Doctoral Dissertation

Economic Improvement of Queen Pineapple Farmers

Through Production Innovations and

Marketing Strategies

Food Economics

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Chapter 3: Economic Evaluation of Traditional and Production Innovations for
Queen Pineapple in Camarines Norte

Chapter 4: The Factors Affecting the Selection of Marketing Channels of
Queen Pineapple Farmers

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ACRONYMS

AFF	Agriculture, Forestry and Fishing
BAR	Bureau of Agricultural Research
DOST	Department of Science and Technology
CNLRRS	Camarines Norte Lowland Rainfed Research Station
DA	Department of Agriculture
GDP	Gross Domestic Product
LGU	Local Government Unit
PCAARRD	Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development
PSA	Philippine Statistics Office

ABSTRACT

This dissertation examines ways to improve the economic condition of Queen pineapple through production innovations and marketing strategies. Pineapple cultivation provides sustainable livelihood to many smallholder farmers in developing countries like the Philippines. The number of farmers engaged in the Queen pineapple industry in the country is small compared to other pineapple varieties due to limiting factors such as insufficiency in the capital, lack of technical know-how, poor post-harvest handling and marketing skills, coupled with a poor network, infrastructure, and access to credit programs which result to overall low productivity.

This dissertation aims to fill the gap by focusing on the production and marketing segment of the pineapple value chain. It aims to assess the traditional production practices of the farmers, identify productivity levels in land labor and capital, and compares this to production innovations to provide baseline information on added value and encourage adoption to increase productivity. Also, it aims to identify the profitability of existing marketing practices and the profit share among the marketing players to determine which channel is more productive for farmers and what factors affect channel selection.

This dissertation presented data from a survey conducted from January to March 2022. The selection of samples was made by location. A total of 96 farmers and 32 buyers were interviewed using a semi-structured questionnaire. Descriptive statistics were used to present relevant data on frequency, percentage, and average. Productivity was measured based on the cost and revenue analysis of traditional and production innovations and the input and output ratio in terms of land labor and capital. On the other hand, profitability was measured by calculating the marketing costs, net profit, and margin per channel. The Chi-square statistics were used to test the influence of socioeconomic variables on the farming systems and marketing channels. Further, Fisher's exact test was used to determine the association of socioeconomic variables to the poverty threshold.

Results revealed that the poverty threshold is influenced by educational status, household size, and pineapple cultivation area. Production innovations increased land, labor, and capital productivity and could potentially bail farmers out of poverty. While in marketing, financial pressures hinder most pineapple farmers from choosing the most profitable channel. Quick cash was identified as the primary factor in the selection of marketing channels. A significant relationship relative to marketing channels was traced to the interplay of the

following key elements: gender, civil status, location, and sources of income. Profitability analysis dictates that the optimum channel for farmers is the direct channel, but it requires higher capital for added marketing costs. Income analysis showed that most of the farmer respondents were living below the poverty threshold.

This dissertation proposes five measures to enhance productivity in the production and marketing of pineapple, such as the expansion of production areas through multi or integrated cropping or adopting production innovations for single-cropping; Adopt direct marketing channels to eliminate marketing layers; Seek/maintaining off-farm jobs to augment income and hire farm labor but invest in direct marketing; Regularly seek government assistance/support/in terms of new technologies, capacity training, and seminar; Encourage the participation and support of private investors for the pineapple industry's value chain and Adopt extension strategies such as Establish demo/model farms to encourage farmers to adopt innovations; Conduct season-long training to improve the farming skills of farmers; Provision of techno guide in the local language; and Provide credit programs with low interest/staggered release of loans based on farm activities.

Through the whole process, this dissertation makes two original contributions to the literature: a) the economic evaluation of traditional and production innovations, the productivity level, the profitability of marketing channels, and factors affecting channel selection.

CHAPTER I
GENERAL INTRODUCTION

1.1 Background

The Philippine economy is the 36th largest economy in the world, the 12th largest in Asia, and the 3rd largest in the ASEAN, according to the International Monetary Fund (2021). The Philippines contributes 0.18 percent to the total Gross Domestic Product (GDP) in the world. Its main economic drivers include service (61.05%), Industry (28.89), and Agriculture, Forestry, and Fishing (AFF) sectors (10.07%). The Philippines is regarded as an emerging economy (UNIDO 2020) because of its competitive workforce, which comprises 65% of its population. By the end of 2022, the Philippine population was around 115 million, wherein about a quarter depended on agriculture for livelihood (Statistica, 2022).

With rapid urbanization and the younger generation more interested in the service and industry sector, the agriculture sector needs more government support and intervention to create more jobs and opportunities in the rural areas to ensure food security and reduce hunger and poverty in the country. Based on the Philippine poverty threshold, a family of five requires Php 12,030 per month for necessities and at least Php 8,379 to meet the basic food requirements (Mapa, 2022). Around 30 million Filipinos are considered poor, meaning 1 out of four Filipinos are poor. In rural areas, the ratio is expectedly to be higher since poverty incidence is much higher in rural areas (36%) than in urban areas (13%) (IFAD, 2022).

Maximizing productivity is one of the development goals of the Philippines. Under Sustainable Development Goal (2.3), agricultural productivity must be doubled by 2030, and the incomes of small-scale food producers must improve. Hence, agricultural policies and programs are geared towards enhancing agricultural productivity throughout the whole value chain of priority agricultural commodities in the country.

The Philippines is considered one of the leading exporters of pineapple globally (Reinhardt, 2009; Balito, 2011; Hossain, 2016), which makes the pineapple industry one of the most significant contributors to the country's GDP. The pineapple industry shares 7.2% of the AFF Sector (Statistica, 2022). Pineapple, a perennial herb in the botanical family Bromeliaceae (Bartholomew et al., 2002; Tewodros et al., 2018), has four common pineapple varieties which thrive in the country, namely: a) Hawaiian, b) MD2, both Hawaian and MD2 are produced heavily in Mindanao by giant companies such as DOLE and Del Monte mainly for export, c) the Red Spanish variety, popularly grown in the province of Aklan for fiber production, and d) the Queen Pineapple in South Luzon, primarily produced for domestic demand.

The Queen pineapple has a small core compared to other varieties. It is widely characterized by a tapering shape, deep eyes, and fresh yellow color and is known for its characteristic aroma, crisp flesh, and sweet juice. It is popularly served as table fruit or dessert. The fruit contains Vitamin C and A, calcium, phosphorus, fat, sugar, and carbohydrates. It is generally smaller in size ranging from 0.7 to 1 kg in medium to large classification (PNS, 2004) but sweetest at 14 degrees Brix. The average weight of fruit without a crown varies from 600 to 800 grams (Debnath et al., 2012). In addition, it has strong fiber, which is excellent for cloth material and an alternative to animal leather. Pineapple has a high demand in domestic and has the potential for an international market niche.

The Queen pineapple fresh fruit was exported to Japan, Korea, and Hong Kong from 2002-2007; however, export activities were not sustained due to irregularity of supply because of unprogrammed production and limited area, which is highly concentrated in the province of Camarines Norte.

Figure 1. The Queen pineapple

The Queen Pineapple production in region 5 is concentrated in the province of Camarines Norte due to climate and land suitability. Camarines Norte is located in the Bicol Region in Luzon. The area lies with a latitude of 14.1390° N and a longitude of 122.7633° E. The province has a total area of 2,320.07 square kilometers occupying the northwestern coast of the Bicol Peninsula in the southeastern section of Luzon. It is bounded on the northeast by the Philippine Sea, east by San Miguel Bay, west by Lamon Bay, southwest by Quezon province, and southeast by Camarines Sur.
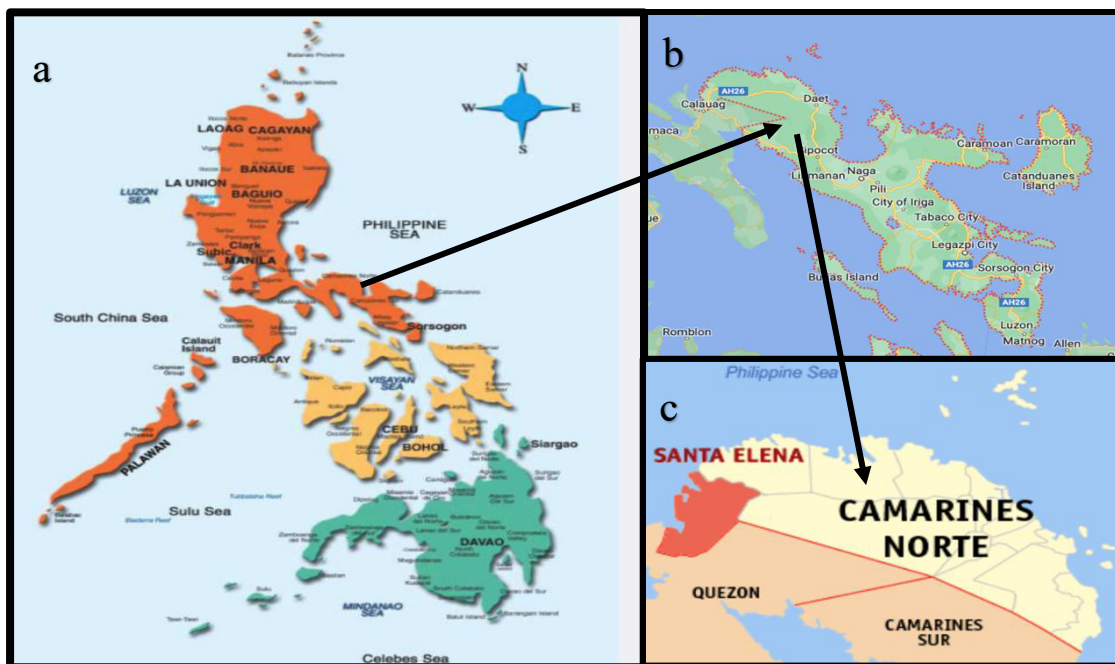
Figure 2. Map of Philippines (a), Region 5 (b) and Camarines Norte (c).

Queen pineapple is suited under a Type II Climate in which there are no distinct dry and wet seasons. Ideal pH ranges from 4.54 - 5.13 at an elevation level of 28-56 feet above sea level. The pineapple plant grows well on clay and sandy loam soil. The ideal rainfall level for other pineapple varieties is within the range of 1000-1500mm/year and evenly distributed during the growing period (Phil. Recommends, 2010); meanwhile, the Queen variety has adapted to a higher rainfall level which ranges from 4000-6500mm/year (PAGASA, 2018).

PSA data showed that the Queen variety is cultivated on around 4,473 hectares in the province, which comprises 97% of the total pineapple production area in the Bicol region and 6.24% of production area in the Philippines, as depicted in Table 1. Of the estimated production yield in Camarines Norte, around 95% of the harvest is sold as fresh fruits. Pineapple, a

perishable good, can last for only two weeks after harvesting; hence, it should be marketed in its prime condition or be subjected to processing to extend its shelf life.

Table 1. Volume and area of pineapple production for CY 2021.

Parameter	Philippines (1)	Region 5 (2)	Camarines Norte (3)	National Share (%) (3/1)	Regional Share (%) (3/2)
Volume (mt)	2,860,202.36	184,202.83	178,696.97	6.24	97.00
Area (ha)	67,117.33	5,015.00	4,473.00	6.66	89.20
Yield per hectare	42.61	36.73	39.95		

Source: PSA 2022

Through the Department of Agriculture, the Philippine government crafted the pineapple national roadmap, which aims to increase productivity, modernize farming tools, methods, and strategies, produce quality agricultural foods, widen the market reach, and enhance global competitiveness. The roadmap aims to provide more job opportunities and income to farmers, promote sustainable and environment-friendly agricultural production, fight malnutrition, and achieve food security, safety, and affordability for all Filipinos.

1.2 Significance of the study

Increasing productivity will encourage farmers and other investors to engage in pineapple production, processing, marketing, and other support business ventures. It will energize the emerging Queen pineapple industry and pave the way to expand production areas and agribusiness-related activities to other provinces and regions. Hence, this paper aims to establish the potential of Queen pineapple production and marketing, especially now that demand for fresh fruit is increasing due to a shift in consumer preferences for a healthy diet. With a demand of 30.58 grams per day and a rapidly increasing population, the domestic market opens vast opportunities for pineapple farmers to produce more, maximize productivity, improve the economic condition, and finally get out of poverty.

1.3 Problem Statement

At the farm level, recommended technologies addressing planting spacing, fertilizer management, and fruit induction were introduced to farmers through pamphlets, training series, and techno demos. However, adoption remains low, and expectedly productivity is still low. Further, there needed to be a holistic recommendation for the Queen pineapple farming system, which analyzes the factors affecting productivity at the farm level and its entrepreneurial environment. The interplay of land, labor, capital, input sources and prices, production players, and marketing partners where the product ends affect farm productivity.

1.4 Objectives of the study

This dissertation aims to improve the economy of the farmers through production innovations and marketing strategies. Specifically, it aims to:

1. Assess the socioeconomic characteristics of the farmers in the study area,
2. Determine the productivity level of traditional practices compared to production innovations,
3. Assess the profitability of marketing channels and factors affecting the selection of channels,
4. Recommend production and marketing strategies to increase productivity.

1.5 Structure of the Dissertation

This dissertation is divided into five chapters. Chapter 1 discussed the agricultural economy of the Philippines and the contribution of pineapple production to the national gross domestic product. The poverty level was presented, which served as the basis for measuring the poverty of pineapple growers in Chapter 2. Further, the initiative of the Philippine government to enhance the Queen pineapple industry was presented, including gaps and limitations of the industry. Some of the gaps were addressed by this study, specifically on production innovations and marketing strategies to enhance productivity. The general objectives and specific objectives were also introduced in this chapter.

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│                  Chapter 1: General Introduction                    │
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│ Evaluation of Traditional and │    │ Affecting the Selection of    │
│ Production Innovations for    │    │ Marketing Channels of Queen   │
│ Queen Pineapple in Camarines  │    │ Pineapple Farmers in          │
│ Norte                         │    │ Camarines Norte               │
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Figure 3. Structure of the dissertation.

Chapter 1 further discussed several works of literature which served as the anchor of this study. For the production section, five pieces of literature were reviewed to assess the existing literature and the gaps that this study seeks to address. For the marketing section, six pieces of literature were reviewed to scan the marketing environment and how this study will enhance the productivity of pineapple farmers through marketing strategies.

Chapter 2 focuses on the socioeconomic characteristics of the respondents, such as age, gender, educational status, civil status, household size, cooperative membership, tenurial status, years in farming, land area, farming systems, and income. The association of the socioeconomic characteristics was analyzed relative to the poverty threshold level. This chapter points out the percentage of farmers living above and below the poverty threshold, which can serve as a basis for the formulation of appropriate recommendations to help improve the economy of farmers.

Chapter 3 highlights the problems encountered in traditional production practices and the level of income generated compared to the benefits of adopting production innovations. This chapter provides data on the estimated productivity level of using production innovations compared to traditional production practices in land, labor, and capital and the estimated area needed to get out of poverty.

Chapter 4 presents the existing marketing channels of Queen pineapple and the factors affecting the selection of channels. This chapter provides data on profitability analysis which covers the profit share of marketing actors from the farmer producer to the consumer, including all intermediaries and the factors affecting the channel selection of the farmers.

Finally, Chapter 5 summarized the findings and provided a conclusion. It also provides recommendations for farmers, enablers such as government agencies and cooperatives, and suggestions for future research endeavors.

1.6 Review of Related Literature

This section reviewed related studies on pineapple using the thematic method. The overview of the production productivity measures and agricultural marketing system of Queen Pineapple follows a multi-paper strategy. This review will touch upon literature on agricultural productivity, land, labor and capital productivity, tenurial system, agricultural marketing system, marketing channels, and factors affecting the selection of marketing channels for Queen pineapple.

The framework of analysis of this dissertation is that production innovations or the applications of productivity-enhancing technologies combined with appropriate marketing strategies result in increased productivity and uplift the farmers' economic condition in the long term, as depicted in the figure below.

INPUT		OUTPUT	IMPACT
Production Innovations	Appropriate Marketing Strategies	Increased Productivity	Increased Productivity
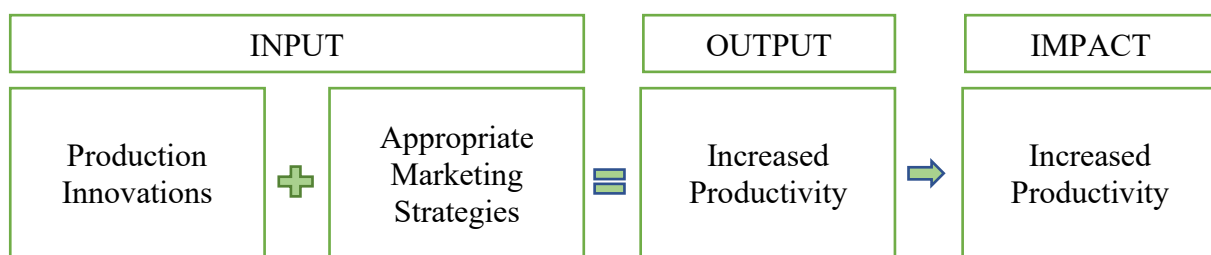
Figure 4. Framework of Analysis

Pineapple production and marketing can increase national income through the expansion of local industries and higher income for farmers involved in its production (Fawole, 2008). It is one of the crops with the most potential in the international market and is highly profitable, an activity that demands a large workforce (Quijandria et al., 1997). Therefore,

pineapple production can be used as a panacea for food security and job generation, help rural development, launch the country on the path of self-sufficiency, increase food production, and help improve lives and health care delivery services (All Africa, 2011).

The Bureau of Agricultural Research (BAR) is an agency responsible for facilitating, conducting, and monitoring all agricultural research under the Department of Agriculture and is also geared toward boosting productivity through the development of various technologies. The Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development (PCAARRD), under the Department of Science and Technology (DOST), is also mandated to coordinate, evaluate, and monitor R & D efforts in the agriculture, aquatic, and natural resources (AANR) sector, is implementing programs to improve the efficiency and competitiveness of the agriculture production base as a supplier of a staple, high value, and cash crops. BAR and PCAARRD have supported research projects to increase the productivity of pineapple nationwide. For the Queen pineapple variety, research projects were focused on cultural management practices, post-harvest handling, and marketing practices.

At the regional level, the Department of Agriculture, Regional Office No. 5, through its research station at the province of the Camarines Norte Lowland Rainfed Research Station (CNLRRS), has long been dedicated to improving productivity and marketability of the Queen Pineapple through the conduct of various production research and technology commercialization. However, technology adoption at the farm level is very challenging and slow; hence productivity remains low, specifically in the production chain.

1.6.1 Agricultural Productivity

In a broader concept, productivity refers to the relationship between input and output. Tangen (2002) tried to harmonize the concept of productivity by gathering the views of managers and workers and concluded that it is impossible to come up with one exact definition applicable to all. However, he highlighted that productivity's essential features are performance, profitability, effectiveness, and efficiency.

There are two types of productivity measures, partial productivity, and total factor productivity. Sustainable prosperity points out (2015) as cited by (Murray & Sharpe, 2016). A partial productivity measure relates output to a single input. For example, labor productivity is the output per hour worked; capital productivity is the output per unit of capital. On the other hand, total factor productivity measures an index of output to a composite index of all inputs.
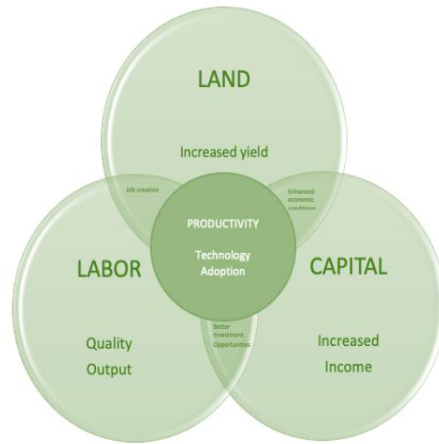
Figure 5. Conceptual Framework.

Figure 5 depicts the conceptual framework of the study on economic evaluation of traditional and production innovations in Chapter 3, based on the three dimensions of productivity. In this chapter, the term productivity is dependent on the use of resources such as land, labor, and capital. The efficient use of these resources is correlated to the increase in productivity. The higher the efficiency, the higher the productivity. Selected variables are used to measure efficiency, such as yield per hectare, quality of output (harvest), and return on investment.

Land productivity is intertwined with labor productivity. Yamauchi (2021) argued that labor-intensive cultivation was only efficient when labor was abundant relative to land. However, when areas are consolidated for economies of scale, labor becomes expensive, and equipment needs arise to substitute for labor. Hence the wider the land area, the higher the labor productivity. When Expansion happens, higher capital is needed to finance fixed capital and increase input volumes such as fertilizer and other operational costs. The higher the capital, the higher the land productivity. This positive correlation is shown in data on fertilizer use relative to land productivity in Pakistan, India, and Sri Lanka (US-DA, 2019), as cited by Yamauchi (2021). However, Eze et al. (2011) explained that an increase in farm income due to an increase in productivity may last for a long time. In the long run, as a farm adopts more productive inputs and practices, it may lead to increased output supply and a possible lowering of farm output prices and income.

Nevertheless, when it comes to the issue of land productivity, it is best to weigh whether low production is an effect of limited land or if land efficiency is not maximized. Few wealthy people monopolize land ownership, while about 70% of farmers are landless (USAID, 2011).

Most of these landless farmers become tenants or leaseholders, cultivating an average area of 1.29 hectares (PSA 2012.)

1.6.2 Tenurial Status

There are major land categories in the Philippines, a) protected areas and b) alienable and disposable land. A protected land area is a public domain classified as valuable because of biological diversity and natural or cultural resources. Meanwhile, alienable and disposable lands refer to lands of the public domain, which can either be agricultural, commercial or industrial, educational, or reserved for towns and public use (RA 2874, Sec. 9). Farmers can either utilize public land classified as agricultural, which may be deemed private upon issuance of the certificate of verification from DENR or private lands acquired through purchase or inheritance. Land use rights are given to those who have rights to own land, use land, occupy land, or inherit the land. The 1935 version of the Philippine constitution states that only Filipino citizens and corporations with at least 60% of the shares owned by Filipinos are entitled to own or acquire land in the Philippines.

The total land area used for agricultural crop cultivation in the Philippines was around 13.42 million hectares, mainly utilized for cultivating rice, corn, and coconut (PSA, 2022). In Camarines Norte, most of the pineapple crops are planted under coconut. Crop prioritization depends on the land tenure system. Food and Agricultural Organization (FAO) defined land tenure as the relationship, legally or customarily defined among people, with respect to land-related resources (Quizon, 2017, as cited by Villapando et al., 2019). In the area of study, tenurial status has three types such as land owner, tenant, and leaseholder. Share tenancy is a system of joint undertaking where one party furnishes land, and the other party provides labor (RA 2263 sec 4). Based on the Act of tenancy, the landholder shall furnish the tenant an area of no less than one thousand square meters where the tenant may construct his dwelling, raise vegetables, poultry, pigs, and other animals and engage in minor industries, the product of which shall accrue to the tenant exclusively.

1.6.3 Labor Productivity

Labor productivity is measured by wages for agricultural laborers or own farm output (Haddad, L & Bouies, H.E). There are three factors to consider in increasing labor productivity: education, health, and technological progress. In this context, the number of years in education is correlated to an increase in labor productivity (Yunhua et al., 2000; Duryea and Pages, 2002 and Razzak and Timmins, 2007; Chansarn S, 2010), health is measured at birth by life

expectancy (Leroex et al., 2003; Hazan, 2006; Knapp, 2007 and Chadha, 2008) and the last factor is measured by the growth rate of total productivity (Chansarn, S. 2010).

Based on the Family Income and Expenditure Survey, the typical Filipino farmer earns an average annual income of P100,000 below the poverty line of 108,000 (PSA, 2016). Other sources say it could be higher if farms are located in nearby cities, then monthly income could go up to Php 16,930 per month or 203,160 per year. However, the reality in the rural areas is that farm wage is low, and farm gate prices of products are also low, resulting in low income and a slow reduction of poverty in the countryside.

Briones (2017) mentioned in his paper that agriculture tends to have the least educated workforce compared to services and industry. About one-third of agricultural workers did not finish primary school. Whereas about half of workers in industry and services are tertiary undergraduates, only a quarter of agricultural workers are.

1.6.4 Poverty Status

Poverty in farming is equated to land area, tenurial status, and literacy level. These factors influence the level of capacity of the farmers to generate income. The common notion is that the higher the area, the higher the income; hence those who are landless strive to save money to procure lands, and those with lands strive harder to expand. However, the interplay of these factors is more complicated in the Philippine scenario. The literacy level in the Philippines, which refers to adults who can read and write, is 96.29%. However, school dropout rates are higher in rural areas; in most farming communities, elementary graduates and high school level students tend to marry early than pursue college degrees. Later in life, they inherit land from farming parents and traditional farming practices.

The fundamental problem of the majority of the farmers is that they need more money to buy or rent the land. They till more to save enough capital from financing the whole production cycle of long-term crops like rice and pineapple. Farmers often seek money lenders or borrow from large farm owners to finance farm capital. To address this, the government has devised ways for farmers to avail of low-interest loans to finance production costs. Some notable initiatives are Landbank's credit programs and the Agriculture Credit Policy Council (ACPC). The land bank offers the Sulong Saka Program, which aims to provide credit assistance to farmers cultivating high-value crops to support production, processing, and other agribusiness projects. At the same time, the ACPC offers the Agri-Negosyo Program (ANYO) for agri-fishery-based, micro, and small enterprises at zero interest rate payable in 5 years.

In the Philippines, there are 14 basic sectors (RA 8425) which include farmers and fisherfolks, indigenous people and cultural communities, workers in formal labor and migrant workers, workers in the informal sector and cooperatives, and others. Among these sectors, rural farmers registered the highest poverty incidence at 31.6% (PSA, 2018). Region 5 ranked 4th in poverty incidence among 81 provinces. According to PSA, poverty incidence is the ratio of families or individuals with per capita income less than the per capita threshold of the total number of families/individuals. Among the six provinces in region 5 the highest poverty incidence is in Camarines Sur at 34.6% (cluster 2), while to the location of the study, Camarines Norte is 4th at 20.9% (cluster 3). Cluster 1 indicates the bottom (poorest) of the provinces.

1.6.5 Marketing Channels and Profitability Analysis

In the marketing of agricultural products, profitability depends on the selection of marketing channels, according to Panda (2012). A sound channel selection is based on sufficient marketing information, strong negotiation skills, and a more comprehensive network. Several studies were conducted along this line to understand profitability in different channels (Gessesse et al., 2019; Wijesooriya, V.R. et al., 2020; and Kaido, 2020) and the factors affecting the selection of channels (Sigei et al. (2014) Apandi et al. 2017; Galvez, 2019; Nahar et al., 2020). However, no specific study on the profitability and the factors affecting the selection of marketing channels for the Queen pineapple variety was ever conducted.

Ten pineapple farmers' associations and four cooperatives are actively enhancing the pineapple industry in Camarines Norte (Office of the Provincial Agriculturist). The industry is known for its high potential (Balite, 2011), mainly as table fruit. Value creation and product development are still at a fledgling stage initiated by the cooperative. At present, the majority of the farmers are focused on production and have limited market participation.

There are several studies about pineapple marketing channels. Some of them analyzed the profit margins of farmers and intermediaries. A study in Southern Ethiopia indicated the participation of primary and secondary actors in the production and marketing of pineapple. Findings from these studies showed that processors cornered the highest profit margin at 33.43%, retailers at 26.96%, wholesalers at 18.33%, and assemblers at 11.86%. The producer had the lowest share of profit margin among the actors at 9.41% (Gessesse et al., 2019).

In Sri Lanka, the highest profit margin went to the retailer at 14-20%, the farmer at 9-13%, and collectors at 5-7%. The lowest share of the profit margin went to the wholesaler at 4-8% (Wijesooriya, V.R. et al., 2021). However, a study in Jambi Province, Indonesia (Kaido, 2020) indicated that farmers had the highest profit margin among actors at 36.25%, followed

by middlemen – at 26%, wholesalers – at 17.82%, local home industry at around 11%, while the local trader cornered the lowest share at 8.93%. In the previous studies, the profit share among concerned sectors was vastly different. This was due to differences in marketing channels and market competitiveness among concerned sectors.

The factors affecting farmers' selection of marketing channels were also analyzed in previous studies. In Isabela, Philippines, there were six (6) marketing channels and four (4) intermediaries, namely: canvassers, traders, processors, and retailers. The factors identified in choosing a marketing channel were based chiefly on loyalty (usual buyers), quality (in terms of size and product handling), and price (based on volume and win-win terms). Galvez (2019) concluded that most of the farmers in Isabela were not keen on prioritizing the marketing activities of their produce.

There were seven marketing channels identified in Sarawak Malaysia, but farmers were inclined to use limited channels due to a need for more awareness. Several factors affecting the choice of channels were identified in Malaysia; these included: 1) price, quantity, and quality of the product; 2) distance between the farm and market center; and 3) service rendered by buyers. Apandi et al. (2017) believed that appropriate marketing channels reduce losses and increase income; hence, marketing information on the availability of marketing channels was crucial. A more recent study by Nahar et al. (2020) in the same area showed five factors affecting farmers' choice of marketing channels, similar to Apandi et al., with the addition of product perishability.

There were only three (3) marketing channels in Jambi Province, Indonesia. Farmers sold large quantities of pineapple directly to the wholesaler while the other two channels passed through the intermediaries. Factors affecting the choice of channels based on channel description were a) grading, b) marketing arrangement, and c) the urgent need for money (Kaido, 2020).

There were six (6) marketing channels in West Bengal, India. Two (2) had the complete chain mechanism. Only one channel is attached contractually with the private processing unit, for which information seems to be limited for analysis; the sector has a high capacity to provide rural employment. The factor affecting the choice of marketing channel was not discussed.

In Kericho County, Kenya, the number of channels was not identified. However, Sigei et al. (2014) identified six factors affecting the choice of marketing channels of smallholder pineapple farmers, namely a) gender, b) group marketing, c) price information, d) pineapple yield, e) contract marketing, and f) vehicle ownership. The findings suggested that males as

heads of the household are more risk-takers and market-oriented than female heads of households.

Most of the previous studies indicated several marketing channels and various factors affecting farmers' selection of the channels in the study areas, wherein the dominant factors zeroed in on issues related to market information and the quality of products.

CHAPTER 2

ASSESSMENT OF SOCIOECONOMIC CONDITION OF FARMERS

2.1 Introduction

Smallholder farmers in the area of study engaged in pineapple enterprise are contained in the production chain and need more marketing participation. Capital, knowledge, and support systems limit their involvement in the overall value chain process. Limited resources and sufficient production and marketing information put the farmers at a disadvantage regarding income and productivity. Low income means poor purchasing capacity to buy the basic food requirements and finance other necessities such as a decent house, education, and medication expenses. Low income also implies a limited budget for critical production resources such as quality planting materials, fertilizer requirements, and marketing expenses.

This chapter aims to profile the key actors in the pineapple production and marketing chain. It highlights the socioeconomic status of the farmers in terms of land area, farming systems, and income, among others. These characteristics dictate the capacity of the farmers to produce pineapple in large volumes and sustain production. More so, the economic condition of the farmers affects the adoption of production innovations and marketing strategies as it entails additional capital, network, and technical know-how. Further, this chapter attempts to profile the buyers and their capacity to purchase, distribute and market the pineapple products.

Pineapple farmers in Camarines Norte are mostly smallholders cultivating pineapple on a limited scale. The average cultivation area of surveyed farmers was 1.2 ha. While the average cultivation area of total pineapple farmers in Camarines Norte investigated in 2018 was 0.86 ha. Since the cultivation of pineapples in the region has been expanding, it is possible that the surveyed farmers also expanded the cultivation area. However, it is necessary to keep in mind that the surveyed farmers may be biased toward the stratum with large cultivation areas. As will be described later, no statistically significant relationship was found between the pineapple cultivated area and the selection of marketing channels, farming types, or the source of income.

Farms are dispersed, and farmers mix pineapple with short-term crops for personal consumption and as a source of added income. There were active cooperatives in the area as well as active pineapple farmers association in most of the municipalities in the province, which benefits farmer members through production loans, training on processing, and product development. Pineapple farmers' key challenge is the source of capital in sustaining the long-term cycle of pineapple cultivation, which can take up to 14 months before harvesting and another four months to get the planting materials from the mother plant. In addition to financial

concerns, many other factors affect farmers' decisions, from planting, cultural management practices, and harvesting to marketing products.

2.2 Methodology

2.2.1 Research Design

This dissertation used a descriptive research design. The descriptive type utilized qualitative and quantitative methods to gather primary and secondary data. Primary data were obtained through a survey. Semi-structured questionnaires (Appendix A & B) were developed and used in gathering information from the personal interview. A total of 96 farmers responded to the survey conducted in January-May 2021. For intermediaries, 32 respondents composed of an agent, wholesaler, retailer, and processor were purposively selected. Secondary data were gathered from Local Government Unit offices, the Department of Agriculture, and refereed journals.

2.2.2 Tools of Analysis

Descriptive statistics such as frequency, percentage, and average were used to present the socioeconomic characteristics of the respondents. Chi-square Statistics and cross-tabulation analysis were done using IBM SPSS v 25 to determine the association of socioeconomic variables to production systems and marketing channels. Income was classified according to sources (on-farm and off-farm) and farming systems (single, multi and integrated) and analyzed based on the Philippine Poverty Threshold.

2.2.3 Location of the Study

The study was purposively conducted in Camarines Norte, where 7% of the total pineapple production in the country was produced (PSA, 2020). Major producing municipalities are Basud, San Lorenzo Ruiz, San Vicente, and Labo. Buyers are concentrated in the municipalities of Basud and Daet, while the two most active cooperatives are located in Basud and Labo. Meanwhile, a government-funded trading center for agricultural commodities is located in Vinzons, which also trades pineapples.

Municipality	Existing area (ha.)	Farmers
Sta. Elena	53.00	49
Capalonga	43.00	58
Labo	155.50	217
Jose Panganiban	45.40	67
Paracale	58.13	41
Vinzons	4.08	6
San Vicente	105.70	117
Talisay	7.30	15
Daet	84.92	88
Basud	915.53	933
San Lorenzo Ruiz	460.16	649
Mercedes	16.95	25
Total	1,949.67	2,265
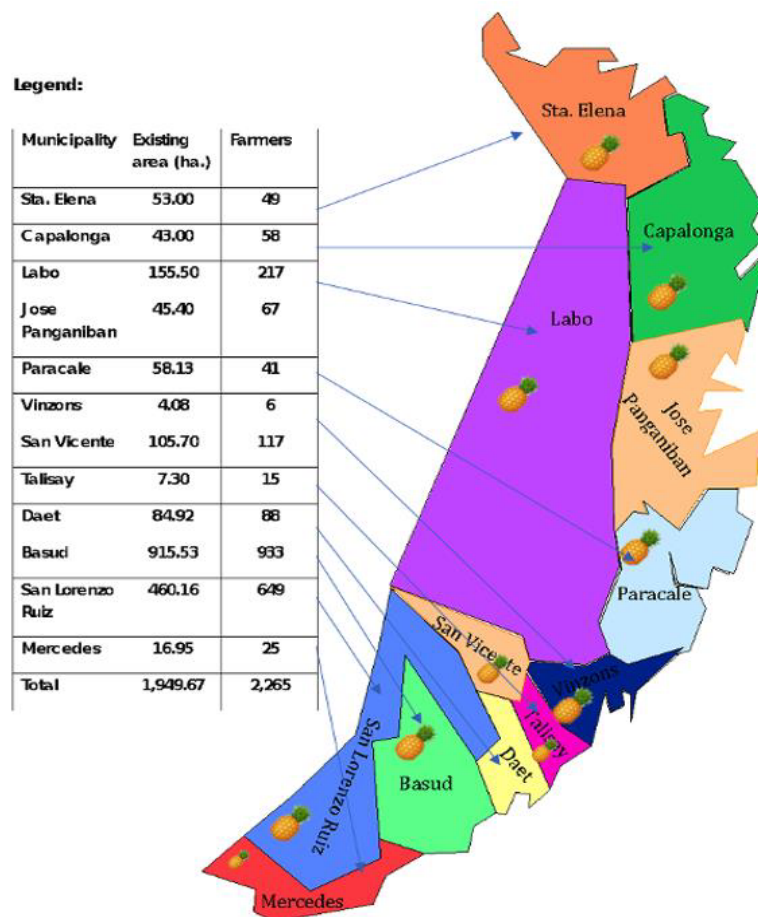
Figure 6. Location of the study.

2.2.4 Sampling Method

The samples were selected by area. Area sampling is a form of cluster sampling where samples are clustered geographically. The number of samples was derived using the Slovens formula. The sample size was divided by ratio and proportion to the number of farmers in every municipality based on the previous survey. The conduct of the survey coincided with the onset of the pandemic. The author conducted an online orientation for hired enumerators. A pre-test was also conducted prior to the actual conduct of the survey. The enumerators were able to interview within the province since, during the pandemic, strict control was only implemented in provincial borders. The respondents interviewed were a member of the household who was actively involved in pineapple production and could provide detailed answers such as the amount of fertilizer application, the timing of induction, costs, income, and marketing channels used, among others.

Table 2. Number of samples by municipality.

Municipalities	Total No. of farmers (2018)	Number of target samples	Number of actual respondents
District 1			
Basud	933	40	41
Daet	88	4	5
Mercedes	25	1	1
San Lorenzo Ruiz	649	28	24
San Vicente	117	5	5
Talisay	15	-	
Vinzons	6	-	
District 2			
Capalonga	58	2	4
Jose Panganiban	67	3	
Labo	217	9	11
Paracale	41	2	3
Sta. Elena	49	2	2
Total	2265	96	96

2.3. Results and Discussion

This section discussed the socioeconomic characteristics of the farmers, the sources of income, and the income generated by farming systems relative to the poverty threshold. The profile of buyers or intermediaries was also presented.

2.3.1 Socioeconomic characteristics of the farmers

Table 3 shows that both males and females participate in pineapple production. However, due to labor-intensive and time-consuming activities involved in pineapple production there was more participation by male respondents (68%) compared to female respondents (32%). The majority (66%) fell within the bracket of 41-60 years old, with a mean age of 48. This is younger compared to the national average age of farmers at 57 years. The result implies higher participation of middle-aged farmers than younger and old-age farmers in pineapple cultivation (Campita, et al., 2022). Similar to the findings of Balogun et al. (2018) that pineapple production is dominated by farmers who are of active age. The findings imply that pineapple growers can still adopt new technologies given the proper training. Esiobo et al.

(2014a) reported that farmers within the age range of 41-50 are still in active age, more receptive to agricultural innovation (Ajibefun, 2022), and could withstand the stress and strain involved in agricultural production.

Table 3. Socioeconomic characteristics of farmers.

Variable	Frequency	Percentage	Average
Gender			
Male	65	68	
Female	31	32	
*Age			
21-30 Years Old	5	5	
31-40 Years Old	16	17	
41-50 Years Old	29	31	48
51-60 Years Old	33	35	
61-70 Years Old	10	11	
Civil Status			
Single	4	4	
Married	81	85	
Widow	4	4	
Separated	6	6	
Educational Level			
Elementary	29	31	
High School	47	50	8.5
College	16	17	
Masteral	2	2	
Household Size			
1-3	21	24	
4-6	56	62	5
7-9	9	12	
10-12	3	2	
Tenurial Status			
Owned	39	42	
Tenant	26	28	-
Leaseholder	28	30	
Coop Membership			
Member	32	34	-
Non-Member	62	66	

Results showed that the mean household size is 5 persons. Most (62%) respondents have an average member of 4-6 heads. Hence, it implies that the household size in the study area is enough to provide family labor for a small parcel of land if needed. Before the pandemic, some households experienced a shortage of labor since young members of the family preferred off-farm jobs in urban areas. During a pandemic, massive termination of contractual works in the cities forced the unemployed to return home and provide assistance in on-farm jobs. However, this movement which results in increased available labor, may be temporary and must be observed after the pandemic.

Coop membership is low at 32%. Some benefits of cooperatives are free training and production loan with low interest. However, the manager of the cooperatives complained of low payment rates, and in the long run, the capital and savings of members are used to pay the loans, and membership becomes null and void. Most of the respondents need a better appreciation of the benefits of the cooperative and prefer to farm as individual farmers. Falling out of members may also threaten the cooperative's very existence. Dimas et al. (2022) cited that despite financial support from various sources, many cooperatives need help to remain viable.
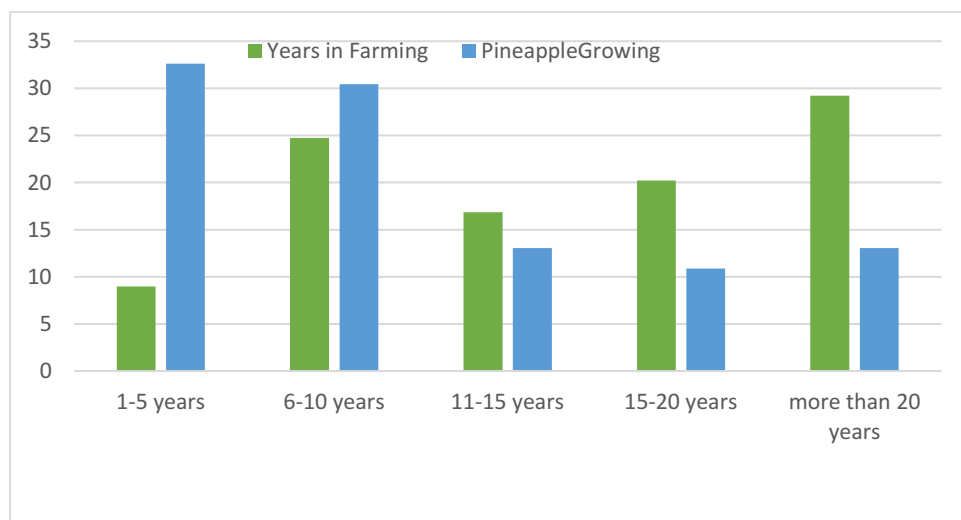
Figure 7. Years in farming and years in pineapple growing of respondents.

The majority of the farmers have an average farming experience of 22 years, while years in pineapple cultivation were 17 years. Most of these farmers grow coconut prior to planting pineapple. A coconut tree bears fruit after 6-10 years, but the peak of production is 15-20 years. As shown in figure 7, the years in farming showed that around 30% of the respondents were involved in farming for more than 20 years. This implies that these respondents have been cultivating crops before engaging in pineapple production. On the other hand, more than half of the respondents were involved in pineapple cultivation for 1-10 years. Hence, these farmers may be experienced in farming but are still learning pineapple cultivation practices.

Several agencies and institutions such as Japan International Cooperation Agency (JICA), DA, and Philippine Coconut Authority (PCA) have encouraged farmers to engage in crop diversification to increase income through the development of a Promotion Manual for intercropping designed for extension workers to guide the farmers (JICA Report, 2016). Further, the Labo Progressive Multi-Purpose Cooperative has led the pineapple promotion activities since 2006 and has benefited more than 1,000 farmers involved in pineapple production and processing (Campita, 2022).

It can be noted that most of the pineapple farmers have experienced cultivating other crops and gained experience in doing farm activities prior to pineapple farming. Onubogu and Esiobo (2014) believed that farmers with a high number of years in farming are expected to conduct more efficient production management systems and have better decision-making. The implication is that experienced farmers are more familiar with the problems encountered in the field and are more likely to resolve them based on previous experiences.

Respondents have an average land area of 3 hectares planted with mixed crops such as coconut, rice, pineapple, and lowland vegetables, among others. The average area allotted to pineapple cultivation was 1.2 hectares. Table 4 shows that out of 57% of the respondents with an area ranging from 2-5 hectares, 52% allotted 1-2 hectares to pineapple cultivation, implying that if one crop is more profitable, expanding the area is also feasible at the expense of low-income crops.

Table 4. Number of respondents by land area.

Total Land Area (ha)	Pineapple Land Area (ha)					
	-0.5	0.5-1	1-2	2-3	3-	Total
-1	5	5	2	1	0	13
1-2	3	5	5	0	0	13
2-3	2	5	13	4	0	24
3-5	5	4	16	4	2	31
5-10	0	5	3	1	3	12
10-	0	0	2	0	1	3
Total	15	24	41	10	6	96

There are three types of tenurial status of the farmer respondents; the first type is landowners, which refers to a person who has the legal right to the land by inheritance or deed of sale. The owner can enjoy and dispose of the land without limitations other than those established by law (Article 435). The second type is the tenants, who are entrusted to manage the land while the owner is either busy or away working in other areas of the Philippines or abroad. Some tenants live on the owner's farm and, depending on the trust and confidence of the owner, may decide which crops to plant. Profit-sharing arrangement varies depending on the agreement.

The third type is the leaseholder, which either rents the land for pineapple production or borrows the land in exchange for labor, such as cleaning the land area and doing other farm jobs as payment. Table 5 shows that out of the 57% of the farmers with an area ranging from 2-5 hectares, 48% were owned, and 24% were the tenant. The average area cultivated by owned and tenant respondents were also higher than the leaseholders. This means that these types of farmers can decide on crop prioritization and adopt new practices. Hence, these groups must be the target for the orientation of production innovations.

Table 5. Tenurial status of farmers by total land area.

Tenurial Status	Land Area (ha)						
	-1	1-2	2-3	3-5	5-10	10-	Average
Owned	2	2	13	13	7	2	4.12
Tenant	1	9	4	9	2	1	3.02
Leaseholder	9	1	7	8	3	-	2.50
Total	12	12	24	30	12	3	

2.3.2 On-farm and off-farm income of farmers

On-farm income of farmers varies based on the farming system used. There were three commonly practiced farming systems in Camarines Norte, namely, a) single-crop farming, b) multi-crop farming, and c) Integrated farming with livestock raising. Coconut is the most dominant crop in the study area, combined with other crops planted underneath.

Single-crop farming refers to the farming system which solely plants pineapple in a production area. However, in this paper, single crop refers to farmer respondents solely planting pineapple in an open area or under coconut. It implies that some farmers rent or borrow the land on special arrangements to plant pineapples. Farm activities are solely focused on Queen pineapple production, which includes preparation of inputs and land, planting, fertilizer application, weed control, pest management, application of growth regulators (optional), and harvesting. Some are traders involved in backward integration, renting land to plant pineapples.

On the other hand, mixed cropping refers to the farming system where multiple crops are grown in a single field simultaneously (CGIAR, 2022). In this case, the pineapple was planted under coconut while growing other crops. In this study, preference for a multi-crop farming system accounts for 44%, almost half of the respondents. This is similar to the findings of Stark et al. (2018) that the multi-crop farming system accounts for almost half of the world's food production, often in the context of smallholder agriculture. Pineapple is a long-duration crop and can be grown in a rice-based cropping system after the harvest of khalif rice in Eastern India (Verma et al., 2020). Coconut-based cropping system is also one of the sustainable cropping pattern models to enhance economic viability (Thomas et al., 2019). Additional activities are conducted, such as harvesting coconut, de-husking, and hauling to the nearest road of de-husked coconuts.

For an integrated farming system, cropping activities were simultaneously conducted with growing animals like a pig for fattener. Crop livestock integration refers to a farming system that plants pineapple simultaneously with other crops like coconut, vegetable, rice, and banana while raising animals. It is an agroecological way of farming as it reduces negative environmental impacts (Ryschawy et al., 2018) and could improve resilience and production efficiency (Stark et al., 2018). In the area of study, the common animals raised while cultivating pineapple were chicken, swine, and carabao. Carabao was used for hauling agri-products and inputs and on land preparation for manual plowing and harrowing. The chicken meat was primarily for personal consumption, while swine growing was mainly on a backyard basis with

3-5 heads. Crop livestock integration requires additional capital and labor but increases land productivity by providing added income without expanding the area.
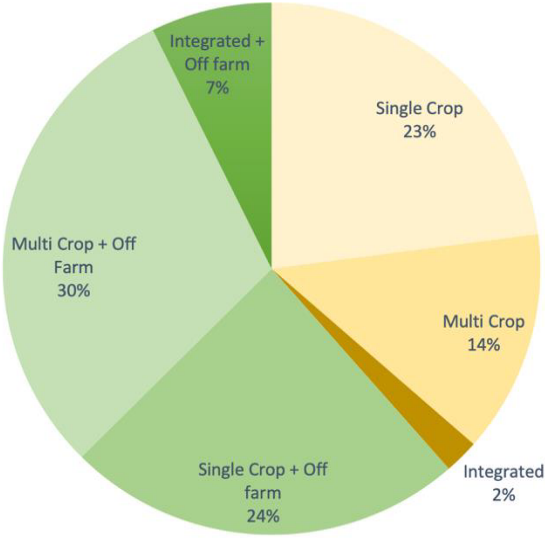
Figure 8. Sources of Income of Queen Pineapple Farmers

To augment the on-farm and household financial budget, 62% of the farmers had off-farm jobs, as shown in figure 8. Off-farm jobs vary by educational status; respondents with college degrees have secured formal jobs, such as government employees or barangay officials, with an average wage per day of 600.00. In comparison, low-educated farmers can only engage in informal jobs such as driver, construction worker, and miner, with an average daily wage of 365.00.

Figure 8 shows that aside from farming systems, farmers are further classified into two sources of income on-farm and off-farm. Those who rely solely on on-farm income practice either single, multi, or integrated farming systems. This group can provide added hours of labor and focus only on farming but tend to need more capital to sustain the financial requirement of pineapple production. The second group, which combines on-farm and off-farm jobs, also practice either single, multi, or integrated farming system in combination with work outside the farm. When farm activities require additional labor, off-farm income was utilized to pay for hired labor to do farm activities. Further, this group expectedly to earn more and provide more investment in pineapple cultivation than farmers without off-farm jobs.

Table 6. On-farm and off-farm average annual income per household member.

Source of income	Frequency	Average pineapple area (ha)	Ave. farm income (Php)	Ave. off-farm income (Php)	Ave. total income (Php)
Without Off farm Job					
Single Crop	22	1.23	5,444		5,444
Multi-crop	13	.95	11,324		11,324
Integrated	2	.63	16,779		16,779
With Off farm Job					
Single Crop	23	1.10	13,524	8,885	20,886
Multi-crop	29	1.24	19,999	14,657	32,083
Integrated	7	1.30	20,399	13,151	33,551
Total/Average	96	1.16	15,633	10,579	23,574

Table 6 shows the sources of income of respondents, such as on-farm and off-farm. The first group solely relied on on-farm income using different farming systems (38%), while the second group combined off-farm income from different farming systems (62%). In terms of the farming system, almost half of the farmers use single crops (47%), followed by multi-crop (44%), and the least preferred was integrated (9%). In terms of income, those without off-farm jobs have low incomes below the poverty threshold. Only multi-crop and integrated farming systems generated income sufficient for basic food requirements.

On the other hand, those with off-farm jobs have an expectedly higher income because of combined sources of income. It can be deduced that this group also has higher capital invested in pineapple cultivation, which can be seen in higher on-farm income wherein the multi and integrated farming system generated an income almost enough for the food basic requirement threshold. Combining the on-farm and off-farm income generated an income above the food requirement for a single crop and above the poverty level threshold for a multi and integrated farming system.

Table 7. Association of poverty threshold to socioeconomic factors of the respondents.

Variable	Fisher's exact test	Significance
Age	4.174	0.378
Gender	0.127	1.000
Civil Status	1.660	0.487
Educational Attainment	10.904	0.022*
Number of household	14.403	0.003**
Coop Membership	2.093	0.383
Tenurial Status	2.848	0.610
Years in Farming	3.875	0.433
Years in Pineapple Growing	3.830	0.422
Total Land Area	1.727	0.454
Pineapple Land Area	6.553	0.033*

*significant (≤ 0.05)
**highly significant (≤ 0.01)

Table 7 shows that the statistically significant factors influencing the farmers' economic status were educational attainment, household size, and pineapple land area. Cross tabulation in educational level showed that most respondents with income below the poverty threshold were in elementary and high school. It can be noted that despite the high literacy level of farmer respondents, which means basic knowledge of reading and writing, it does not equate to the capacity to apply production innovations and capacity to secure high-paying off-farm jobs.

Expectedly the number of households affects the entire budget of the farmers for personal and on-farm expenditures. The higher the number of households, the higher the financial requirement for basic needs such as shelter, food, and education, eventually affecting the budget allotted for pineapple production. In effect, higher household expenditures reduce production capital. The lower the production capital, the less likely to harvest quality fruits and sell them at higher prices. It should be noted, however, that the baseline data used is intended for the household with a family member of five, which was divided into the individual requirement to consider the different household sizes of the respondents. It must be kept in mind that individuals within the household have different needs and expenditures; hence if looking at the holistic view of poverty, it is best to convert the values back to the household level.

In terms of area, pineapple land area influences the poverty level of the farmers; this implies that despite the larger area for farming, pineapple cultivation has a more significant impact on the income level compared to other crops. The association implies that expanding the area for pineapple using existing practices can bail the farmers out of poverty.

Table 8. Cross tabulation of socioeconomic factors of the respondents relative to poverty threshold.

Variable	Less than basic food	Less than poverty threshold	More than poverty threshold
Average HH size (persons)	5.5	3.9	3.8
Average pineapple area (ha)	1.07	0.77	1.48
Educ status			
Elementary	17		4
High School	11	8	8
College	8	2	4
Total	36	10	16

The cross-tabulation results shown in Table 8 reflect the socioeconomic factors of the farmers relative to the poverty threshold. It can be noted that the poor farmers living in poverty are those with larger family household sizes with 1 hectare and below cultivation area for pineapple and mostly were in elementary and high school levels. The number of households affects the overall budget for personal and on-farm. To live more than the poverty level based on existing income, the household must only have a maximum of 4 members. Meanwhile, if using traditional practice, the pineapple cultivation area must be at least 1.5 hectares to generate income more than the poverty line. Most of the elementary and high school farmers are living below the poverty line and food basic requirement. The data implies that farmers require capability training to improve practical knowledge that can help them increase their income.
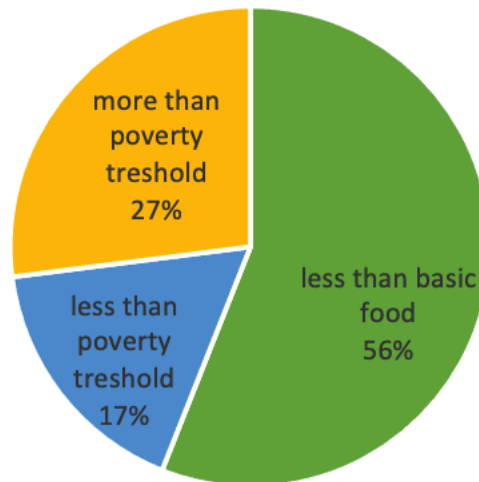
Figure 9. Economic Status of Surveyed Farmers

Based on the Poverty Threshold

The farmers' income was derived from the average income of farmers in 2019 and 2020. According to PSA (2021), the poverty threshold is P12,040 per month for basic necessities and P8,379 for food requirements for a household with five family members. Since this threshold is the amount for a family of five members, to estimate the standard amount for each family with a different number of household members, this standard amount was divided by five to calculate the amount per household member. The individual poverty threshold is P2,406 per month or P28,872 per year, while the individual food requirement is P1,675 per month or 20,110 per year. By multiplying this amount by the number of household members, we calculated the estimated income per household. As a result of this estimation, the farmers whose incomes were less than the basic food requirements were 36 (56%), those whose incomes were less than the poverty threshold were 11 (17%), and those whose incomes were more than the poverty threshold were 17 (27%).

2.3.3 Socioeconomic characteristics of the buyers

A total of 32 respondents were purposively selected for the survey for intermediaries. Women dominate the trading aspect, mostly 41-50 years old, married, and highly educated, with an average household size of 5. This implies that buyers have higher educational and financial literary levels than their farmer counterparts. The majority operated with a capital of Php 500,000.00 and below (72%). Only one had a capital of 1 million, and two had more than

two million. The rest preferred not to disclose information on capital.

Channel intermediaries are among the most critical elements of any supply chain, as the bulk of output passes through them (Sharma et al., 2020). The Queen pineapple marketing channel has up to three layers of intermediaries. The first layer is the intermediaries who purchase pineapple from farmers, the second layer is the wholesalers who transact through agents, and the third layer is the retailers who purchase from the wholesaler. These retailers who purchase products from the wholesalers are mostly based in Metro Manila. Table 9 shows the absorptive capacity of the first layer of channel intermediaries who purchase directly from farmers.

Table 9. Characteristics and absorptive capacity of intermediaries in the marketing channels of Queen pineapple.

Intermediaries	Nature of business	Location	Qty. per transaction (pcs)	Volume traded per month (MT)	Destination	Form of commodity
Agent	Not registered		25,000	up to 160		
Wholesaler	Registered or	Farm Site			Metro Manila	Fresh
	Not Registered	Farm Site	20,000	up to 20	Bicol Region	Fresh
Retailer	Not Registered	Farm site/ Market Outlet	15,000	up to 4	Camarines Norte	Fresh
Processor	Registered	Consolidating /Processing Area	3000-25,000	1-160	MM/Bicol/ CN	Processed and Fresh

The wholesalers have the largest absorptive capacity of up to one truckload per transaction. Wholesalers are concentrated in the municipality of Basud, where a large plantation of Queen pineapple is located. They offer cash advances to farmers during the production period from planting to fruiting, harvest the fruits through hired laborers, and haul the harvest from the farm to the access road. Cooperatives mainly processed small-sized fruits into juice, jam, dried pineapple, wine, vinegar, and many others. During peak season from April to June, cooperatives act as wholesalers or retailers. One cooperative provides the delivery vehicle to farmers who want to transact directly with retailers in Metro Manila. Logistics costs were deducted from the gross sales but proved more profitable than selling pineapples to local traders.

Table 10. Distribution of harvest per channel.

Intermediaries	No. of respondents	Total harvest for one cycle (pcs)	Percentage (%)
Agent	17	317,650	20
Wholesaler	57	1,043,843	67
Retailer	3	62,120	4
Direct	4	81,050	5
Multiple	12	63,580	4

Intermediaries play a crucial role in Queen pineapple marketing, with 95% (Table 10) of the products passing through them before reaching consumers. Except for direct, where the farmer sells directly to consumers, all channels were indirect, where farmers sell to intermediaries. Since traders only commissioned agents, the absorptive capacity is the same as that of wholesalers.

Table 11. Location of buyers.

Type of Buyer	Location					
	Basud	Daet	SLR	SV	Vinzons	Total
Agent		4				4
Trader	11		1	1	3	16
Cooperative	2	2				4
Processor			1			1
Retailer	1	2	2		2	7

Camarines Norte is divided into two congressional districts. Basud, Daet, San Lorenzo Ruiz, and San Vicente are under District 2, whereas Vinzons is located in District 1. It can be noted that the concentration of buyers is in District 2; most of the traders are residents of Basud, while all agents reside in Daet, the province's capital town. Most of the towns in District 2 are Bicol Speaking towns, while most of the towns in District 1 are Tagalog Speaking towns. As will be discussed later, such location of buyers influences farmers' choice of marketing channels.

2.4 Conclusion

The socioeconomic characteristics of the respondents influence the way they live and make decisions on-farm and off-farm. These decisions translate to farming practices, adoption of innovations, and marketing strategies. The better the characteristics of literacy level, tenurial status, land area, and family size, the better the chances of generating income higher than the poverty threshold.

However, around 73% of the Queen pineapple farmers lived below the poverty threshold, and only 27% had better economic conditions. Most of the poor farmers had low educational attainment, large household size, and less than a hectare of pineapple production area.

Queen pineapple farmers have a high literacy rate and are primarily in middle age. Hence, given the capacity-building training on production innovations, a higher literacy rate can help farmers understand the technology adoption process. Being an active age is also an excellent opportunity to implement production innovations since it involves hard labor, especially in broader cultivation areas.

There needed to be better cooperative membership, indicating the need for a campaign on the benefits of cooperatives. Most are experienced farmers; hence the challenge will be how to encourage changes in production practices by adopting innovations. The average land area is adequate but needs to be maximized, as evident in the high percentage of farmers below the poverty line.

CHAPTER 3

ECONOMIC EVALUATION OF TRADITIONAL AND
PRODUCTION INNOVATIONS FOR QUEEN PINEAPPLE
IN CAMARINES NORTE, PHILIPPINES

3.1 Introduction

Queen pineapple production has been one of the primary sources of income for smallholder farmers in rural areas in the Philippines, especially in Camarines Norte, a province in region 5 where typhoon occurrence is around 20 times a year. Farmers observed that Queen pineapple is a very resilient crop that can withstand up to tropical storm cyclone wind signal no 3 (TCWS), which makes it a stable source of income. A TCWS is a plain text warning to a particular land area that may experience winds of at least a strong breeze in strength (DOST PAGASA). Signal no 3 means a Beaufort force of 89-117 km/hr. Aside from resiliency to severe weather conditions, farmers are also assured of the market due to high domestic demand. However, farmers complained of inadequate capital due to the long production cycle and the high percentage of small fruits due to poor cultural management practices leading to lower prices of produce.

Low productivity has remained a considerable problem for Queen pineapple farmers for decades. While varieties for export, such as Hawaiian and MD2, yielded an average of 42MT per hectare, the Queen variety is way below 20.5 MT per hectare (Campita et al., 2022). Though the Queen variety is known for its sweetest taste, its small size, and deep eyes limit its competitive advantage; hence the critical challenges in production have always been how to increase the number of fruits planted and enhance its size. Previous research conducted was focused on enhancing cultural management practices, but no accurate data can be found as to the existing cost of production for Queen pineapple compared to the cost and income of adopting recommended technologies. Lubis et al. (2014) believed that low productivity in horticulture is mainly due to the inability of the farmers to exploit the available technologies resulting in lower production efficiencies.

Many factors can affect agricultural productivity, which may include land, labor, and capital (Urutia et al., 2018). Land Productivity indicates the level of sustainable land use versus its output. It is equated with land size compared to yield per hectare. Meanwhile, labor productivity refers to the output per hour of work. It is equated with educational attainment compared to output or quality of work. At the same time, capital productivity refers to the cost of capital compared to the net income.

In tracing productivity sources, considering the entirety of the farming practices is worth a closer look. The farming system represents crops, cropping systems, and other agri-related enterprises. It must simultaneously address production goals, livelihoods, and environmental sustainability in a constantly changing world (Snapp, 2017). The traditional Queen pineapple farming systems were honed by the experiences of long-time farmers and passed on to generations. Practices vary due to various influences, initiatives of cooperatives, and government interventions. However, then and now, the problem boils down to one thing: farmers complain of low productivity and rely on jobs outside the farm to make ends meet. Pineapple cultivation is one of the primary sources of income for 2,265 farmers in Camarines Norte. Farmers have been cultivating pineapple for an average of 12 years or equivalent to at least six cropping cycles. Growing pineapple earned them an average monthly income of P5,000-10,000 per month. This paper aims to identify the existing production system relative to the socioeconomic characteristics of farmers, compare existing production practices to recommended production practices, identify constraints mitigating optimum productivity, and provide recommendations.

3.2 Methodology

A partial productivity analysis was used to measure productivity levels to relate input to single output such as land, labor, and capital. Productivity refers to the amount of added value per unit of input factor. Value added is obtained by subtracting material costs from the output. Labor productivity was computed by labor input versus output. The labor input is the number of working days put into one cycle of pineapple cultivation multiplied by the wages per day. Labor productivity was generated by getting the added value divided by the labor input. The added value refers to the gross income less variable costs.

Meanwhile, since it takes 14 months to cultivate pineapples, the added value per land area obtained in one cycle of pineapple cultivation is converted to one year's worth. Input capital consists of variable capital and fixed capital.For productivity analysis the following formula were used

Labor Productivity

Labor input ＝The number of working days* average farm wage per day

Added value= Gross income – Material cost

Labor productivity = Added value/labor input

Capital Productivity

$$\text{Capital input} = \text{Variable Capital} + \text{actual fixed capital}$$

$$\text{Capital productivity} = \text{Added value} / \text{capital input}$$

$$\text{Land productivity} = \text{Added value} \times 12\text{months}/\text{months per cropping}$$

3.3 Results And Discussion

Pineapple cultivation is a laborious and long-term undertaking. One cycle may take up to 14 months from planting to harvest and another four months after harvest to get the suckers or planting materials for the next cycle. Activities include land preparation, hauling/preparation of planting materials, planting, weed control through herbicide and manual weeding, fertilizer application, fruit induction, harvesting, and marketing. Production practices vary depending on the farmers' exposure to traditional practices, training, and ability to adopt technology recommendations.

3.3.1 Traditional Production Practices

Pineapple is considered as drought tolerant plant. Land preparation is best done from January to September to avoid heavy rains from October to December. Most farmers use manual preparation by clearing the area of grasses and weeds. If a farmer uses a tractor, plowing the land to eliminate debris follows the clearing activity. Plowing is the initial cutting of the soil, usually in large clods. After two weeks, harrowing will be done to allow the weeds to decompose. Harrowing breaks soil clods, incorporates plant materials and levels the soil. If the area is idle for a long time and the weeds are thick, harrow the land one month after plowing. The most common practice is manual land preparation. This is done by manually clearing all the bushes and weeds using bolo and planting pineapple without tillage.

The asexually propagated planting materials are crown, slip, and sucker. Farmers in Camarines Norte mostly use suckers. It takes about 16-18 months to harvest the fruit, compared to suckers from the crown, with a 22-24 months harvest period after planting (Philippine Recommends, 2008). Usage of non-uniform planting materials can bring about early or late plant maturity, resulting in a high percentage of small fruits and low economic performance. Cooperatives and individual farmers sell uniformed-size suckers at Php 1.5-3 pesos, while uneven-size suckers are sold at P1.00 per piece.

The application of fertilizer for Queen pineapple is mostly based on traditional practices or recommendations of fellow farmers. The most common type of fertilizers used are complete (14-14-14) and urea (46-0-0) at 4 bags each per hectare. Planting of pineapple is done on the farmer's preference in consideration of plant spacing, open or intercropped areas, alleyways for harvesting, and walking trails for humans and carabao. Farmers often used the single row at 60 cm x 30 cm or 100 x 30 cm or the estimated distance between plants.

Table 12. Traditional Production Practices.

Activity	Sample Period	Practice	Problem
Land Preparation	Early May	Manual clearing of weeds	Plants are prone to fungal diseases due to residue in the soil
Preparation of planting materials	Early May	Hauling of suckers/sun drying	Planting all suckers without sorting and eliminating small sizes results to uneven size of fruits
Planting	Early May	Use single spacing based on estimates usually 100 x 30cm	lower number of plants and fruits
Weed Control using chemical	every 3 months after planting	Herbicide application using sprayer	plants are competing with weeds while establishing its roots which hinders optimum growth
Manual Weeding	every 2 months as needed	manual pulling of weeds using bolo	weeds are massive and harder to pull out without tillage
Fertilizer application	3 and 7 months after planting	complete- months after planting at 1.6g/plant Urea – applied at 1.6/plant	Insufficient amount and type of fertilizer limits plant growth
Flower Induction	7 months after planting	apply per plant	early induction results to high percentage of small fruits
Harvesting & Marketing	with tinge of yellow at the bottom of the fruit	Trader facilitates harvesting	low profit share

Weed control can be done manually or by spraying herbicides. Most farmer respondents control weeds using herbicides, and only eight practiced manual weeding. Farmer's application of herbicides varies depending on the budget. Some apply herbicide every three months after planting or at three months and seven months after planting. Manual weeding is done as the need arises. The quality and weight of pineapple fruit depend highly on the amount of fertilizer and the application timing. There are two methods of nutrient management; fertilizer recommendation based on soil analysis and recommended application for Queen pineapple (Techno Digest, 2015).

For soil analysis, extension workers were conducting orientation on collecting soil samples and submitting them to the regional soil laboratory for analysis. Farmers may also refer to the pineapple compendium book distributed to the agriculture office and pineapple farmers. Soil samples and the soil analysis report may also be submitted to the Local Municipal Agriculture Office so that farmers do not need to travel to the regional office. Plants applied with fertilizer recommendation based on soil analysis had 14% increased fruit weight, and a moderate sweetness of 16 Brix compared to farmers' practice and recommended application for pineapple in the absence of soil analysis. Hence, if capital is available for an additional cost of fertilizer and labor, it is recommended to apply fertilizer based on the soil analysis result. However, despite extension efforts, only some of the farmers submitted samples or followed the recommended fertilizer application rate and instead used fellow farmers' recommendations in applying fertilizer.

Fruit induction was done between 7-10 months. After seven months of spending money on inputs, financial pressure gets heavy, and most often, farmers rush to induce the plants and harvest earlier than their natural fruiting schedule. Insects, pests, and diseases can cause severe crop losses on Queen Pineapple production if left untreated. Mealybug is the leading cause of economic loss in pineapple production. It is characterized by a loss of turgidity in the leaves resulting in reddish coloring, wilting, and drying of the affected leaf portions (Alegre, 2016).

Proper timing is crucial in harvesting to prolong shelf life. For the local market, fruit is harvestable at maturity index one or when the first line of eyes is tinted with yellow. For export, fruits are harvested, still green, and just about to turn yellow. Queen pineapple is usually harvested at 4.5-5 months after flower induction. Around P130,000.00 is needed to finance the cost of one-hectare pineapple production. A net income of around 100,000.00 per cycle is equivalent to a monthly income of around P8,333.00.

Table 13 presents the cost of production of Queen pineapple using traditional practices. Variable costs comprised planting materials, fertilizer, herbicides, and Ethrel. Planting materials and fertilizer are the major cost drivers for materials at 60% and 34%, respectively. The planting material of pineapple is called a sucker. Farmers typically space pineapple suckers at 100 x 30 cm. This means each sucker occupies .3 sq m per plant and around 33,333 per hectare. A typical pineapple area is planted under coconut at irregular spacing. Using the recommended space for coconuts at 10 x 10 m and each tree occupying a 2 x 2 sq m, a hectare is ideally planted with 100 coconuts at a total space of 400 sq m. With the remaining space of 9,600 sq m, a total of 32,000 pineapples can be planted. However, the population of pineapple varies depending on the available suckers and the farmers' budget.

Table 13. Costs of pineapple production using traditional practices.

Item	Quantity	Unit	Price/Unit	Total
Variable Cost				120,421.93
Materials				70,050.00
Suckers Used	30,000	Pc	1.50	45,000.00
Fertilizer		Bag		21,000.00
Complete	4	Bag	2,700.00	10,800.00
Urea	4	Bag	2,550.00	10,200.00
Herbicide	4	kg	850.00	3,400.00
Leadthrel	1	Liter	650.00	650.00
Labor				40,289.20
Land Preparation	5	MD	500.00	2,500.00
Planting	30,000	Pc	0.50	15,000.00
Weeding	15	MD	500.00	7,500.00
Fertilizer Application	6	MD	500.00	3,000.00
Herbicide Application	4	MD	500.00	2,000.00
Transport from farm to road	25,723	Pc	0.40	10,289.20
*Interest on Variable Cost	0.087	14 months		10,082.73
Fixed Cost				8,722.00
Depreciation on Bolo	4	Pc	233	932
Depreciation on Pale	2	Pc	117	234
Depreciation on Sprayer	2	Pc	778	1556
Land Rental	1	ha/cycle	6000.00	6,000.00
Total Cost				129,143.93

*Prices of fertilizer were adjusted as of December 2022

Most of the farmers practiced zero tillage and manually prepared the land by clearing the area of grasses and weeds. After clearing, the suckers are planted using bolo. Application of fertilizer was often based on information from fellow farmers and or personal estimate of the farmer. A survey conducted by the author in 2018 showed that most farmers used a combination of complete and urea and applied three times during the entire cropping season. However, after the pandemic, the price of fertilizer increased by 25-30% since the onset of 2022, and farmers reduced application to two times at 3 and 6 months after planting at around 3.3 grams per plant.

Herbicide application was made 2 and 6 months after planting. Farmers apply 2 kg of herbicide per hectare (karmex or diuron) at 130 grams per sprayer load with 16 liters of water. Manual weeding is done alternately or depending on the budget. Farmers induced pineapple to flower at 7-9 months after planting. Induction is done by adding five ml of ethrel and 250g urea to 16 liters of water in a sprayer. The solution is applied to the whorl of the plant. Flowering starts after 30 days and can be harvested 4- 4.5 months after spraying. Hence, if the farmer induced at nine months, the harvest will be at 13 months after planting.

The primary cost driver in pineapple production is suckers (35%), fertilizer (16%), and labor (31%). The average labor cost per day increased after the pandemic from 400 to 500 per day due to inflation. Land rental comprised a considerable portion of the fixed cost at P6,000.00 per hectare. Farmers prefer to use something other than heavy equipment, such as tractors, for land preparation. The fixed cost was limited to small farm tools such as pale, bolo, and sprayer.

Table 14. Depreciation of farm tools.

Item	Unit	Value	Lifespan	Salvage value	DC (12 months)	DC (13 months)
Bolo	pc	400	2 years	0	200	217
Pale	pc	200	2 years	0	100	108
Sprayer	pc	2500	3 years	500	667	722

Cost of Money

The cost of money refers to the price paid using money either borrowed or owned. The production capital required for traditional practice amounted to P150,000.00. Based on the current interest bank rates, the cost of money is 9% used multiplied by the number of months of pineapple production from planting to harvest.

Table 15. Cost of money for pineapple production using traditional practice.

Source of Money	Amount	Annual interest	Sign	Annual total	13 months
Equity	50,000	0%	-	0	
Loan	100,000	12%	+	12,000	
Total	150,000			12,000	
Cost of money		8%		0.08	0.09

Revenue

The revenue of the pineapple depends on two things, the number of fruit and the price. Based on farmers' observation, pineapple is resilient to typhoons and has only an average mortality rate of 5% unless other problems arise, such as insect and pest infestation, which are uncommon. In traditional practice, farmers connect to the market via an agent or trader; once the agreement is made, the trader facilitates harvesting pineapple and other marketing activities until the product reaches the market. Hence, the trader was also in charge of estimating the sizes and corresponding prices of the harvest. The farmer can negotiate during this process, but the decisions mainly rely on traders. Pineapple fruits are not actually sorted but rather priced based on estimates before harvest. Below is the sample of size category and corresponding price based on the agreement between trader and farmer, which often takes place two weeks before harvest.

Table 16. Revenue of pineapple production using traditional practices.

Item	Quantity	Unit	Price/Unit	Total
Sales				
Large	20,167	Pc	9	181,503.00
Medium	5,556	Pc	7	38,892.00
Small	1,667	Pc	5	8,335.00
Given Free	556	Pc	5	2,780.00
Self-consumption	556	Pc	5	2,780.00
Gross Income	28,502	pc	-	234,290.00
Net Income				100,799.40
Net income per piece				3.54
Added Value				156,837.00

3.3.2 Production Innovations for Pineapple

Table 17. presents the cost of production using production innovations such as the utilization of a tractor for harrowing and plowing, double row plant spacing, application of fertilizer based on soil analysis, application of pre-emergence herbicide, and induction of plants at ten months. The production innovations mentioned here are not scientific breakthroughs but rather a package of technologies that are already there but need to be used or adopted by most farmers.

Land preparation using a tractor is recommended but not traditionally practiced. In some areas, it may be impossible to mechanize land preparation due to slope and hilly terrain, but there are also areas where it can be done. The tractor is recommended for conducting one-time plowing to break huge chunks of soil and remove weeds and two times harrowing to break the soil into arable land further and mix the weeds in the soil for faster decomposition. There was a two-week break period between plowing and harrowing to allow the weed to decompose. Suckers were exposed to sunlight to prevent fungal diseases. Sorting out suckers were suckers with symptoms of diseases; short and dried were removed. Laying out of the site was done using a bamboo stick, plastic straw, tape measure, and bolo.

Tractors are available for rent at the Office of the Provincial Agriculturist (OPAG) – two units, at the Camarines Norte Lowland Rainfed Research Station (CNLRRS) -two units and at LGU Basud - one unit. Based on the provincial resolution, the tractors of the OPAG can be availed free, provided the farmers shall provide the diesel and payment per day of operator. For CNLRRS and Basud, the rate of rental of tractors is Php 2,000 per hectare. The survey showed that only 8 out of 81 respondents use the tractor in land preparation.

Recommended spacing is a double row at 100 x 50 x 30 cm. To get the number of planting materials needed, get the length by dividing 10,000 cm (100 sq m) by 30 cm to the 333 values for L. Add 100 cm and 50 cm for the width and divide it by 2 to get 75 cm. Then, get the width by dividing 10,000 cm by 75 cm to get the value of 133,33. Then multiply the value of length and width to get the total number of plants of around 44,443. Allotting 400 sq m for coconut, the remaining space of 9,600 sq m can be planted with a total of 40,900 pineapples.

Herbicide application was made four times, ten days before planting and 3, 6, and 9 months after planting. Manual weeding is done as the need arises. The frequency of weeding proved to control the competition of weeds for nutrients. Fruit induction is done ten months after planting and harvest at 14 months. The average labor cost per day is 500. Land rental comprised a considerable portion of the fixed cost at P6,000.00 per hectare.

Table 17. Production innovations for pineapple.

Activity	Period	Practice	Merit
Land Preparation	early to middle of May	Use tractor for one time plowing and two times harrowing	Improve soil medium to increase yield
Preparation of planting materials	early to middle of May	Hauling, sun-drying and sorting of suckers	Quality planting materials produce bigger fruits
Planting	middle of May	Use double row spacing at 100x50x30	Increase number of plants
Weed Control using chemical	10 days after planting and 6, 9 months after planting	Herbicide application using sprayer	pre-emergence application minimize weed competition during plant establishment
Manual Weeding	every 2 months or as needed	spot weeding	spot-weeding as need arises after chemical spray is more economical
Fertilizer application	1 and 7 months after planting	complete at 2.85 g/plant	Application of correct dosage of fertilizer is correlated to increase in fruit size
	3,5 and 7 months after planting	Urea - at 1/plant	
	1 and 7 months after planting	Muriate of Potash at 2.15g/plant	
	4 and 10 months after planting	Amotash at 3.2g/plant	
Flower Induction	10 months after planting	apply per plant at 10 MAP	ensure uniform ripening
Harvesting	July 23, 2020	Harvest by 4-6 labor	same as traditional
Marketing	July 24, 2020		multiple channels

The advantages of production innovations also comes at a cost. Added planting materials, other agriculture inputs and labor costs increased the production capital requirements at around P 250,000.00.

Table 18. Costs of pineapple production using production innovations.

Item	Quantity	Unit	Price/Unit	Total
Variable Cost				235,132.31
Materials				111,900.00
Suckers Used	40,000.00	Pc	1.5	66,600.00
Fertilizer				34,200.00
Complete	5	Bag	2,700.00	13,500.00
Urea	2	bag	2,550.00	5,100.00
Muriate of Potash	3	bag	2,450.00	7,350.00
Amotash	5	bag	1,650.00	8,250.00
Leadthrel	1	L	800	800.00
Herbicide (diuron)	8	kg	850.00	6,800.00
Pest Control (lorsban)	1	L	950.00	950.00
Face Mask	2	Set	25.00	50.00
Boots	3	Pairs	500.00	1,500.00
Gloves	20	Pc	50.00	1,000.00
Labor				80,500.00
Clearing	20	MD	500.00	10,000.00
Land Preparation				
Tractor rental	1	Day	2,000.00	2,000.00
Operator	1	MD	500.00	500.00
Hauling of Planting Materials	40,000	Pc	0.15	6,000.00
Lay outing	5	MD	500.00	2,500.00
Planting	40,000	Pc	0.50	20,000.00
Weeding	16	MD	500.00	8,000.00
Fertilizer Application	12	MD	400.00	4,800.00
Herbicide Application	4	MD	500.00	2,000.00
Harvesting	38,000	Pc	0.25	9,500.00
Transport from farm to road	38,000	Pc	0.40	15,200.00
*Interest on Variable Cost	0.108	14 months		21,366.15
Fixed Cost				8,534.00
Depreciation on Bolo	4	Pc	200	800.00
Depreciation on Pale	4	Pc	100	400.00
Depreciation on Sprayer	2	Pc	667	1,334.00
Land Rental	1	ha/cycle	6000.00	6,000.00
Total Cost				243,666.31

*Prices of fertilizer were adjusted as of December 2022

For fertilizer application, soil sample analysis is recommended. Soil samples were gathered from the site and submitted to the regional soil laboratory for analysis for free, but none of the respondents availed of the service. Despite campaigns for soil analysis, few have responded, and others who previously submitted samples said they could not afford to buy all the recommended types and volumes of fertilizer due to high cost. Compared to traditional practice, recommended fertilizer was applied at 1,3,4,5,7, and 10 depending on the type and volume per plant. Similar to traditional practice, the primary cost drivers in applying farm innovations were planting materials (27%), fertilizer (14%), and labor costs (33%).

Table 19. Sample fertilizer recommendation per hectare based on soil analysis

Per hectare recommendation	Types of Fertilizer	Month of application	Dosage per plant (gram)	Per hectare (bags)
	complete	1,7	5.7	
	14-14-14			5
	urea	3,5,7	2.8	
306-47-321	46-0-0			2
	Muriate of Potash	1,7	4.3	
	0-0-60			3
	Amotash	4,10	6.4	
	17-0-17			5

Revenue

Applying the recommended technology enhances the overall harvest quality in terms of size. However, the degree of sweetness is negligible in the domestic market. On the positive side, good size harvest can be sold to different channels and still commands a reasonable price. Traders buy a pineapple at a higher price when the majority of the pineapple is premium in size. Pineapples can also be sold at the local trading center or in the cooperative for processing. The sample computation is shown in Table 20.

Table 20. Revenue of pineapple production using production innovations.

Sales	Quantity	Unit	Price/Unit	Total
Extra large	14,198	Pc	15	212,972.97
Large	17,568	Pc	13	228,378.38
Medium	4,775	Pc	9	42,972.97
Small	1,459	pc	6	8,756.76
Gross Income	38,000			493,081.08
Net Income				**248,080.77**
Net Income/pc				6.53
Added Value				350,987.33

3.3.3 Productivity Analysis

Productivity depends on using resources such as land, labor, and capital. The efficient use of these resources is correlated to the increase in productivity. The higher the efficiency, the higher the productivity. In this paper, efficiency is measured by the income from the land for the period used, labor per day, and return on capital.

For the traditional practice, the labor required for one cycle is 81 days and would entail a capital of around 133,422. The combination of these two serves as the input. To measure the output per year, net income is multiplied by the number of months allotted from planting to harvest. Since traditional practices induce plants to flower one month earlier than recommended, the production cycle period is only 13 months from a rental value of 6,000.00. The land productivity was measured at around 95,000. Labor is valued at P1,893 per day, higher than the daily average wage from the off-farm job. The capital return is 1.14 means that in every 1-peso input, there is a return of P1.14 output.

Table 21. Measure of productivity level for traditional and production innovations for pineapple.

Production Practice	Traditional	New	Difference
Labor (days)	80.58	161.00	80.42
Capital (Php)	133,422	248,532	115,110
Productivity			
Land (Php	95,004.99	213,784.09	118,779.10
Labor (Php/day)	1893	2306	412.34
Capital (Php)	1.14	1.49	0.35

Using new production innovations in pineapple farming improved productivity. The required labor and capital input per hectare of new production innovation are almost double that of traditional production. Although production innovation needs more labor and capital, it brings higher productivity than traditional production. The land productivity for 14 months is more than double the traditional land productivity level at 13 months. Hence, the issue is not land availability but maximizing the productivity of land used for a specific period. However, improvement in labor productivity may be insignificant because new production innovation needs more labor input per area. That is, new production innovation is labor-intensive practice. However, labor productivity is at a satisfactory level where farmers' time is well paid off more than the wages at the off-farm job whether practicing traditional or production innovation. In terms of capital, an added value of .35 is good enough for short-term investments or one cycle of pineapple production.

3.3.4 Estimated Income by Production System

Income analysis showed that in traditional practice for pineapple, income increases by mixing with other crops and growing livestock. Meanwhile, following production innovation, income is higher in planting pineapple under coconut without other crops. This implies that land productivity can be maximized if the land is utilized for intercropping (coconut + pineapple) by applying new production innovation for pineapple.

The decision on the production system to practice mono, mixed, and integrated depends on land area and land tenure status, as shown in Table 22. In the study area, most of the farmers previously planted coconuts before mixing pineapple and other crops like rice and lowland vegetables. The expansion of one crop at the expense of another may depend on profitability. Hence, if the farmer observes that one crop generates more income than the other, the rest of the land may be allotted to that crop.

To increase the income of farmers, the adoption of new production innovations may be considered and allot more area for pineapple cultivation over other crops. The survey showed that from a total area of 3 hectares, only 1.6 hectares or below are allotted to pineapple cultivation. This is because the traditional practice is profitable when combined with other crops. Meanwhile, applying production innovations showed that farmers are better off planting pineapple over other crops, provided the packed technologies are adopted. Farmers can apply for production loans to finance the financial requirement in pineapple production and rent land for one cycle. Hence, the question of adoption relies on the availability of credit programs and

technical know-how of the farmers, which depends on two things: the awareness level of the technology and the decision to adopt the technology.

Table 22. Measure of productivity level for traditional and production innovations
for pineapple by cropping system.

Production System	Mono	Multi	Integrated
	Pineapple planted under coconut	Pineapple + Coconut +Rice	Pineapple + coconut +rice + swine
Traditional			
Cost	**115,633**	**138,338**	**193,625**
Pineapple	115,633	57,698	57,698
Coconut		13,888	13,888
Rice		66,752	66,752
Swine			55,287
Net Income	**91,965**	**108,337**	**81,394**
Pineapple	91,965	45,982	31,270
Coconut		45,632	11,408
Rice		16,723	16,723
Swine			21,993
Production Innovation			
Cost	**202,173**	**181,727**	**203,720**
Pineapple	202,173	101,087	101,087
Coconut		13,888	13,888
Rice		66,752	66,752
Swine			21,993
Income	**206,943**	**165,826**	**132,217**
Pineapple	206,943	103,472	82,093
Coconut		45,632	11,408
Rice		16,723	16,723
Swine			21,993

3.3.5 Economic Status of the farmers

According to PSA, farmers, especially those living in rural areas, have higher poverty incidences. The location of the study is classified as a rural area, and farmers are primarily smallholders. The annual income of the farmers using single cropping ranges from 45,000 to 100,000 depending on the land area, production practice, and selling price. This income level is insufficient to sustain the basic necessities of an average household of farmers. Based on the local poverty threshold, a family of five needs Php 12,030 per month or 144,360 per year to afford the basic necessity (PSA, 2022); below this value means people are living in poverty, either suffering from hunger or will not be able to send children to school among others. Farmers cultivate other crops, grow poultry and livestock, or maintain off-farm jobs to augment income. However, as shown in the table below, around half remain in poverty, and many live not eating the complete meal daily because their income is less than their basic food needs.

Table 23. Poverty level by source of income.

Poverty Threshold	Without off-farm job			With off-farm job			Total
	Mono	Multi	Integrated	Mono	Multi	Integrated	
Less Than Basic Food Needs	8	6	1	8	10	3	36
Less Than Domestic Poverty Line	-	1	-	2	7	1	11
More Than Domestic Poverty Line	-	1	-	4	9	3	17
Total	8	8	1	14	26	7	64

Farmer respondents have six common sources of income; however, regardless of the source of income, most of the respondents earned less than basic food needs except those respondents who combined pineapple with other crops while earning from the off-farm job. Hence, if farmers do not adopt production innovations, the only way out of poverty is to multi-crop and secure/maintain off-farm jobs.

The poverty level of smallholder farmers is often equated to land area. In the case of pineapple farmers, this is also the case, as shown in Table 24. The ratio of poverty to less than basic food needs and less than the domestic poverty line is higher in areas below 2 hectares. The number of farmers cultivating an area of .5 to 2 hectares is high, indicating that farms are neither too small nor big for pineapple cultivation; hence it may mean that land is not limited, but productivity is not maximized resulting in low-income.

Table 24. Poverty level by land area.

Poverty Level	Less Than 0.5ha	0.5-1.0ha	1.1-1.9.0ha	2.0-3.0ha	3.1ha and more	Total
Less Than Basic Food Needs	5	15	18	3	1	42
Less Than Domestic Poverty Line	1	1	8	0	0	10
More Than Domestic Poverty Line	2	6	11	4	3	26
Total	8	22	37	7	4	78

Landless farmers are expected to have lower incomes than owners and tenants since the bulk of the capital goes to pay for land rental. In the case of pineapple farmers, more than half earned less than the basic food needs regardless of tenurial status; however, the most number of farmers are less than the domestic poverty line, and more than the domestic poverty line are landowners. This implies that owning land has a better chance of earning more than tenants and leaseholders. The ratio of farmers who earned more than the domestic poverty line versus those less than the poverty line is decreasing from owned, tenant, and leaseholder.

Table 25. Poverty level by tenurial status

Poverty Level	Owned	Tenant	Leaseholder	TOTAL
Less Than Basic Food Needs	14	13	14	41
Less Than Domestic Poverty Line	7	1	2	10
More Than Domestic Poverty Line	12	8	6	26
Total	33	22	22	77

The ratio of respondents who earned less than basic food needs and less than the poverty line compared to respondents who earned more than the domestic poverty line improved as the educational level increased. The percentage of respondents who earned more than the domestic poverty line was 20%, 31%, and 56% in elementary, high school, and college, respectively. Hence, the data indicate that the higher the educational level, the higher the chances of earning more income.

Table 26. Poverty level by educational level.

Poverty Level	Elementary Level	High School Level	College Level and higher	TOTAL
Less Than Basic Food Needs	16	21	5	42
Less Than Domestic Poverty Line	3	4	2	9
More Than Domestic Poverty Line	5	11	9	25
Total	24	36	16	76

3.3.6 Estimated Required Production Area

Table 27 shows the pineapple cultivation area required for farmers to earn an income above the poverty line if they cultivate only pineapple for both traditional production and production innovation. This table is calculated based on a standard family size of 5 members. If the farmer cultivates by traditional production, he must cultivate 1.16 ha to earn an income that meets the basic food requirements and 1.67 ha to earn an income that meets the poverty line.

The average pineapple cultivation area of surveyed farmers was 1.2 ha. It is difficult for the farmer who cultivates the average pineapple area to earn an income above the basic food requirements using traditional production. Only 16 farmers cultivated more area to earn more than the poverty line by the traditional production. While, if a farmer adopts new production innovation, he needs only 0.47 ha of pineapple cultivation to earn an income that meets the basic food requirements and 0.68 ha to earn an income that meets the poverty line. The introduction of the new production innovation can be expected for most pineapple farmers to escape poverty.

Table 27. Estimated required pineapple production area.

Parameter	Traditional Production	Production Innovation
Net annual income per hectare (Php)	86,399	212,640
Required are for the basic food requirement (ha)	1.16	0.47
Required area for the Philippine poverty line (ha)	1.67	0.68

Note: the basic food requirement and poverty line are calculated for five family

members.

3.4 Conclusion

Production innovation increased productivity in terms of land, labor, and capital. However, not all farmers have the capacity to adopt due to limiting factors such as financial capital, tenurial status, and technical know-how. Production innovations are recommended for adoption by those who own the lands or tenants who have the authority to decide on crop prioritization and with an average area allotted to pineapple of at least .5 – 1 hectare to be able to bail out of poverty.

The income level of the farming system using the traditional production practice for pineapple is higher in multi-cropping. It indicates that income from pineapple using traditional practice is insufficient, and needs are mixed with other crops to increase farm income. It can be noted that using production innovations, mono-cropping generated an income higher than multi and integrated farming systems. It implies that using production innovations can generate sufficient income without combining it with other crops or growing animals. This way, farmers can consolidate farming capital into pineapple production, generating higher net income than other crops.

It is recommended to 1) expand production areas through mixed or integrated cropping or adopt production innovations for mono-cropping; 2) Farmers must regularly seek government assistance/support/in terms of new technologies, capacity training, and seminar; 3) Encourage participation and support of private investors for the pineapple industry's value chain and 4) Adopt extension strategies such as a) Establish demo/model farms to encourage farmers to adopt innovations, b) Conduct Season-long training to improve the skills of farmers, c) Provision of techno guide in local language and d) Provide credit programs with low-interest/staggered loan release based on farm activities.

CHAPTER 4

THE FACTORS AFFECTING THE SELECTION

OF MARKETING CHANNELS OF QUEEN PINEAPPLE FARMERS

IN CAMARINES NORTE PHILIPPINES

4.1 Introduction

In reality, the marketing of pineapple is laborious, entails high capital requirements, and needs adequate information. These factors put some tolls on farmers' decisions on which marketing channel to take. Furthermore, the lack of market information, poor negotiating skills, limited resources, loyalty (Galvez 2019), perishability of products and yield (Segei et al. 2014), higher price (Kaido, 2020), transportation cost, and time (Apandi et al., 2017), are added constraints that beset the farmers from making sound marketing decisions. The bottom line is for the farmer to decide on the best marketing channel which will reduce losses or costs, thus, maximizing profit or increasing income (Apandi et al., 2017).

Most pineapple products and by-products are delivered in Metro Manila, where demand is high, and consumers have higher purchasing power. However, prime market outlets in high-demand areas are dominated by varieties such as Hawaiian and MD2 produced by large corporations such as DOLE and Del Monte. In addition, traders (i.e., wholesalers and retailers) who are well funded dominate the market for the pineapple to the detriment of resource-poor farmers who have very limited capital to operate and market their produce.

This current market condition resulted in low profitability and left farmers struggling to bail themselves out of poverty. Many smallholder farmers live in small houses and survive by doing multiple jobs such as labor to neighboring farms, tricycle driver, or construction worker, among others. In contrast, intermediaries such as wholesalers and retailers who corner the bulk of income from production and marketing have visible socioeconomic transformations, i.e., huge houses, vehicles, and a larger budget for food, education, and entertainment.

Most articles related to this subject attributed the low productivity of farmers to the poor quality of the product (Bime et al., 2014; Mina et al., 2021). Low productivity could also be traced to the low participation rate of farmers in the marketing of their goods, unlike wholesalers and cooperatives, who devote more time to marketing activities (Galvez 2019). However, according to Panda (2012), marketing of pineapple depends on the appropriate selection of marketing channels or the choice of non-traditional channels (Naseer et al., 2019).

This paper analyzed the characteristics of existing market channels and channel intermediaries in the pineapple market in Camarines Norte to validate some findings that this factor has a more significant attribution to the productivity of pineapple farmers. The value chain segment of each channel was likewise analyzed as well as the profit shares among farmers and intermediaries. The marketing practices of pineapple farmers particularly on the logic behind their marketing decisions and how will this contribute ultimately to the improvement of their quality of life were further explored and assessed.

4.2 Methodology

A total of 96 farmers and 32 buyers were interviewed to assess the marketing channel preference and identify characteristics of channels and intermediaries. Descriptive statistics were used to present relevant data in terms of frequency, percentage and average. The Chi-square statistics were used to test the influence of socioeconomic variables on the marketing channels. Lastly, profitability was measured by calculating the marketing costs, net profit, and margin per channel.

4.3 Results and Discussion

Marketing of pineapple harvest is a daunting task to most of the farmers especially to those with poor access to market information such as price, logistics costs, and direct buyers. This chapter described the characteristics of marketing channels and the profit shared by farmer as producer and the intermediaries as buyers. The output provided a concrete baseline data to help farmers in future decision relative to marketing channel to be used.

4.3.1 Characteristics of farmers by channel preference

Farmers are higher in the first district of Camarines Norte such as Basud and San Lorenzo Ruiz. Most of the respondents from San Lorenzo Ruiz and Basud preferred the wholesaler channel while 16 out of 17 respondents who chose the agent channel are living in Basud. This may be an indication that these respondents are living in proximity to the agent and wholesalers.

Table 28. Location of respondents by channel preference.

Municipality	Agent	Wholesaler	Retailer	Direct	Multiple	Total
Basud	16	17	2	-	4	39
Labo	-	10	-	1	-	11
San Lorenzo Ruiz	1	17	-	3	2	23
Daet	-	4	-	-	1	5
San Vicente	-	5	-	-	-	5
Capalonga	-	3	-	-	1	4
Paracale	-	-	-	-	3	3
Others	-	1	1	-	1	3
Total	17	57	3	4	12	93

Aside from location, it can be noted that the agent channel was also chosen by 16 male respondents out of 17 total respondents. On gender perspective, the men may have chosen this channel because they either trust the agent and out of habit do not want to break the cycle. Often agents are also fellow farmers and have known each other for long periods. Meanwhile, for women, it can be noted that they choose more profitable channels over relationships. Though female respondents were only 30% of the total there were more women than men in retailer channel, equal number of genders on direct channel and in multiple channels, the number of women is half of that of men.

Table 29. Gender of respondents by channel preference.

Gender/location	Agent	Wholesaler	Retailer	Direct	Multiple	Total
Male	16	37	1	2	8	64
Female	1	20	2	2	4	29
Total	17	37	3	4	12	93

Respondents using single crop without off-farm job preferred to sell harvest via wholesaler. Wholesalers was the most preferred channel; however, it can be noted that respondents who prefer retailer and direct channels were those without off farm jobs which means they either have ample time to bring the products to retailers or their harvest is of limited volume. Multiple channels is preferred by those with multi crops and off-farm jobs.

Table 30. Source of income by channel preference

Farming System	Agent	Wholesaler	Retailer	Direct	Multiple	Total
Without off-farm job						
Mono	-	18	2	1	1	22
Multi	2	6	1	1	3	13
Integrated				1	1	2
With Off-farm Job						
Mono	6	14	-	1	2	23
Multi	8	14	-	-	4	26
Integrated	1	5		-	1	7
Total	17	57	3	4	12	93

4.3.2 Characteristics of the Marketing Channels

There were five existing marketing channels the surveyed farmers used to sell pineapple, namely agent, wholesaler, retailer, multiple and direct. As shown in Figure 10. There were four intermediaries: agent, wholesaler, retailer, and processor in the channels. The most extended channel is the agent, which consists of producer, agent, wholesaler, and retailer, and the most straightforward channel is direct, which has no intermediaries. The product sold to processors was small-sized pineapples. Accordingly, the farmers who sell to processors also used other channels for the medium and large sizes. This channel is called multiple channels.
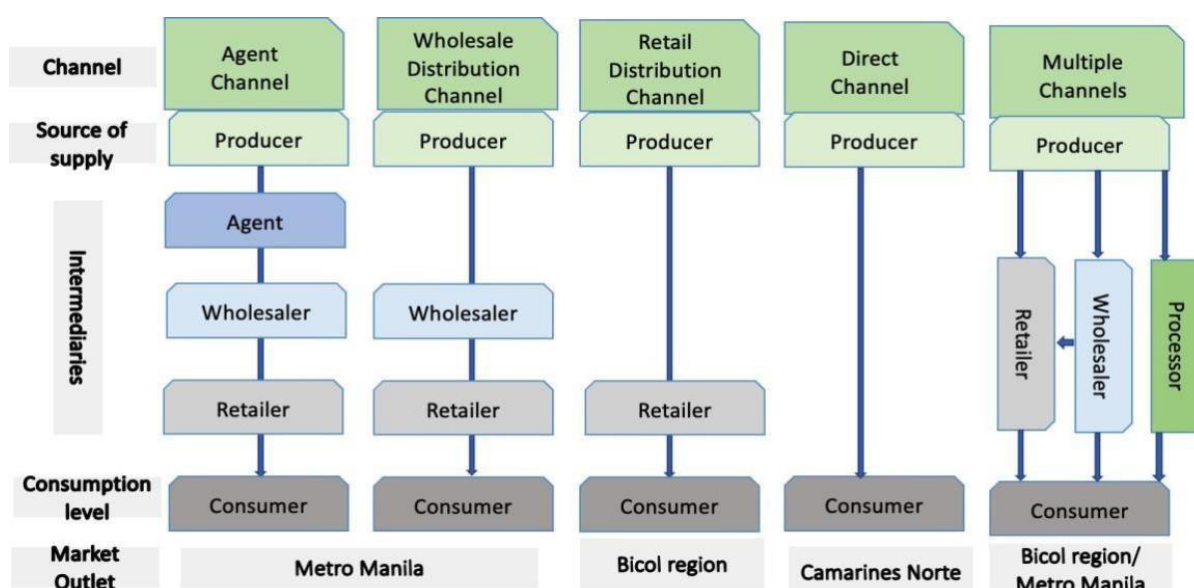

Figure 10. Marketing channels of Queen pineapple in Camarines Norte

4.3.3 Type of Marketing Channels

Agent Channel (Farmer-Agent-Wholesaler-Retailer-Consumer)

This three-level channel is the longest in Queen pineapple marketing and was chosen by 17 or 18% of the respondents. Farmers agreed on the price with the agent and got paid as early as two weeks before harvesting. Agents charged Php .5 to 1 per fruit or 5% of the gross sales per successful transaction from wholesalers.

The agents do not buy or sell pineapple by themselves. The wholesalers commission them. The wholesalers facilitate postharvest and marketing activities. Similar to the wholesaler channel, wholesalers supervise the harvesting, grading, uploading, and transporting of pineapples. Most pineapples were transported to Metro Manila by the wholesalers in this channel. Some wholesalers have their market outlet in Metro Manila and sell directly to consumers, while others sell pineapple to retailers. The retailers sell pineapples to the consumer.

There are at least 16 pineapple agents in Camarines Norte mostly based in Basud; some agents are also farmers. Although Agents have coverage areas that can span from one municipality to the entire province, 16 out of 17 farmers who chose the agent channel were residing within or nearby municipality, hence living nearby the agents. An agent has an average client of 10 farmers. The agent visits actual farm plantations and discusses marketing schemes and pricing with the farmers. If an agreement is not immediately made, the agent leaves contact numbers to farmers in case the farmers decide to sell.

The advantages of this channel from the farmers' viewpoint are a standing relationship with the agent and convenience. Filipino farmers are shy and overly grateful which prevents them from doing marketing negotiations with people they do not know and trust. Since agents were visible at the farm level, farmers develop a habit of selling harvest to them rather than exploring other marketing channels. Farmers also believed that this setup is very convenient since they need not go out of the farm to scout for buyers, the agents go to them. The disadvantage is that farmers cannot negotiate further to increase an agreed price in case the farmers see that the previously agreed price is not sufficient.

Wholesale Distribution Channel (Farmer-Wholesaler-Retailer-Consumer)

This two-level channel is where the wholesalers buy the pineapple harvest in large volumes. In this channel, postharvest activities such as harvesting, grading/sizing, packaging, and transportation are done by the wholesaler. Most respondents, 57 out of 96, preferred this channel due to its convenience and fast transaction. Most farmers devote time to planting up to harvesting but are less interested in marketing activities. Farmers prefer channels with less market participation and activities such as but not limited to planning the marketing scheme, identifying who and where to sell, setting the price, negotiating, and or directly selling the harvest.

Wholesalers of pineapple in Camarines Norte are locally called traders. There were seven registered wholesalers/traders based within the province, which operate with a total capital of P 1.1 million. Registered wholesalers are wholesalers with legitimate business names and area coverage issued by the Department of Trade and Industry (lifetime) and with the business permit issued by the municipal mayor (renewable per year). Registered wholesalers can be provided with a foodlane pass/sticker upon request. Foodlane accreditation is given to *viajeros* to ensure smooth delivery of products, especially during the pandemic where border restrictions were implemented (Department of Agriculture, 2020) and in normal conditions where traffic flow is heavy.

Each trader has a contact of 2-3 agents. Traders transact with agents or directly with farmers. Farmers can borrow money from traders as early as the planting season; hence an informal marketing agreement was made that the farmer would sell to its creditor. Similar to the agent channel, most of the pineapple in the wholesaler channel is transported to Metro Manila.

Compared to the agent channel, the advantage of this channel is that farmers can further negotiate the price which may otherwise be paid for the agent's fee. Hauling from the farm to the road is usually shouldered by the farmers. However, in this channel, farmers may negotiate to split the cost of the hauling fee or increase the price of the harvest. However, to directly sell to the trader, farmers must go to the trader's house and request for farm visit before negotiation.

Retail Distribution Channel (Farmer-Retailer-Consumer)

This one-level channel is where the farmers sell fresh pineapple to retailers. Only 3 or 3% of the respondents chose this channel due to its limited absorptive capacity. A single retailer can only accept up to 4 metric tons per transaction. Hence, farmers would have to look for several retailers or use a combination of channels to market the excess volume. The retailer group is composed of market and street vendors. The retailers operating within the Bicol Region sell at a lower price than the retailers in Metro Manila. Local retailers with market outlets sourced out supply from farmers who are relatives, neighbors, or those whom a trusted person recommended. Street vendors often sourced out supply from commercial farmers with 1-hectare plantation and above who sell rejects and portions of their good size harvest.

Direct Channel (Farmer – Consumer)

Direct marketing to consumers is the simplest channel. This was chosen by 4 or 4% of the respondents. Without intermediaries, farmers facilitate the postharvest and marketing activities and incur corresponding marketing and wastage costs. Farmers sell pineapple by using a hauler (tricycle) to go house to house within the nearby barangays and municipalities. A farmer can sell an average of 600 pcs sold at Php 15.00-20.00. Thus a farmer earns a round Php 10,000.00 and spent Php 500 on gasoline and Php 500 on food. Farmer also sells pineapple directly to the consumer by renting stalls in the market at Php 300.00 per day. Depending on the demand, pineapples sold at market stall ranges from 500 to 1000 pcs per day at Php15.00 -20.00 per piece. However, depending on the ripeness of pineapple and the quality of the road, wastage may range from 30 to 50 pieces a day. Other than the capital, the perishability of Queen pineapple hinders the farmer from choosing this simplest channel despite higher potential income. Hence, one strategy is scheduled application of growth regulator to be able to sell pineapple by batch.

Multiple channels

In multi-channel, the farmer decides to sell pineapple through various channels. Some farmers divide their harvest to retailers and processors and/or directly sell it to consumers. Of the twelve respondents who chose this channel the following combination was reflected in the data: a) Sell half of the produce to the trader and half directly to consumers b) sell to the agent and sell half of the harvest directly to traders, c) Sell half to the retailers and the other half of

the product directly to consumers, d) sell one third to retailers, one third to cooperative and one third directly to consumers, and e) sell to agent and retailer or sell to trader and half to the retailer. Selling to multiple channels was preferred by 12 or 13 % of the respondents.

Selling harvest for processing to cooperatives also appeals to backyard producers, with limited capital; backyard producers have a limited number of plants and budget for fertilizer and weed control, resulting in a high number of small fruits suited for processing. Further, processors cannot buy in large volumes as they limit the number of fruits to process each day; hence the absorptive capacity of the cooperative is also limited, like the retailer channel.
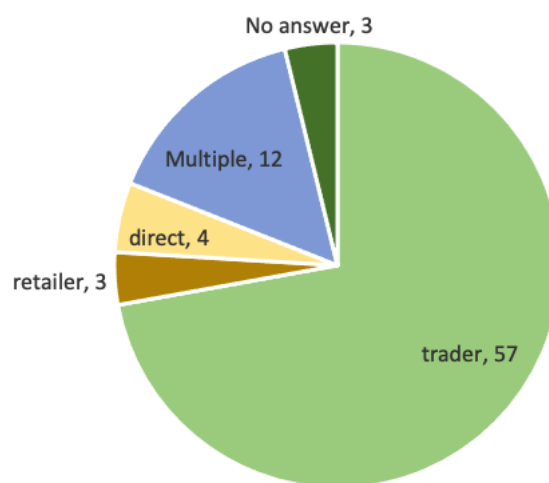
Figure 11. Number of respondents by marketing channel.

4.3.3 Profitability Analysis

The activities, estimated price, cost, and profit of farmers and intermediaries are shown in Table 27. In the agent channel, the average farm-gate price of pineapple is 5.52 Philippine pesos (Php) per piece. The farmer spent Php 3.73 per piece from planting to harvesting and earns Php 1.78. In this channel, farmers have no postharvest and marketing participation. The farmer negotiates with the agent, who gets at least 5% of the total gross sales per transaction. Therefore, the profit of the agent is Php 0.27 per piece. The agents' fee is added to the cost incurred by wholesalers and does not affect the farm gate. The wholesaler purchases Php 5.52 from farmers and sells Php 10.60 to retailers. They pay Php 0.27 to agents. The wholesalers hired laborers to harvest, haul, grade, sort, load and unload and transport the product to the market outlet, usually in Metro Manila. They spend Php 2.32 on these activities. Therefore,

their profit is Php 2.49. The retailers usually rent market stalls and pay for hauling, sorting, and vending labor. They purchase at Php 10.60 from wholesalers and spend Php 2.83 on their activities. They sell at 22.10 to consumers. Therefore, the retailers' profit is Php 8.67.

Hence in the agent channel, the total cost for production and marketing is Php 8.89, and the profit is Php 13.21. The profit among farmers and intermediaries is 13.5% for farmers, 2.0% for agents, 18.8% for wholesalers, and 65.6% for retailers. The highest profit goes to retailers similar to the findings of Wijesooriya, V.R. et al.(2020), on profitability analysis of farmers in Sri Lanka and contrary to the study of Kaido (2020) that farmers in Jambi province Indonesia get the highest profit share among the actors. Farmers have no postharvest and market participation while the wholesalers perform the heavy activities in the channel. The agents merely negotiate and earn the lowest per transaction.

The wholesaler channel is almost the same as the agent channel. The agent's profit is added to the wholesalers as the agents are removed from the channel. The wholesalers directly transact with farmers and reduce the cost of the agents' fee. As a result, had an increased profit of Php 0.27 per piece compared to the agent channel. Retailers' cost, profit, and product prices in the wholesale channel are the same as that of the agent channel. This is the most profitable channel for the wholesalers. The wholesaler's profit by economies of scale, purchasing and delivering huge volumes to metro manila, and backloading vegetables to the province.

In the retailer channel, the farmer incurred additional costs on postharvest and marketing activities but earned an additional income of Php 0.9 per piece compared to agent and wholesaler channels because of the higher purchase price. The retailers purchase at a higher price Php 7.64, but the selling price to the consumer is lower than the agent and wholesaler channel. In this channel, retailers are mainly based within the province of Camarines Norte and sometimes sell in the nearby provinces of Camarines Sur, Albay, and Sorsogon. The retail price in the province is lower than that in Metro Manila.

Also, retailers spend more than the agent and wholesaler because of additional activities. Therefore, the profit of retailers in the retailer channel is Php 5.15, which is lower than the profit of retailers in the agent and wholesaler channel. In this channel, the total cost for production and marketing is Php 8.08, and the profit is Php 7.83. The proportion of profit between farmers and retailers is 34.2% and 65.8%, respectively. Though the retailers get the highest profit share, this is the point where pineapples are rapidly decaying. Hence the risk of losses once the pineapples are not sold immediately was high.

Table 31. Activities, estimated price, cost, and profit of farmer and intermediaries per channel.

Channel	Particulars	Farmer (Php/pc)	Agent (Php/pc)	Wholesaler (Php/pc)	Retailer (Php/pc)
AGENT CHANNEL	Price	5.52	5.79	10.60	22.10
	Cost	3.73	5.52	8.11	13.43
	Profit	1.78	0.27	2.49	8.67
	Activities	Planting to Fruiting, Hauling from farm to access road	Nego-tiation	Harvesting, Grading, Up/Unloading, Transporting	Sorting, Selling to Consumer
WHOLESALER CHANNEL	Price	5.52		10.60	22.10
	Cost	3.73		7.81	13.43
	Profit	1.78		2.79	8.67
	Activities	Planting to Fruiting, Hauling from farm to access road		Negotiation/ Harvesting, Grading, Up/Unloading, Transporting	Sorting, Selling to the Consumer
RETAILER CHANNEL	Price	7.64			15.91
	Cost	4.96			10.76
	Profit	2.68			5.15
	Activities	Planting, Harvesting, Grading, Up/Unloading, Transporting			Sorting, Transporting to market outlets, Selling to the Consumer
DIRECT CHANNEL	Price	15.42			
	Cost	6.81			
	Profit	8.61			
	Activities	Planting, harvesting, Grading, Up/Unloading Transportation, and selling to the consumer			
MULTIPLE CHANNEL		combination of any channels above			

Note: * *Source: The farmers' and buyers' survey by the author (2021)*

In the direct channel, as there is no intermediary in this channel, the farmer performs all the activities from planting to harvesting, grading, loading, and transporting the products to the market outlet and directly selling to consumers. In this channel, the cost spent by the farmer is the highest because the farmer has to bear all the costs. The farmers' cost is doubled compared to the agent and wholesaler channel at Php 3.08 per piece and around Php 1.85 per piece increase compared to the retailer channel. The retail price is also the lowest, but farmers

earn the highest profit at Php 8.61 per piece because the farmer gets all the profit.

In multiple channels, farmers may opt to use a combination of any of the four channels mentioned, and incurred cost and earned profit depend on the specific combination. To engage in this channel, farmers need sufficient market information and a network of contacts to sell pineapple using different channels.

The direct channel brings the largest profit to the farmer. However, the farmer conducts more activities than the other channel. The direct channel had the lowest cost and gained all of its profit because of the absence of intermediaries. However, it should be noted that there is a limit to the quantity that can be sold in the province. As mentioned above, a large part of the pineapple is sold in Metro Manila. Even though the local markets are more profitable for the farmer than Metro Manila, the primary market is still Metro Manila.

The most affordable retail price was at the direct channel at the consumer level. This was expected because of the reduced marketing layers, the farmers can earn more, and the consumer can buy a pineapple at fair value. The direct channel is where the farmer and the consumer benefit the most.

The result showed that income from the direct channel is 384% higher compared to the agent and wholesaler and around 221% higher compared to the retailer channel. It is evident that the highest profit for farmers comes from direct channel however, only four respondents are capable of doing direct selling. Since the capital requirement is way above most farmers' financial capacity, farmers must be empowered to participate in marketing activities through the direct channel. To do this, farmers must have sufficient capital of Php 200,000.00 to produce and self-market around 30,000 pcs of pineapples. There must be available loan windows that farmers can access not from traders but from banks or cooperatives.

Further, the result showed that the channel varies mainly on cost requirements and the activities involved in each level. However, both cost requirements and activities involve money. whole process from planting, harvesting, postharvest, and marketing. More so, sufficient marketing information is needed to empower them to perform these activities as to cost and prices per channel, network and negotiation skills, and building long-term relations with their clients.

4.3.5 Factors Affecting Selection of Marketing Channel

Market channels are the series of pathways a product must go through and transform before it reaches the consumer. Choosing the right marketing channel is an important decision a farmer makes every harvest since it may reduce losses or increase income (Apandi, 2017). This decision is crucial and dictates the speed of transaction, the amount of money paid for the product, and the quality of the product upon reaching the consumers.

Table 31 summarizes the factors considered by the farmer in choosing a marketing channel. The farmer-respondents chose two factors on average. The predominant issue was quick cash, chosen by 60 out of 96 respondents (62.5%), and was selected 22.9% of the time. The second leading issue was time-saving (40.6%). High income ranked third among the issues (38.5%). Borrow capital was the least selected issue for choosing a marketing channel (2.1%) and was chosen two times out of 261. The quick cash being the top consideration is highly expected considering that pineapple farmers waited a long time to produce pineapple and had accumulated financial responsibilities at the end of the production period.

Table 32. Factors that influence the selection of marketing channels.

Factors affecting selection	Marketing Channel					
	Agent	Wholesaler	Retailer	Multiple	Direct	Total
Quick Cash	4	45	1	7	1	58
Time Saving	4	26	1	5	1	37
Less Labor Cost	7	23	2	2	1	35
High Income	8	20	1	4	2	35
Habit	13	4	2	4	-	23
Efficiency	7	8	1	3	-	19
Security	-	12	-	4		16
Recommendation of Trusted Person	6	7	-	2	-	15
Stability	3	1	1	2	1	8
Other reasons	2	1	-	-	1	3
borrow capital	-	1	-	-	1	2
No answer					1	1

The main factor influencing the selection of the Agent Channel is Habit (75% or 13 out of 17 respondents). Farmers using this channel have developed a trusting relationship with the agents and were not interested in exploring other channels. This is similar to the findings of Galvez (2019) that pineapple farmers in Isabela chose the channel because of loyalty. Further, farmers chose the agent channel because of perceived efficiency, lower labor costs, recommendation of a trusted person, and high income. However, profitability analysis (Table 23) showed that the agent channel has the lowest profitability at the farmer level. Hence, this indicates that farmers lack market information on comparative profitability data per channel similar to the findings of Kaido (2020).

The main factor influencing the selection of the Wholesaler Channel is Quick cash (79% or 45 out of 57 respondents). Quick cash was the main reason for 45 respondents who chose the wholesaler channel. The long production cycle depletes farmers' capital due to pineapple production's high labor and materials costs. The wholesaler channel was the fastest way to get cash since wholesalers have capital and can lend cash in advance or pay cash at an agreed time. Farmers prioritized Quick cash due to financial pressure to sustain production and personal needs. This was also the findings of previous studies that farmers preferred immediate payment (Blandon et al., 2009; Gelaw et al., 2016; Ochleng, 2020; and Schipamn and Qalm as cited by Ihli et al., 2021) despite available options with higher profitability (Fisher & Qalm, 2014). In this case, there were other marketing channels where profit margin would be higher, but due to financial pressure majority of the farmers chose the wholesaler channel.

The main factor influencing the selection of the Retailer channel are saving labor and habit (67% or 2 out of 3 respondents). Farmer respondents who chose this channel believed that selling to a trusted retailer can save labor costs compared to other channels. Selling out of habit indicates that the farmer and the retailer have a long-term relationship which proves convenient to the farmers. Since retailers have limited absorptive capacity, farmers who chose this channel has also limited production which is best suited to this channel.

The main factor influencing the selection of Multiple channels is quick cash (58% or 7 out of 12 respondents). Since this was a combination of channels, the farmer enjoyed the advantage of quick cash by selling to wholesalers or agents and high income by selling to the retailer or directly to the consumer. However, in choosing this channel a farmer needs additional capital, a wider network, and preferably a delivery vehicle.

The main factor influencing the selection of the Direct Channel is High Income (50% or 2 out of 4 respondents). Farmer respondents who chose this channel must have bigger

capital and available logistics compared to other respondents. Since financial pressure is not a hindrance, farmers in this channel can independently decide on the methods of selling, grading, and pricing their produce.

Expectedly the main factor influencing the overall selection of channels is quick cash (60.4% or 58 out of 96 respondents). It can be deduced that respondents who chose this factor as the main consideration have experienced an urgent need to get back the capital they used in pineapple production to pay for other financial responsibilities. Financial pressure limits the respondents in choosing the most profitable channel.

The findings of this study revealed that pineapple farmers in Camarines Norte are similar to pineapple farmers in Isabela wherein most farmers could not sell their produce (Galvez, 2019), have an urgent need for money (Kaido, 2020) and prefer channels with limited marketing participation. To encourage participation in formal marketing of farmers in India, Panda (2012) recommended the enhancement of access to market information, training and education, value addition, and improved

4.4 Conclusion

Majority of the pineapple farmers in Camarines Norte were living below the poverty threshold which means their income was not sufficient to finance the basic necessities. The long production period and high cost of pineapple cultivation result in strong financial pressure at the time of harvesting and marketing which hinders most of them from choosing an appropriate marketing channel.

Pineapple farmers have five marketing channels as options in marketing their products, however, the wholesaler channel was selected by a majority of the respondents due to quick cash, time-saving, and saving labor, despite lower profit compared to other channels. Among the intermediaries, the wholesaler has the most considerable capital and high absorptive volume capacity which enables them to capture the majority of the harvest delivered to market outlets outside the province. Retailers in Metro Manila get the highest profit share. Profitability analysis showed that farmers get the highest profit using direct channels however, the farmer gets to do more work and spend more than other channels and can only sell at a limited volume within the province.

A significant relationship relative to marketing channels was traced to the interplay of the following key factors: gender, civil status, location, and source of income. The majority

of males, married status and with residence nearby an agent or wholesaler tend to choose the agent and wholesaler channels. Respondents with higher income were also located in the southern part of the province implying that economic opportunities are higher in the southern area.

Income analysis showed that to increase income, farmer respondents specifically under classes 1 and 2, may have to weigh between two options 1) expand production through enhanced multi-cropping and improving production management of pineapple to improve quality, or 2) get off-farm employment while growing pineapple and other crops. Respondents without off-farm employment have a greater challenge to increase their income by 25-30% to live above the poverty line. Profitability estimates provided evidence that choosing a direct channel can potentially bail them out of poverty.

This can be done by selling directly to the consumer by batch through synchronized harvesting. However, it entails selling at a limited volume and requires additional work and capital. To resolve this, farmers may strategize the application of growth regulators to harvest and sell by batch to reduce marketing losses. Farmers may also adopt a multi-crop pineapple production system to maximize land utilization and increase productivity or secure off-farm employment.

CHAPTER 5

SUMMARY AND GENERAL CONCLUSION

This dissertation aims to improve the economic condition of the Queen pineapple farmers through production innovations and marketing strategies. Specifically, it aims to assess the socioeconomic characteristics of the farmers, the cost and revenue of traditional practices, the productivity level of existing practices compared to production innovations, identify and assess the profitability of marketing channels, identify factors affecting channel selection, and recommend farming, marketing, and extension strategies. This dissertation is framed on the concept that production innovations and appropriate marketing strategies result in increased productivity. Increasing productivity in production and marketing chains are ways to encourage investments in the industry, generate more income, increase job opportunities, and eventually improve the economic condition of the farmers.

This study is based on the survey of pineapple farmers and intermediaries in Camarines Norte, where production of the Queen pineapple variety is concentrated. The findings of these study showed that Queen pineapple production and marketing is dominated by men, mostly middle age, active and capable of laborious activity in pineapple production, has high literacy level, have an average of 8.5 years spent in school, mostly married with an average household size of 5. The farmland area of surveyed farmers was 3.3 hectares, and the average allotted portion for pineapple cultivation was 1.2 hectares. Regarding tenurial status, owners and tenants have higher average farmland area at 4.12 and 3.02 hectares, respectively, while leaseholders have an average of 2.5 hectares.

There were three common farming systems, single-crop, multi-crop, and integrated. The multi-crop and integrated had generated higher annual average income than single crop. The farming system preference was affected by land size and tenurial status. More than half of surveyed farmers earned less than the basic food needs. Only one-third of the surveyed farmers had income above the domestic poverty line.

The traditional production practiced by the farmers is insufficient in fertilizer input and low planting density, which bring small production quantities and low quality. It needs small capital and labor input. But its productivity is low in terms of land, labor, and capital. In order for a farmer to earn income above the poverty line from pineapple cultivation, 1.6 hectares of pineapple cultivation area is required. Using production innovations requires higher capital,

around 250,000.00. This equates to around 20,000 monthly income, which is above the poverty threshold level.

Productivity analysis also showed that production innovations increased productivity in terms of land area. This means that to get out of poverty using traditional practice, a farmer needs 1.6 hectares which is more than the average farm size, while adopting production innovation only requires .68 ha below the average farm size.

Profitability in the marketing chain is highest at the direct channel. However, the farmer needs additional capital to finance marketing activities and additional logistics costs. Multiple channels also proved profitable for farmers with good networks and marketing know-how.

The queen pineapple production and marketing open opportunities to get farmers out of poverty by maximizing their income. For increasing the income of queen pineapple farming, production practice and marketing channel selection are crucial issues. The production innovation is expected to raise productivity, and the appropriate selection of marketing channels is expected to improve the profit share of farmers. The current level of farmers' income implies much-needed support from enabling agencies to guide farmers on processes to improve their economy. The number of farmers involved in the industry is relatively small and highly concentrated in one province. This situation calls for steps to encourage farm investments and the development of best practices.

The socioeconomic characteristics of the farmers indicate a high literacy level, active age suitable for strenuous farming activities, a sufficient number of household members that can contribute to farm labor, and above a hectare average of land. All these characteristics lay the foundation for sustaining pineapple cultivation. However, problems encountered in pineapple farming, such as insufficiency in resources such as capital, technical know-how, post-harvest handling, and marketing skills coupled with a poor network, infrastructure, and access to credit programs, minimize the overall productivity.

Introducing production innovations to farmers can increase income. However, the question is whether the farmer has sufficient capital to finance the added cost of production innovation and whether the farmer has the technical know-how to apply the introduced production technologies. Similar to the application of marketing strategies, wherein the farmers will venture into direct marketing activities, added logistics and capital is needed, as well as network and knowledge in negotiation and pricing.

In increasing productivity and reducing poverty, it is crucial to focus on the socioeconomic variables which had significant influence, such as educational level, household size, and pineapple cultivation area. These social factors are associated with government agencies such

as the Department of Education for literacy, the Department of Social Welfare and Development for family planning and control, and Department of Agrarian Reform for agricultural land area, and the Department of Agriculture for agricultural extension promotion activities. Farmers must be aware that the cultivation area allotted to pineapple influences their economic condition. Hence, expansion is a must to increase income using traditional practices or utilization of existing areas and maximize productivity by adopting production innovations.

Farmers may also initiate joint marketing by establishing a network of willing farmers to pull resources and consolidate harvest to sell within and outside the province. Further, farmers may also engage in active membership with the cooperative and seek the support of local government units (LGUs) and the Department of Agriculture to strengthen market linkage and sell a consolidated volume of pineapple in Metro Manila. Lastly, farmers may adopt the value chain concept, especially in the processing and marketing chain, to add value to the product.

For further studies, it is recommended to develop strategies to enhance access of pineapple farmers to market information to serve as a basis for the efficient selection of marketing channels; and assess the level of assistance provided by the LGU, DA, DTI, and other concerned agencies in terms of farming sustainability; and identify sustainability mechanisms for the pineapple industry via policy imperatives. Regulators to harvest and sell by batch to reduce marketing losses. Farmers may adopt a multi-crop pineapple production system to maximize land utilization and increase productivity or secure off-farm employment. Due to limited time to cover all the gaps in pineapple production and marketing, this dissertation did not delve into the logistics requirements, such as road infrastructure, facility, and processing equipment. The effect of agricultural extension services was not also discussed, which is an essential factor in technology adoption.

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APPENDIX A.

Respondent Number	Transnational Doctoral Programs for Leading Professionals in Asian Countries Nagoya University Graduate School of Bioagricultural Sciences

Agricultural Marketing Analysis of Queen Pineapple in the Philippines towards effective Value Chain Management

Survey Questionnaire For Farmer Producer
(Input and Production Chain)

INTRODUCTION

Greetings! My name is Maria Christina Campita, a transnational doctoral student of Nagoya University. The data derived from this study shall be used as inputs in enhancing agricultural marketing system and value chain management of Queen Pineapple in the Philippines.

You have been randomly selected to participate in this survey. I would like to ask you some questions about your farm production and marketing activities. I assure you that your answers and opinions will be treated in the strictest confidence, and will be used only for the purpose of this study.

Rest assured that data such as your name, email address and other information will be kept confidential.

Would you agree to participate in this important survey? [ ] Yes (CONTINUE) [ ] No (END INTERVIEW)

_____
Signature of the Respondent

_____
Date

I.   Background Information (Please encircle what is applicable)

Name of farmer:	

Age:_____
 	
   1 below 20
   2 21-30 years old
   3 31-40 years old
   4 41-50 years old
   5 51-60 years old
   6 61 years old above
	Contact Number:
	
	Gender:
	
	   1 Female
	   2 Male
	   3 LGBT

Civil Status 1 Single 2 Married 3 Separated 4 Live-in 5 Annulled	

Educational Attainment
   0 No educational background.   3 Vocational
   1 Elementary level   4 College Level
   2 High School level 5. Masteral Level	

Household Size_____ Number of Working HH member_____ Male HH Member____ Female HH Member___	

Barangay:	City/Municipality:	Province:

Type of Farmer:	1 Individual 2 Member of associations or cooperative 3 Assisted by Cooperative 4 Assisted by LGU
Organization: Position:	
Number of Years in Farming:_____ Number of years in pineapple growing:_____	

II.   Profile of The Farm

Farm Address			
Total Land Area		Cultivating area for Queen Pineapple	

Land Tenure Status:
 	
    1   Owned
    2   Lease holder
    3   Tenant
    4   Renter
    5   Others_____
		Source of Information in pineapple production and marketing
		
		    1 Fellow farmers
		    2 Training
		    3 Techno guide
		    4 Radio or TV	

III.   Sources of Household Income

A. On-farm Income

Sources of Farm Income	Area Planted/Number of heads	2019 (Normal year)		
		Total Value of Production	Total expenses	Net Income
Main Crop				
Intercrop				
Livestock				

Sources of Farm Income	Area Planted/Number of heads	2020 (with pandemic and typhoons)		
		Total Value of Production	Total expenses	Net Income
Main Crop				
Intercrop				
Livestock				

B. Off Farm Income (include income from farm labor/work to another farmers farm/rental of farm animal or farm equipment/others)

Type of Work	Monthly Income	
	2019	2020

IV. Cost and Return (in reference to normal year prior to COVID-19)

COST AND RETURN OF QUEEN PINEAPPLE PRODUCTION PER HECTARE

Item	Quantity	Unit	Unit Cost	Cost
PRODUCTION COST				
Land Preparation				
Tractor Rental				
Operator				
Diesel				
Labor				
Family Labor				
Planting (___ cents/sucker)				
Weeding				
Fertilizer Application				
Chemical Application				
Hired Labor				
Planting				
Weeding				
Fertilizer Application				
Chemical Application				
Materials				
Pineapple Suckers				
Complete Fertilizer				
Ammonium Phosphate (16-20-0)				
Urea (46-0-0)				
Muriate Potash (0-0-60)				
17-0-17				
Herbicide (Diuron/karmex)				
Insecticide				
Leadthrel				
Total Cost				
Sales				
Net Income				
PROCESSING COST				
Labor				
Material				
Total Cost				
Sales				
Net Income				
MARKETING COST				
Labor				
Material				
Total Cost				
Sales				
Net Income				

V. Allocation of Products per harvest

Type	Quantity	Price	Percent Share
Self-Consumption			
Given Free			
Sold Fresh			
Processed			
Others			

I. Marketing Channels

Please indicate percentage if using more than 1 channel.

Percentage	Market channel
	Farmer - Consumer
	Farmer -Retailer
	Farmer -Trader
	Farmer -Agent
	Farmer - Cooperative
	Farmer assisted by LGU -Retailer
	Farmer Assisted by Cooperative - Retailer

II. Details of Marketing Practices (normal year vs new normal)

Mode of Marketing	Price (Php)	Distance of farm from road (km)	Mode of Transport
1 Symber 2 Arasar 3 Direct marketing 4 Assisted by LGU 5 Assisted by Coop			1 Pick up 2 Delivered

III. Value Chain Participation

	1 yes	2 no
1. Do you practice value adding activity?		
2. Do you know of any group of farmers or fishers who process and market their own produce?		
3. Do you or does your group have an existing contract for production, marketing and/or technical services?		

Reasons for choosing specific channels:

Respondents may select multiple reasons:

	Fast cash
	Higher return/income
	Recommendation of trusted/any person
	Efficiency
	Stability
	Security
	Habit
	Saving Time
	Saving Labor
	Others

IV. Cost Per Chain (if involved in other chains)

Chain	Cost	Sales	Net Income
Production (in reference to table 1) -refers to cost incurred in production from planting to harvesting which include labor and materials such as suckers, fertilizer and herbicides.			
Processing -refers to cost incurred in processing from fresh fruit into by products which may include labor and packaging materials, maintenance of equipment, utility bills such as water and electricity and others.			
Marketing -refers to cost incurred in marketing of either fresh fruit or by products. This include hauling fee from the farm, rental fee for market outlet, and labor.			
Grandtotal			

END OF INTERVIEW - THANK YOU RESPONDENT

APPENDIX B.

Respondent Number	Transnational Doctoral Programs for Leading Professionals in Asian Countries Nagoya University Graduate School of Bioagricultural Sciences

Agricultural Marketing Analysis of Queen Pineapple in the Philippines towards effective Value Chain Management

Survey Questionnaire for Buyer
(Distribution/Marketing Chain)

INTRODUCTION

Greetings! My name is Maria Christina Campita, a transnational doctoral student of Nagoya University. The data derived from this study shall be used as inputs in enhancing agricultural marketing system and value chain management of Queen Pineapple in the Philippines.

You have been randomly selected to participate in this survey. I would like to ask you some questions about your farm production and marketing activities. I assure you that your answers and opinions will be treated in the strictest confidence, and will be used only for the purpose of this study.

Rest assured that data such as your name, email address and other information will be kept confidential.

Would you agree to participate in this important survey? [ ] Yes (CONTINUE) [ ] No (END INTERVIEW)

_____
Signature of the Respondent

_____
Date

VI. Background Information (Please encircle what is applicable)

Name of buyer:	

| Age:_____

   7   below 20
   8   21-30 years old
   9   31-40 years old
  10 41-50 years old
  11 51-60 years old
  12 61 years old above | Contact Number:

Gender:

   4   Female
   5   Male
   6   LGBT |

Civil Status   1 Single   2 Married   3 Separated
4 Live-in   5 Annulled

Educational Attainment
- 3 No educational background.   3 Vocational
- 4 Elementary level   4 College Level
- 5 High School level   5 Masteral Level

Household Size_____   Number of Working HH member_____   Male HH Member____

                                                Female HH Member___

Barangay:	City/Municipality:	Province:

Type of Buyer	
	1 Agent – procures on behalf of the by the trader 2 Assembler - finances farmers and traders and has agents responsible for procurement and assembly 2 Processor - Transforms fresh fruits into by-products 3 Cooperative - registered farmer organization, procures from members and non-members 4 Institutional Buyer-includes hotels, restaurants, military camps and hospitals which buy in bulk to be consumed by their clients 5 Retailer - sells directly to consumers

VII.   Nature of business

A. Fil this up if respondent is a member of association or cooperative, if none proceed to item B.

Name of Cooperative/ Company/organization (If any)	
Office Address	
Number of years in pineapple marketing	
Number of members	
Members involve in pineapple trading	
Operating Capital for pineapple trading	

B. Business Coverage

Covered area (ha)	
Number of Clients	
Covered municipality/ies	
Covered Barangay/s	
Average number of fruits per transaction	
Marketing Outlets (if any)	
Destination of products	

VIII.   Mode of Marketing

Mode of Marketing	Price (Php)	Distance of farm from road (km)	Mode of Transport
6 Symber 7 Arasar 8 Direct marketing 9 Assisted by LGU 10 Assisted by Coop			1 Pick up 2 Delivered

IX.   Details of Marketing Practices (normal year vs new normal)

| Destination | Buying price (Php) | Distance from outlet | Frequency | If delivered | | Other Marketing Cost | Total Cost of Mktg |
				Mode of transport	Cost of transport/ kilo		

X.   Marketing Channels

Please indicate percentage if using more than 1 channel.

Percentage	Market channel
	Buyer - Consumer
	Buyer -Retailer
	Buyer -Institutional buyer
	Agent -Trader
	Others:_____

XI.   Reasons for choosing specific channels:

Respondents may select multiple reasons:

	Fast cash
	Higher return/income
	Recommendation of trusted/any person
	Efficiency
	Stability
	Security
	Habit
	Saving Time
	Saving Labor
	Others

XII.   Cost and Return (Per Activity)

	Cost	Return/Sales

GRADING
    Labor Cost
    Material Cost
    Depreciation cost
        Equipment
        Building
Sub total		

SORTING
    Labor Cost
    Material Cost
    Depreciation cost
        Equipment
        Building
Sub total		

PACKAGING
    Labor Cost
    Material Cost
    Depreciation cost
        Equipment
        Building
Sub total		

HAULING
    Labor Cost
    Material Cost
    Depreciation cost
        Equipment
        Delivery car
Sub total		

XIII.   Cost Per Chain, if involved in other chains.

Chain	Cost	Sales	Net Income
Processing -refers to cost incurred in processing from fresh fruit into by products which may include labor and packaging materials, maintenance of equipment, utility bills such as water and electricity and others.			
Marketing -refers to cost incurred in marketing of either fresh fruit or by products. This include hauling fee from the farm, rental fee for market outlet, and labor.			
Grand total			

XIV. CHALLENGE/S ENCOUNTERED

XV. RECOMMENDATIONS

END OF INTERVIEW - THANK YOU RESPONDENT