique. Quota sampling technique was used in selecting number of the profitability of crops.

Table 1. Distribution of the sample respondents of the study in Jose Abad Santos.

Crops	Total farmers per crops
Abaca	100
Banana	100
Coconut	100
Corn	100
TOTAL	**400**

Research Instruments

The structure questionnaire is composed of sixth (6) parts. The first part is the demographic profile of the respondents it mainly focused on the age of farmers, gender, civil status, educational attainment, ethnicity, religion, number of children and number of years in farming. The second part is the farm profile it focuses on the number of hectares, tenurial status, cropping system, practices management and topography of the land.

The third part is the production management and focused on the land preparation, planting and the plant care and management, harvesting and materials and equipment. The fourth part; focused on marketing strategies of farmers. The fifth part is the cost and return to selected agricultural commodities the last part the problem encountered by farmers.

Data Gathered

Data gathered in this study include demographic profile of the respondents; the farmers' profile; the production management; the marketing management of crops; and the problem encountered by farmers in Jose Abad Santos, Davao Occidental.

Data Gathering Procedure

The researcher has allotted vigorous time, effort and cooperation in developing their questionnaire so as to serve intended respondents. The survey was created using suitable questions modified from related research and individual questions formed by the researcher. The survey comprised of 6 main parts subdivided into different subpart which were related to the participant's perception regarding profitability of crops production.

Statistical Tool

The data was collected is treated and interpreted using descriptive statistical such as mean, and cost and return analysis may used to measure the profitability of crops in Jose Abad Santos.

Frequency percentage- a percentage frequency distribution is a display of data that specifies the percentage of observations that exist for each data point of grouping of data.

Mean- the mean was used and employed to determine the average scores of sample quantitative data.

Measures of income

1. Gross Margin =(Total Return - Total Variable cost)
2. Net Margin =(Total Return - Total Cost)

Measures of Profitability

1. Production Cost/unit =(Production sold/Total Cost)

Net income/Peso cost =(Net Return/Total Cost)

Ethical Considerations

Ethical aspect was also considered for this, in terms of privacy and confidentiality, the researcher attached a signed letter to the questionnaire addressing the respondents that the data gathered was kept confidential. Upon asking for consent and permission from the location, the researcher structured a signed letter addressed to the respondents asking for their participation at their convenient time. The voluntary participation of the respondents was realized by giving them enough time to answer questions supported by interviews. Aside from that, the purpose of the study was stated.

Another ethical consideration for this study may the unavailability of respondents due to being absent or busy during the deployment of the questionnaire. As a researcher, it was asking when it was possible to conduct an interview, or the questionnaire was left and was been picked when accomplished. There was need for confidentiality of the information that was given by the

participants as the right to privacy if there was personal information that the participants had to divulged. It was agreeing that privacy and confidentiality was prioritized. Obtaining approval for the intended research methods through the appropriate ethics.

RESULTS AND DISCUSSION

The Respondent's Profile

Table 2 presents the demographic profile of farmers engaged in abaca, banana, corn, and coconut production in Jose Abad Santos, Davao Occidental. The results show that most respondents were 40 years old and above, indicating that farming is largely dominated by middle-aged and older individuals. Only a small percentage were below 30 years old, suggesting limited youth participation in agriculture. In terms of gender, the majority of farmers were female, highlighting the significant role of women in agricultural production. No respondents identified as LGBTQ+. Regarding family size, most farmers had one to three children, while coconut farmers tended to have larger families with four to six children. This shows that farmers generally belong to family-oriented households that may contribute to farm labor. As for years in farming, most respondents had been engaged in farming for more than 10 years, particularly among corn and coconut growers. This indicates that farming in the municipality is a long-established livelihood, often sustained by experience and generational continuity.

Table 2: The Respondents Profile

PROFILE		Abaca	Banana	Corn	Coconut
Age					
	40-year-old and above	57.00%	54.00%	59.00%	76.00%
	35-39	13.00%	18.00%	14.00%	2.00%
	30-34	16.00%	13.00%	14.00%	2.00%
	25-29	7.00%	11.00%	10.00%	0.00%
	20-24	6.00%	4.00%	3.00%	0.00%
	20- Years old below	1.00%	0.00%	3.00%	0.00%
Gender					
	Male	46.00%	46.00%	40.00%	26.00%
	Female	54.00%	54.00%	60.00%	54.00%
	LGBTQ	0.00%	0.00%	0.00%	0.00%
No. of children					
	10 above	4.00%	14.00%	12.00%	6.00%
	7-9	21.00%	11.00%	13.00%	10.00%
	4-6	26.00%	30.00%	36.00%	37.00%
	1-3	39.00%	40.00%	38.00%	26.00%
	None	10.00%	5.00%	1.00%	1.00%
No. Years in farming					
	10 above	41.00%	60.00%	83.00%	77.00%
	7-9	9.00%	16.00%	6.00%	1.00%
	4-6	23.00%	16.00%	7.00%	1.00%
	1-3	21.00%	7.00%	4.00%	1.00%
	1- Year below	6.00%	1.00%	0.00%	0 .00%

Based on Table 3, notable variations were observed in the farm conditions and characteristics among abaca, banana, corn, and coconut producers in Jose Abad Santos, Davao Occidental. Abaca and corn were predominantly cultivated in mountainside and hilly areas, with 49–50% of abaca and 99% of corn farms located in such terrains, indicating their adaptability to upland conditions. Banana farms were more evenly distributed across mountainside (49%) and plain (30%) areas, while coconut farms were largely found on flat lands, reflecting their preference for well-drained, lowland soils. In terms of farm size, coconut farmers had the largest average area (2.33 ha), followed by abaca (2 ha) and corn (1.69 ha), while banana farmers operated the smallest farms (1.24 ha). Most farmers across all commodities owned their land, except for 20% of coconut growers who reported otherwise, showing that land ownership remains common in the area.

When comparing crop varieties and yield, distinct patterns emerged. Abaca farmers mainly planted Montenegro, Maguindanao, and Native varieties, while banana growers relied heavily on native types (95%), suggesting limited varietal diversification. Corn farmers were almost exclusively dependent on Tinigib (86%), and coconut growers primarily cultivated Tall/Century (62%) and Green Dwarf (23%) varieties. In terms of productivity, coconut recorded the highest average yield (3,568.38 kg), followed by abaca (1,266.82 kg) and corn (1,222.25 kg), while banana had the lowest at 253.90 kg. These results indicate that coconut farming is the most productive and land-extensive, while banana production remains small-scale and less yielding, possibly due to limited farm size, variety used, and topographical constraints.

Table 3: Farm Profile

PROFILE	PERCENTAGE				AVERAGE			
	ABACA	BANANA	CORN	COCONUT	ABACA	BANANA	CORN	COCONUT
Topography of the land:								
Plain	1.00%	30.00%	1.00%					
Mountainside	49.00%	49.00%	99.00%					
Rocky ground	0.00%	0.00%	0.00%					
Hilly	50.00%	21.00%	0.00%					
Actual Area planted					2	1.24	1.69	2.33
Tenure status of the farm								
Owned	100.00%	100.00%	100.00%	80.00%				
Rented	0.00%	0.00%	0.00%	0.00%				
Other	0.00%	0.00%	0.00%	0.00%				
If owned, the current market price of your land								813,191.49
Variety planted								
Montenegro	36.00%							
Maguindano	25.00%							
Native	21.00%	95.00%						
Balangon	18.00%							
Lakatan		5.00%						
Tinigib			86.00%					
Green coconut dwarf				23.00%				

Maypan coconut	0.00%			
Tall/Century	62.00%			
The yield of planted area (kgs)	1,266.82	253.90	1,222.25	3,568.38

Table 4 shows the production management practices of abaca, banana, corn, and coconut farmers in Jose Abad Santos, Davao Occidental. The results reveal that corn and coconut farms required more frequent plowing and harrowing (2.66 and 2.96 times, respectively) than abaca (1.55) and banana (5.40), with abaca incurring the highest land preparation cost (₱1,286.88). Most respondents across all crops did not apply manure or decomposed waste, indicating limited use of organic soil amendments. Planting schedules varied by crop: abaca was mainly planted during January to April, banana during May to June, corn in March to April, and coconut in March to April, reflecting farmers' adaptation to seasonal rainfall patterns. The cost of seedlings was highest for abaca (₱21.70) and lowest for corn (₱0.18), while labor costs for planting were highest in coconut farms (₱186.46 per day) due to larger land areas and heavier field work.

Weed and water management also differed among crops. Manual weeding was common in corn (100%) and coconut (80%) farms, while abaca farmers did not practice manual or chemical weeding. None of the farmers used irrigation, indicating that all crops relied on rainfed conditions. In terms of harvesting, coconut had the longest maturity period (3,362.56 days), followed by banana (345.95 days) and corn (119.4 days), while abaca could be harvested after only 27 days from planting, likely due to staggered harvesting of matured stalks. The cost of harvest labor was highest for coconut (₱196.88 per day), reflecting its labor-intensive process. Overall, the data suggest that production management practices vary widely among crops, with abaca and coconut requiring higher investment and labor, while banana and corn are relatively less costly but depend heavily on manual operations and seasonal timing.

Table 4: Production Management of Crops

	PERCENTAGE				**AVERAGE**			
PARTICULARS	**ABACA**	**BANANA**	**CORN**	**COCONUT**	**ABACA**	**BANANA**	**CORN**	**COCONUT**
Land preparation								
Frequency of plowing and harrowing					1.55	5.40	2.66	2.96
Cost per plowing and harrowing					1,286.88	151.09	363.5	341.77
Application of manure and decompose wastes								
Yes	0.00%	0.00%	0.00%	0.00%				
No	100.00%	92.00%	100.00%	80,00%				
Planting								
Planting month								
Jan-Feb	45.00%	4.00%	0.00%	0.00%				

Mar-April	37.00%	22.00%	96.00%	79.00%				
May-June	13.00%	61.00%	2.00%	1.00%				
Jul-Aug	0.00%	8.00%	2.00%	0.00%				
Sep-Oct	4.00%	4.00%	0.00%	0.00%				
Nov-Dec	1.00%	1.00%	0.00%	0.00%				
Distance per hill (cm)								
Row						262.45	48.4	621.25
Column						258.05	35	1,081.50
Seedlings needed for the planted area					347.70	107.74	712.1	251.48
Cost per seedling					21.70	3.50	0.18	8.61
Application of basal fertilization								
Yes	0.00%	0.00%	0.00%	0.00%				
No	100.00%	100.00%	100.00%	80.00%				
Laborers needed for planting					4.62	2.10	2.51	2.15
Cost of per laborer per day					169.70	135.30	141.94	186.46
Days of planting for the planted area					4.06	1.94	2.055	1.51
Cost foods every planting					1,421.50	206.33	338	205.10
Weed Management								
Application of herbicide								
Yes	0.00%	0.00%	0.00%					
No	100.00%	100.00%	100.00%					
Manual weeding								
Yes	0.00%	38.00%	100.00%	80.00%				
No	100.00%	62.00%	0.00%	0.00%				
If yes, frequency in manual weeding						3.04	2.64	2.93
Laborers needed per manual weeding						1.30	2.63	3.34
Cost of manual weeding laborer per day						79.80	147.8	171.71
Cultivation and Maintenance								
Frequency of off-barring before harvesting					1.51		5	3.00
Cost for off-barring laborer per day					125.50		200	200.00
Frequency of thinning before harvesting					0.65			295
Cost for thinning laborer per day					83.00			255.00
Frequency of hilling-up before harvesting					0.08			1.00
Cost for hilling-up laborer per day					14.65			200.00
Water management								
Using of irrigation								
Yes	0.00%	0.00%	0.00%	0.00%				
No	100.00%	100.00%	100.00%	80.00%				
Harvesting								
Harvesting time from the date of planting (No. of days)					27.00	345.95	119.4	3,362.56

Days allotted in harvesting for the planted area	5.59	1.77	2.63	6.61
Harvesters needed for the planted area	200.00	2.06	2.63	6.29
Cost per day per harvester	175.50	143.00	141.9	196.88
Materials and Equipment				
Lagaraw	217.60			
Hagot	244.50			
Bara	387.17			
Bolo		257.42	248.3	
Crowbar		370.40		
Shovel				488.65
Axe				423.51
Matoch				291.25
Wood fire				203.63

Table 5 presents the marketing management practices of abaca, banana, corn, and coconut farmers in Jose Abad Santos, Davao Occidental. The results show that abaca and corn farmers commonly sold their produce to Mr. Joyce (45% and 42%), while banana farmers primarily sold to Mr. Rodriguez (58%), and coconut farmers to An-an Juban (41%). The buyers' locations were mostly concentrated in Caburan Big, Marabatuan, and Caburan Small, suggesting that trading activities are localized within the municipality. This reflects a community-based marketing system where farmers directly transact with established middlemen or local buyers rather than through formal cooperatives or larger market channels.

In terms of pricing, abaca had the highest average buying price (₱77.02 per kilogram), followed by coconut (₱42.83/kg), banana (₱16.67/kg), and corn (₱8.89/kg). This indicates that abaca and coconut offer higher value per unit, while corn and banana are lower-priced bulk commodities. Almost all abaca (100%), corn (92%), and coconut (80%) farmers transported their own products, incurring average transportation costs ranging from ₱89.38 to ₱232.68, while only 11% of banana farmers handled their own transport since most buyers collected the produce directly. These results suggest that marketing practices vary across crops—with abaca and corn farmers bearing higher logistics costs due to self-transportation, while banana farmers benefit from buyer-managed collection systems that reduce marketing expenses but may limit price control.

Table 5: Marketing Management of the crops

PARTICULARS	PERCENTAGE				AVERAGE			
	ABACA	BANANA	CORN	COCONUT	ABACA	BANANA	CORN	COCONUT
Buyers of your products								
Mr. Joyce	45.00%	4.00%	42.00%	18.00%				
Mr. Ang	37.00%		11.00%					
Mr. Magbanua	5.00%							

Mr. Juban	13.00%							
Mrs. Poning		21.00%						
Mr. Rodriquez		58.00%						
Mrs. Mending		17.00%						
Mr. Palmera			10.00%					
Mr. Guardados			37.00%					
An an Juban				41.00%				
Roy Miguil				19.00%				
Erole Salmon				2.00%				
Location of the buyers								
Culaman	5.00%	0.00%						
Cab. Small	37.00%	21.00%	21.00%					
Cab.Big	13.00%	58.00%	37.00%					
Marabatuan	45.00%	21.00%	42.00%	19.00%				
Magulibas				19.00%				
Buying price					77.02	16.67	8.89	42.825
Transporting of products								
Yes	100.00%	11.00%	92.00%	80.00%				
No	0.00%	89.00%	8.00%	0.00%				
If yes, it cost					232.68	92.73	136.77	89.375

Table 6 presents the major problems encountered by abaca, banana, corn, and coconut farmers in Jose Abad Santos, Davao Occidental. The data show that the lack of capital was the most common problem across all crops, affecting 98% of corn, 93% of abaca, 73% of coconut, and 34% of banana farmers. This indicates that most farmers struggle with insufficient financial resources for farm inputs, maintenance, and labor. Another major concern was the high incidence of pests and diseases, particularly among banana (92%) and abaca (68%) growers, suggesting these crops are highly vulnerable to biological threats. In contrast, only 25% of corn farmers and none of the coconut farmers reported pest-related issues, reflecting the relatively resilient nature of these crops.

Other challenges included the limited supply of high-yielding and disease-free planting materials, notably reported by 84% of corn farmers, which may hinder productivity and crop improvement efforts. Problems related to marketing and infrastructure were also observed. About 51% of both corn and coconut farmers and 93% of abaca farmers identified poor farm-to-market roads as a major constraint, making product transport difficult and costly. Meanwhile, only a few respondents cited market access and location as significant problems. Overall, the results suggest that the most critical issues affecting agricultural production in the area are financial constraints, pest and disease infestation, and inadequate farm infrastructure, all of which directly influence productivity and profitability.

Table 6: Problems Encountered of the Respondents

PARTICULARS	**Abaca**	**Banana**	**Corn**	**Coconut**

Lacks of capital	93.00%	34.00%	98.00%	73.00%
Limited Supply of high yielding and disease free Planting materials	4.00%	4.00%	84.00%	2.00%
High incidence of pest and disease	68.00%	92.00%	25.00%	0.00%
Markets of the product	0.00%	23.00%	5.00%	11.00%
Market location	0.00%	8.00%	6.00%	1.00%
Farm to Market Road	93.00%	20.00%	51.00%	51.00%

Table 7 presents the cost and return analysis of abaca, banana, corn, and coconut production in Jose Abad Santos, Davao Occidental. The results reveal significant differences in profitability among the four crops. Coconut farming recorded the highest return (₱152,815.66) with a net return of ₱139,000.10, making it the most profitable enterprise. Corn followed with a net return of ₱5,073.25, while banana gained a modest ₱1,352.32. In contrast, abaca farming incurred a net loss of ₱109,750.20, primarily due to its high total production cost (₱207,320.67) and relatively low yield value (₱97,570.48). This negative margin indicates that abaca production in the area was not financially viable under current management and market conditions.

In terms of cost distribution, harvesting and planting expenses were the major contributors to overall production costs, particularly for abaca and coconut. Abaca farmers spent the most on harvesting (₱192,699.00), while coconut farmers incurred higher costs on both cultivation (₱1,552.25) and harvesting (₱8,185.29) due to labor intensity. The production cost per unit was highest for abaca (₱163.65) and lowest for corn (₱0.23), indicating substantial variations in cost efficiency. Overall, the findings suggest that coconut farming offers the greatest profitability and return on investment, while abaca production remains unprofitable, requiring improvements in management practices, market access, and cost control to achieve economic sustainability.

Table 7: Cost and Return of Agricultural Crops

PARTICULARS	**Abaca**	**Banana**	**Corn**	**Coconut**
Return/Yield	97.570.48	4,232.51	10,382.95	152,815.6594
Cost				
Land preparation	1,994.67	816.20	966.91	1,012.50
Planting	12,149.69	1,134.63	1,198.31	2,976.14
Fertilization	-	-	-	-
Weed Management	-	315.23	1,026.20	-
Cultivation and Maintenance	244.64	-	1,000.00	1,552.25
Pest Control	-	-	-	-
Water management	-	-	-	-
Harvesting	192,699.00	521.41	981.51	8,185.29
Marketing cost	232.68	92.73	136.77	89.38
Rental Fee	-	-	-	-
TOTAL COST	**207,320.67**	**2,880.19**	**5,309.71**	**13,815.56**

NET RETURNS	**-109,750.20**	**1,352.32**	**5,073.25**	**139,000.10**
Measures of Income				
Gross Margin	-109,750.20	1,352,32	5,073.25	139.000.10
Net Margin	-109,750.20	1,352,32	5,073.25	139.000.10
Measures of Profitability				
Production cost/Unit	163.65	11.34	0.23	38.95

CONCLUSION AND RECOMMENDATION

The findings of the study revealed that farming in Jose Abad Santos, Davao Occidental is largely practiced by experienced, middle-aged to older farmers, most of whom are female and operate on small to medium-sized, self-owned farms. The production and management practices varied by crop, with coconut and corn being more established and productive, while banana and abaca were cultivated on smaller, often upland areas. Farmers commonly relied on traditional crop varieties and rainfed conditions, with minimal use of organic fertilizers or irrigation. Major problems encountered included lack of capital, pest and disease infestations, and poor farm-to-market roads, which limited productivity and profitability. The cost and return analysis showed that coconut farming was the most profitable, yielding the highest net return, followed by corn and banana, while abaca production incurred losses due to high operational costs. These results emphasize the need for financial support, improved infrastructure, access to quality planting materials, and sustainable production technologies to enhance the profitability and resilience of agricultural enterprises in the municipality.

Based on the findings, it is recommended that farmers be provided with financial assistance and easier access to credit programs to address the common problem of insufficient capital, particularly among abaca and corn producers. The improvement of farm-to-market roads and transportation facilities is also essential to enhance market access and reduce post-harvest losses. Furthermore, the introduction of high-yielding and disease-resistant crop varieties, along with training on pest management, can help minimize production losses, especially in banana and corn farming. Farmers should also be encouraged to adopt sustainable farming practices, such as the use of organic fertilizers and crop diversification, to ensure long-term productivity. Lastly, strengthening farmers' cooperatives and providing continuous training on modern farming technologies and marketing strategies can further improve profitability and resilience in agricultural production.

References

Adebiyi, S., & Okunlola, J. (2013). Adoption of improved agricultural technologies among farmers in Nigeria. *Journal of Agricultural Extension, 17*(2), 23–35.

Anap, N. M., Rathod, J. R., & Kadam, S. S. (2014). Constraints faced by banana growers regarding production in Wardha district of Vidarbha region of Maharashtra state. *International Journal of Agricultural Sciences, 10*(1), 231–236.*

Ariyo, O. J. (2011). Factors affecting maize production and productivity. *Journal of Agricultural Sciences, 3*(4), 45–52.*

Bande, J. (2012). Propagation and cultivation of abaca. *Philippine Journal of Crop Science, 37*(1), 45–52.*

Bellamy, A. (2013). Agroecological practices in banana and plantain cultivation. *Journal of Sustainable Agriculture, 37*(2), 154–165.*

Bempomaa, B., Kyei, P., & Asante, F. (2014). Technical efficiency of maize farmers in Ghana: The role of education and credit. *International Journal of Agricultural Management, 3*(4), 112–120.*

Burton, K. (2021). Coconut production worldwide: Uses and economic importance. *Agricultural Reviews International, 12*(2), 56–63.*

Capuno, O. B. (2012). Abaca production and export performance in the Philippines. *Journal of Philippine Fiber Research, 34*(2), 45–52.*

Capuno, O. (2012). Soil requirements and nutrient management for abaca production. *Philippine Agricultural Scientist, 95*(2), 73–80.*

Chandrakar, M. R., Verma, S. K., & Thakur, R. K. (2015). Constraints in banana production and supply chain management in Chhattisgarh. *Indian Journal of Agricultural Marketing, 29*(1), 78–86.*

Climaco, J. C. (2010). Socio-economic factors affecting adoption of coconut-based farming systems in the Philippines. *Philippine Journal of Crop Science, 35*(3), 12–20.*

DebMandal, M., Mandal, S., & Pal, N. K. (2011). Coconut (*Cocos nucifera* L.): In health promotion and disease prevention. *Asian Pacific Journal of Tropical Medicine, 4*(3), 241–247.* https://doi.org/10.1016/S1995-7645(11)60078-3

Eroy, M. N. (2012). Performance of abaca varieties and hybrids under coconut intercropping systems. *Philippine Journal of Crop Science, 37*(1), 23–31.*

Escaninas, R. (2019). Comparative study on direct seeding and transplanting methods of sweet corn production. *University of Vermont Agricultural Studies.*

FAO. (2020). *FAO statistical yearbook: World food and agriculture.* Food and Agriculture Organization of the United Nations.

Field, A., & Wall, G. (2011). The influence of education on modern agricultural adoption. *Journal of Rural Development, 29*(3), 54–68.*

Gu, X. (2020). Technical efficiency and agricultural productivity growth: Evidence from corn-producing regions. *Agricultural Economics Review, 42*(3), 65–78.*

Irulandi, S., Rajasekar, K., & Kumar, P. (2012). Impact of banana weevil (*Odoiporus longicollis*) infestation on yield and plant vigor. *International Journal of Agricultural Research, 7*(5), 101–108.*

Lalusin, A. G., Garcia, R. N., & Calumpang, C. L. (2015). Breeding strategies for developing high-yielding, disease-resistant abaca varieties in the Philippines. *Philippine Journal of Crop Science, 40*(2), 56–68.*

Lugando, S. (2013). Gender and conservation agriculture adoption in smallholder farming systems. *African Journal of Agricultural Research, 8*(5), 621–629.*

Marketline. (2016). *Global maize industry profile.* Marketline Industry Profiles.

Miraflor, M. (2020, October 20). Coconut farmers among the poorest in agriculture. *Manila Bulletin.* https://mb.com.ph

Moneyworld. (2020). *Coconut cultivation and its economic potential in the tropics.* Moneyworld Agribusiness Reports.

Nikolova, M. (2013). Impact of drought on plant development and productivity. *Bulgarian Journal of Agricultural Science, 19*(5), 887–893.*

Nunes, M. C. N., Emond, J. P., & Brecht, J. K. (2013). Quality changes in bananas during ripening as affected by temperature and humidity. *Postharvest Biology and Technology, 86,* 85–94.*

Olchondra, R. T. (2012). Banana production and export quality challenges in the Philippines. *BusinessWorld Publications.*

Pawar, R. S., Patil, V. B., & Shinde, R. R. (2016). Constraints faced by banana growers in adoption of banana production technology in Nanded district of Maharashtra state. *Agricultural Update, 11*(3), 247–252.*

Qian, Y. (2021). Analysis of factors affecting corn production efficiency and policy recommendations. *Journal of Agricultural Science and Technology, 23*(4), 112–120.*

Ramirez, P., Lassois, L., & Bellamy, A. (2011). Sustainable banana and plantain production under climate stress. *Journal of Tropical Agriculture, 89*(3), 210–219.*

Ranum, P. (2014). Global maize production, utilization, and consumption patterns. *Annals of the New York Academy of Sciences, 1312*(1), 105–112.*

RF ROGYS FARM. (2021). *Commercial coconut farming: Profitable business ideas.* https://www.rfrogysfarm.com

Shahbandeh, M. (2022). *Global coconut production and market trends.* Statista Research Department.

Sopheap, S., Chan, S., & Kimsan, T. (2012). Determinants of yield improvement among banana farmers in Southeast Asia. *Asian Journal of Agriculture and Rural Development, 2*(4), 393–402.*

Tampus, J. (2019). Corn production as a livelihood source among Filipino farmers. *Philippine Agricultural Review, 28*(3), 122–130.*

Thomas, G. V., Manikantan, N. A., & Sreekumar, R. (2018). Sustainable coconut-based cropping systems for enhanced productivity and profitability. *Indian Journal of Agronomy, 63*(2), 129–137.*

Uwagboe, E. O., Adekoya, A. E., & Adeogun, S. O. (2012). Constraints to adoption of integrated pest management practices among female-headed households in Nigeria. *Journal of Agricultural Extension and Rural Development, 4*(3), 52–58.*

Vaughan, J. (2011). Growth and environmental requirements of abaca (*Musa textilis*). *Tropical Agriculture Review, 31*(2), 105–118.*

Vaughan, J. G. (2011). The structure and utilization of abaca fibers. *Journal of Natural Fibers, 8*(4), 255–266.*

Wallington, T. J., Anderson, J. E., & Mueller, S. A. (2012). Corn ethanol production, energy balance, and greenhouse gas emissions. *Environmental Science & Technology, 46*(3), 1684–1692.*

Watchira, M., Kamau, G., & Wekesa, M. (2013). The effect of intercropping on soil fertility and crop yield. *African Journal of Agricultural Research, 8*(12), 1043–1050.*

Workman, D. (2020). *Banana exports by country.* World's Top Exports. https://www.worldstopexports.com

Yilmaz, N., & Cekmecelioglu, D. (2013). Effect of post-harvest coatings on banana color and texture quality. *Journal of Food Quality, 36*(2), 87–94.* https://doi.org/10.1111/jfq.12022

Zhao, X. F. (2021). Improving agricultural technical efficiency for sustainable production growth. *International Journal of Agricultural Management, 10*(2), 87–94.*

Zuber, M. S., Lillehoj, E. B., & Renfro, B. L. (1979). Aflatoxin contamination of corn: Causes and control methods. *Plant Disease Reporter, 63*(10), 873–880.*