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A COMPARISON OF COCONUT INDUSTRY DEVELOPMENT IN SILANG AND NORTH MINAHASA

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This paper primarily aimed to compare coconut industry in Silang, Cavite Province, Philippines and North Minahasa, North Sulawesi Province, Indonesia to enhance the livelihood and local income. The study was conducted from July to August 2008 in Silang rural areas and North Minahasa rural areas using descriptive survey method and the research data originated from the collection and analysis of primary and secondary data. The results generally indicate that income generating from coconut farming currently very low. Coconut farmers in Silang produce young coconut while in North Minahasa copra and old coconut. There is no value added created from the coconut trees. To increase income of coconut plantation farmers in Silang practice intercropping and livestock while in North Minahasa intercropping only.

Keywords: Coconut by product, Coconut industry development, Coconut value added, Economic development, Livelihood, Rural area.

Introduction

Coconuts are used to derive a number of products, such as copra, coconut oil, coconut cake, coir, coconut water which provides a refreshing nutritious drink. Coconut components, namely 35 percent coconut fiber, 12 percent coconut shell, 28 percent coconut meat and 25 percent coconut milk. Each component can be used as food and non-food products. For example, coconut fiber can be used for mats, brooms, furniture; coconut shell for charcoal; coconut meat for frying oil, coconut cream, copra; and coconut milk for nata de coco. (Surtaningsih, 2004)

The two biggest producers of coconut in the world are Philippines and Indonesia. As a commodity, coconut plays very important role both as a means of livelihood and as a source of local government income in both countries. For the past two decades the Philippines coconut production has been erratic and generally on the downward trend threatening the country's position as one of the top coconut producers in the world. Coconut farmers and producers remain in poverty. (Taya, 2006). Although Indonesia is the largest coconut producer in the world, the current condition of the national coconut industry is not satisfactory, especially in terms of exports, productivity and farmers' income. (Hengky, Rompas & Darwis, 1998)

This study primarily aimed to compare coconut industry in Silang, Cavite, Philippines and North Minahasa, North Sulawesi, Indonesia. Specifically the problem addressed in the study was designed to answer the following research questions: (1).What are the current condition and problems of coconut industry in Silang and North Minahasa. (2). What are the possible solutions to the current problems of coconut industry in Silang and North Minahasa. (3). What is the ideal solution to increase the income of farmers, providing livelihood opportunities to low-income families to improve the quality of life in rural areas.

The municipality of Silang is approximately 45 kilometers south of Manila. Silang is located in the eastern section of Cavite province. According to the 2007 census, it has a population of 199,285 people (as of August 1, 2007) in an area of 209.4 square kilometers or 6.98% of total population of Cavite Province that has 2,856,765 total population. Silang is politically subdivided into 64 barangays/villages (which comprises of 46 rural areas and 18 urban areas. (National Statistics Office, 2007) Silang, like most of the towns in the province of Cavite, is mainly agricultural in nature. The primary crops grown in the vicinity are coconut, coffee, corn, banana, pineapple, and tree crops like mango, lansones, caimito, santol, jackfruit, guava and avocado. The municipality of Silang has a total land area of 15,641 hectares, 9,731.83 hectares or 62.22 percent of which is suitable for agricultural production. Of the total agricultural area utilized, 3,474 hectares or 35.70% of which were utilized for the plantation of coffee, 2,562.82 hectares or 26.33% for coconut, 1,092 hectares or 11.22% were used in planting pineapples, the remaining 2603.01hectares or 26.75% for planting rice, corn, fruit trees, vegetables, sugar cane and cut flowers. (Source: Silang Municipal Office).

Silang's production gave great contribution to the Gross Domestic Product (GDP) of the locality. The highest contribution of which was in 1999 where the municipality earned a total of PhP 597,917,425.00. A decrease of 24.09% was observed in year 2000 where PhP 453,855,640.00 were earned while in year 2001 a 7.79% increase was achieved after earning PhP 489,253,889.50. (Source: Silang Municipal Office).

As of 2001 (source: PCA, Trece Martires City, Cavite): Total number of coconut farmers= 1,790; Total number of coconut farm workers= 704; Total coconut plantation areas= 2,539.98 hectares; Average own per farmer= 1.42 hectares; Total number of trees= 217,941; Productivity per year= 1.061 tons/hectare; Total productivity/year = 2,694 tons equivalent copra terms.

North Minahasa is a region in northern Sulawesi Province in Indonesia. This Province could perhaps claim more than most notably its location close to the Philippines on the periphery on the Indonesian archipelago. North Minahasa areal size 932.20 km2, population 154,189 people or 7.04% of North Sulawesi Province total population 2,189,273. It has 10 districts, 124 villages and 6 towns. Coconut Plants are disseminated in all North Minahasa regency and is main farming resident. Its economy is heavily primary industry

based, with coconuts playing the predominant role. Its Regional Original Income: Rp. 342,695,539,435.92. GDRP = Rp. 6,080,000, (P1=Rp.207 as of Aug 6, 2008) and its economic growth is 6.14%. Regional potential: Marine and fishery, mining and energy, agriculture, tourism, trade and industry. It is abundant with natural resources. (North Sulawesi Official Website retrieved, June 27, 2008).

Coconut production as of 2007 *(Source: North Minahasa Regency office)*: Total number of plant owners = 21,282; total coconut plantation areas = 47,884.48 hectares; total number of trees = 4,577,818; Average own per farmer = 2.19 hectares; Productivity per year = 1.343 tons / hectare; Total productivity/year = 47,653.86 tons.

Literature Review

1. Coconut Harvest Operations. It takes up to a year for coconuts to mature, the trees bloom up to thirteen times a year. Fruit is constantly forming, thus yielding a continuous harvest year-round. An average harvest from one tree runs about 60 coconuts, with some trees yielding three times that amount. (Filippine, 2007) It is harvested according to the purpose for which it is has to be used. If the nut is needed for its water, it is allowed to ripen for just 5 to 6 months and then it is harvested. If copra is required from the coconut, 8 to 10 months old fruits are harvested. For the dry copra, the coconut is allowed to ripen fully for 10-12 months and then harvested.

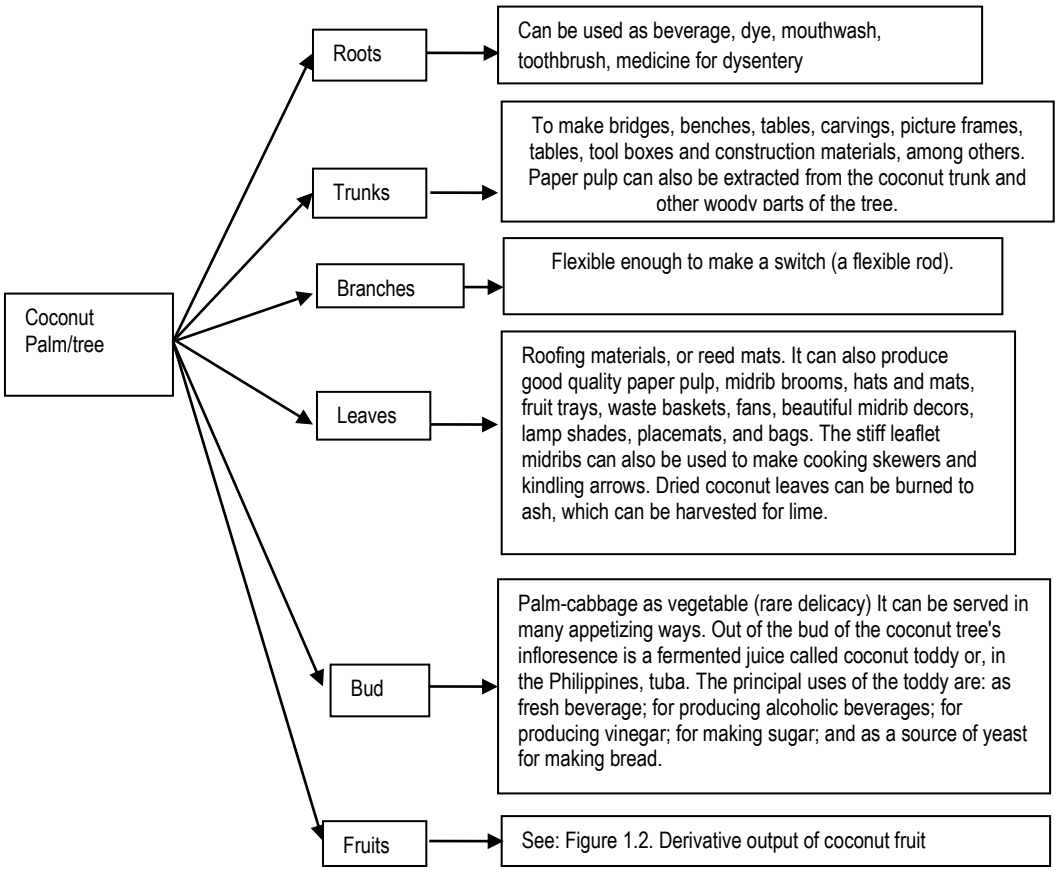
Bearing coconut palms produce nuts throughout the year, although yields may vary with the season. A normal-bearing, adult palm produces at least one matured ready-to-harvest bunch of coconuts every month. Depending on the variety, the number of nuts per bunch can vary from 5 to 15. The theoretical number of bunches per palm that can be harvested annually is about 14 from tall coconut varieties and 16 from the dwarf species.

2. Coconut Development. Indonesia. Most of the coconuts grown in the country are tall types. About 98% have been cultivated by smallholders and the rest by government and private organizations. For replanting and rejuvenation, farmers usually select seed-nut from their garden. In 1975, the Government introduced coconut hybrid PB 121 from Ivory Coast. PB 121 was distributed to the farmers through the SCDP (Smallholder Coconut Development Project). Harsh environmental factors caused the poor performance of coconut hybrids in terms of yield. It was also found that coconut hybrids required high input. Hence, most farmers disliked planting hybrids and preferred local tall coconut. (Hengky, 1998). *Philippines.* The existing coconut stands in the country are still dominated by talls (at least 97%). Magat (1993) reported that from the initial planting of Malayan Yellow Dwarf × West African Tall (MYD × WAT) hybrids in 1976 to date, surviving population area of these high yielding hybrids including PCA local hybrids (PCA 15-1, PCA 15-2 and PCA 15-3) could be around 45,000 hectares. It was, however, estimated that these hybrids are occupying less area or around 30,000 to 35,000 hectares. The major tall populations grown in the country are Bago-Oshiro (BAO), Baybay (BAY), Laguna (LAG), Macapuno (MAC), San Ramon (SNR), Tagnanan (TAG), and Hijo Tall (HJT). The dwarf varieties include Catigan (CAT), Tacunan (TAC), Kinabalan (KIN) and Aromatic (ARO). (Santos & Rivera, 1998)

3. Coconut Production. The world production of coconut sums up to around 55 million tons annually. Indonesia and Philippines are the major countries that produce the maximum coconut fruits in the world. The leading producers of the crop in the year 2005 with their production figures are Indonesia (16,300,000 metric tons), Philippines (14,500,000 metric tons), India (9,500,000 metric tons), Brazil (3,033,830 metric tons), Sri Lanka (1,950,000 metric tons), Thailand (1,500,000 metric tons), Mexico (959,000 metric tons), Vietnam (940,000 metric tons), Malaysia (710,000 metric tons), Papua New Guinea (650,000 metric tons). *Source: CRN India.*

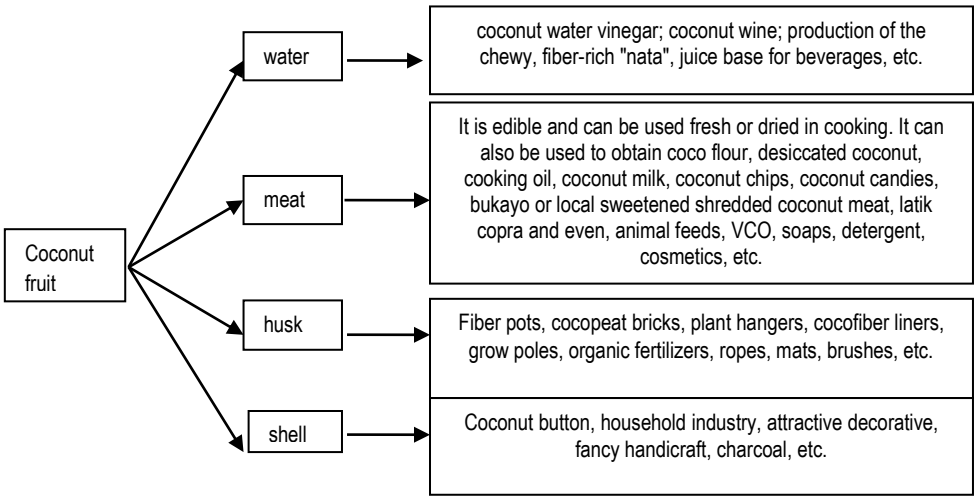
The top copra producers in the world were the Philippines (42%), Indonesia (24%), India (9%) and Thailand (7%). In the case of coconut oil, The Philippines produced 44% of the world production, followed by Indonesia (18%) and India (14%). (Singh, Seepersad & Rankine, 2006). Of the total production of coconuts in Indonesia, 34.7 percent is processed for coconut cream, 8 percent for frying oil, and 57.3 percent for copra (Surtaningsih, 2004). There are many outputs coming from coconut processed products. Figure 1.1 shows the parts of coconut palm and the use. Figure 1.2 shows the derivation output of coconut fruit and appendix A shows the integrated processing for matured coconut. Jhenz (2008) describes why coconut tree is called "The Tree of Life". The Coconut Tree is known to have many uses, from its roots to tips (leaves), from culinary to non-culinary. *Coconut roots*. Coconut roots are used as beverage, dye, mouthwash, and medicine for dysentery (formerly known as flux or the bloody flux). A frayed-out piece of root can also be used as a toothbrush. *Coconut trunks*. Its hardy and durable wood is used for building small bridges, preferred for their straightness, strength and salt resistance. It is also used to make benches, tables, carvings, picture frames, tables, tool boxes and construction materials, among others. Paper pulp can also be extracted from the coconut trunk and other woody parts of the tree. *Coconut branches*. Coconut branches (leaf petioles) are strong and flexible enough to make a switch (a flexible rod) *Coconut leaves*. Coconut leaves can be woven to create effective roofing materials, or reed mats. It can also produce good quality paper pulp, midrib brooms, hats and mats, fruit trays, waste baskets, fans, beautiful midrib decors, lamp shades, placemats, and bags. *Coconut fruit*. Coconut fruit produces buko, often used for salads, halo-halo (crushed ice with sweetened fruit), sweets and pastries. The "sport fruit" of the coconut known as makapuno is primarily harvested in the Philippines. They are sold in jars as "gelatinous mutant coconut" cut into balls or strands. Considered a delightful delicacy and largely used for making preserves and ice-cream. *Coconut meat*. Coconut meat is the thick white, fleshy substance found inside the coconut shell. It is edible and can be used fresh or dried in cooking. It can also be used to obtain coco flour, desiccated coconut, coconut milk, coconut chips, coconut candies, bukayo or local sweetened shredded coconut meat, latik copra and even, animal feeds.

Figure 1. Parts of coconut palm and the use



*Coconut water***.** Coconut water provides an isotonic electrolyte balance, and is a highly nutritious food source. Uses of coconut water include: coconut water vinegar; coconut wine; production of the chewy, fiber-rich "nata", good as a dessert and as a laxative; as a growth factor; and as a substitute for dextrose. It is also used to cure renal disorders. *Coconut milk***.** Coconut milk is made by processing grated coconut with hot water or milk, which extracts the oil and aromatic compounds. It should not be confused with the coconut water mentioned above, and has a fat content of approximately 17%. When refrigerated and left to set, coconut cream will rise to the top and separate out the milk. The milk is used to produce virgin coconut oil. *Coconut oil***.** Copra is the dried coconut meat and, after further processing, is a source of high coconut oil content (as much as 64%). Coconut oil is the most readily digested, of all the fats, generally used in the world. It can be rapidly processed and extracted as a fully organic product from fresh coconut flesh, and used in many ways including as a medicine and in cosmetics, or as a direct replacement for diesel fuel. Virgin coconut oil is found superior to the oil extracted from copra for cosmetic purposes. *Apical buds***.** Apical buds of adult plants are edible and are known as "palm-cabbage" or heart-of-palm. In the Philippines, it is known as ubod and considered one of the finest vegetables. It is considered a rare delicacy, as the act of harvesting the bud, could kill the palm. It can be served in many appetizing ways. It is also eaten in salads (mixed with mayonnaise or thousand island dressing), known as "Millionaire's Salad". *Coconut inflorescence***.** Out of the bud of the coconut tree's infloresence is a fermented juice called coconut toddy or, in the Philippines, tuba. The principal uses of the toddy are: as fresh beverage; for producing alcoholic beverages; for producing vinegar; for making sugar; and as a source of yeast for making bread. *Coconut husk***.** Coconut husks are made of bristle fiber (10%), mattress fiber (20%) and coir dust and shorts or wastes (70%). Coir is used in ropes, mats, brushes, caulking boats and as stuffing fibre; it is also used extensively in horticulture for making potting compost. The husk can be used for fuel and are a good source of charcoal. Dried half coconut shells with husks are used to buff wooden floors, making it clean and shiny (free from dusts). In the Philippines, it is known as "bunot". Fresh inner coconut husk can be rubbed on the lens of snorkelling goggles to prevent fogging during use. *Coconut shell***.** Coconut shell produces the core of the most saleable household products and fashion accessories that can be turned into lucrative, wide-selling cottage industries. Shirt buttons can be carved out of dried coconut shell. Coconut buttons are often used for Hawaiian Aloha shirts.

Figure 2. Derivative Output of Coconut Fruit



4. Marketing. Farmers are interested mainly in prices in local markets where they sell their goods. Indonesia's marketing information system already uses provincial offices to distribute locally collected data to radio stations, newspapers etc., and to maintain "Price Boards" which are displayed in collection areas and updated every day. Distribution of marketing information at a grass roots level is not adequate to meet the needs of farmers. The information distributed tends to be raw price data, often averaged over the country, which is of little use to farmers. (Agricultural Marketing, 1994).

5. Technology. The invention of farm machine in the Philippines which is called one machine does six different tasks introduced. It can be used as a forage chopper, shredder of farm wastes, grinder, hammer-mill, forage mixer and coconut husk decorticator. It can also chop farm wastes and residues into easily decomposed materials for organic fertilizer or compost production. (Sarian, 2006). It is studied that by fertilizing coconut with 2 kilos of salt can increase yield by 25%. This is proved to be cheapest coconut fertilizer, easy to apply, increases thickness of coconut meat, increases number of nuts, makes coconut drought resistant, makes coconut resistant to pests and diseases. The effect in copra production in the 1st year is 20%-25% and 2nd year 50%-100%. The Amount of salt is 2 kilograms per tree/year. (PCA, 2008).

6. Intercropping and Livestock. To maximize the land productivity in coconut plantation area, Mantau & Polakitan (2007) introduced the land use pattern among the coconut plantation through integrated farming system with maize and goat.

Methodologies

The study was conducted from July to August 2008 in Silang rural areas and North Minahasa rural areas. Barangay officials, Agriculture Officer in Silang Municipal Office and North Minahasa Regency Office, Farm Consultants of IIRR, coconut sellers in Silang Market, Coconut farmers in Silang and North Minahasa were involved in this study. PCA officials, distributor of fertilizer, farm technology inventor, coco coir processing manufacturer were also interviewed.

The research method used in this study is a descriptive survey. The questionnaire was designed as the major source of information to answer the questions of the current condition and problems of coconut industry in Silang and North Minahasa. Respondents of the study were those coconut plantation owners in rural areas of Silang and North Minahasa. There were 21 respondents who participated in the study, eight respondents from Silang and thirteen respondents from North Minahasa.

The secondary data were gathered from Silang Municipal Office, Philippines Coconut Authority in Cavite Provincial and Manila, North Minahasa Regency office, related literatures. *Empirical Results*. The aim of this part is to report and discuss the data, analyze and interpret the results so as to answer the research questions.

Part I. Farming Operations

Table 1. **Length of Time in the Coconut Farming**

Length of time (years)	Silang		North Minahasa	
	f	%	f	%
5 to 10	-	-	2	15.4
11 to 15	1	12.5	2	15.4
16 to 20	2	25	2	15.4
21 and above	5	62.5	7	53.8

Total	8	100	13	100

Table 1 indicates that majority of respondents in North Minahasa (7 or 53.8%) have been in the coconut farming operations for more that 20 years and the other respondents varies from 5 to 20 years. 5 or 62.5% respondents from Silang have been in coconut farming for more than 20 years and the 2 or 25% have been for about 16 to 20 years and only 1 or 12.5% was only about 11 to 15 years in this operations.

Table 2. **The Size in Hectares of Coconut Farm**

Size in hectares	Silang		North Minahasa	
	f	%	f	%
½ to 2	3	37.5	6	46
>2 to 4	5	62.5	3	23
>4 to 6	-	-	-	-
>6	-	-	4	31
Total	8	100	13	100

Table 2 shows that in North Minahasa six or 46% of respondents own around ½ to 2 hectares of coconut farm and four of 31% own more than six hectares while three or 23% own around two to four hectares. 5 or 62.5% of respondents from Silang have the farm size of above 2 to 4 hectares and 3 or 37.5% have only about 1/2 to 2 hectares.

Table 3. **Number of Coconut Trees in the Areas**

Number of trees	Silang		North Minahasa	
	f	%	f	%
45 to 200	5	62.5	7	53.8
201 to 400	3	37.5	2	15.4
401 to 600	-	-	1	7.7
601 to 800	-	-	1	7.7
801 to 1000	-	-	1	7.7
>1000	-	-	1	7.7
Total	8	100	13	100

Table 3 shows the number of coconut trees own by each respondent. Majority of respondents in North Minahasa (7 of 53.8%) have around 45 to 200 coconut trees in their plantation areas and there is one or 7.7% own more than 1000 trees, and the others varies from 201 to 1000 trees. 5 or 62.5% of respondents from Silang have around 45 to 200 coconut trees and 3 or 37.5% have around 201 to 400 trees.

Table 4. **Average Age of the Coconut Trees**

Average age (years)	Silang		North Minahasa	
	f	%	f	%
5 to 20	-	-	4	30.8
21 to 40	2	25	5	38.5
41 to 60	5	62.5	1	7.7
>60	1	12.5	3	23
Total	8	100	13	100

Table 4 shows that 23% of respondents in North Minahasa have coconut trees older than 60 years of age, 69.3% respondents have around 5 to 40 years of age, and only 7.7% respondents have coconut trees with 41 to 60 years of age. 5 or 62.5% respondents from Silang's coconut trees around 41 to 60 years old, 2 or 25% around 21 to 40 years old and only 1 or 12.5% above 60 years old.

Table 5. **Types of Coconut Trees**

Types of coconut trees	Silang		North Minahasa	
	f	%	f	%
Tall	8	100	5	38.5
Hybrid	-	-	-	-
Mixed	-	-	8	61.5
Total	8	100	13	100

Table 5 indicates that 61% North Minahasa respondents have mixed variety of coconut trees and only 38.5 percent have tall type only in their plantation areas. All respondents (8 or 100%) in Silang have tall type of coconut trees only. The reason of having the tall varieties is those trees already planted by the parent long time ago.

Table 6. **Nuts/fruits of Each Tree per Harvest**

Number of fruits	Silang		North Minahasa	
	f	%	f	%
5 to 12	5	62.5	4	30.8
13 to 20	3	37.5	3	23
21 to 30	-	-	4	30.8
31 to 40	-	-	2	15.4
Total	8	100	13	100

Table 6 indicates, 30.8% respondents in North Minahasa stated can harvest around 5 to 12 nuts per tree each harvest time, another 30.8% respondents can harvest 21 to 30 nuts, 23% can harvest 13 to 20 nuts and only 15.4% can harvest 31 to 40 nuts. 5 or 62.5% respondents from Silang can only harvest around 5 to 12 nuts per tree and 3 or 37.5% can have 13 to 20 nuts.

Table 7. **Number of Harvest Time Each Year**

Number of fruits	Silang		North Minahasa	
	f	%	f	%
2 to 3 times	-	-	4	30.8
4 to 5 times	-	-	8	61.5
6 to 7 times	1	12.5	1	7.7
8 to 9 times	1	12.5	-	-
10 to 12 times	6	75	-	-
Total	8	100	13	100

Table 7 shows that in North Minahasa, the most practice by coconut farmers is harvesting four to five time a year (8 or 61.5%), 4 or 30.8% harvest two to three times a year and only 1 or 7.7% harvest for six to seven times a year. In Silang the most practice in harvesting is 10 to 12 times a year. This is done by 6 or 75% respondents. Only 1 or 12.5% practice harvesting around 6 to 7 times a year and the other 1 or 12.5% harvest 8 to 9 times a year.

Table 8. **Effort in Trying to Increase More Crops**

Number of fruits	Silang		North Minahasa	
	f	%	f	%
Fertilized	-	-	2	15.4
Cleanliness and nurture	-	-	6	46.1
Rejuvenate/planting more	1	12.5	2	15.4
Fertilized and Cleanliness	-	-	2	15.4
Fertilized and anti pest	7	87.5	1	7.7
Total	8	100	13	100

Table 8 shows that most (6 or 46.2%) of respondents in North Minahasa practice cleanliness and nurture the plantation to be able to increase more crops, and the other respondents practice various ways from fertilized, anti pest and rejuvenate. 7 or 87.5% respondents in Silang applied fertilizer and anti pest to increase more crops and only 1 or 12.5% try to plant more to increase more crops.

Table 9. **Types of Coconut Fruits Harvested**

Types of Fruits	Silang		North Minahasa	
	f	%	f	%
Young	5	62.5	-	-
Old	2	25	11	84.6
Mixed	1	12.5	2	15.4
Total	8	100	13	100

Table 9 indicates that in North Minahasa most of fruits harvested are old types this is proved by 11 or 84% respondents and only 2 or 15.4% harvested mixed of old and young coconuts. In Silang, most respondents (5 or 62.5%) usually harvest young coconut, only 2 or 25% harvest old coconut and 1 or 12.5% harvest mixed of old and young coconuts.

Table 10. **Practice Intercrops**

Practice	Silang		North Minahasa	
	f	%	f	%
Intercrops:				
Nutmeg and/or clove	-	-	4	30.8
Fruits (mango, banana)	-	-	4	30.8
Various vegetables	3	37.5	3	23
Coffee/bananas/fruits	2	25	-	-
Cassava/banana	2	25	-	-

Pineapple/banana/papaya/ Peanuts	1	12.5	-	-
Mono crop	-	-	2	15.4
Total	8	100	13	100

Table 10 shows that most coconut farmers in North Minahasa (11 or 84.6%) practice intercrops in their coconut plantation and only 2 or 1.4% practice mono-crop with nutmeg, clove, and fruits. In Silang, the farmers practice intercrops with coffee, bananas, cassava, pineapple, papaya, peanuts and some other vegetables and fruits.

Table 11. **Practice Livestock in Coconut Plantation Areas**

Practice	Silang		North Minahasa	
	f	%	f	%
Livestock/fowl:				
Chicken/ducks	1	12.5	-	-
Pigs	1	12.5	-	-
Cattle/buffalo/goat	1	12.5	-	-
Pigs and chicken	1	12.5	-	-
None	4	50	13	100
Total	8	100	13	100

Table 11 indicates that in North Minahasa there is no practice of having livestock or fowls in coconut plantation area but in Silang only 4 or 50% respondents do not have livestock or fowl in coconut plant but the other 50% have various livestock and fowl.

Table 12. **Source of Seed Nuts**

Sources	Silang		North Minahasa	
	f	%	f	%
Local Government	1	12.5	3	23.1
NGO (Non Government Organization	-	-	-	-
Own/self plantation	7	87.5	10	76.9
Total	8	100	13	100

Table 12 shows that 10 respondents or 76.9% from North Minahasa get the seed nuts from their own plantation, and only 3 respondents or 23.1% stated that they could get the seed nuts from local government. 7 or 87.5% respondents from Silang get their seed nuts from their own plantation and only 1 or 12.5% get from government for free.

Table 13. **Subsidies/Support Received**

Source and Types of Subsidy	Silang		North Minahasa	
	f	%	f	%
Government:				
Marketing support/price/counseling	-	-	1	7.7
Price/counseling	-	-	1	7.7
Fertilizer/anti pest/counseling	4	50	4	30.7
Marketing/price/fertilizer/anti pest	-	-	1	7.7
Counseling	-	-	-	-
Health/life insurance	2	25	-	-
Financing/loan	-	-	-	-
Price/fertilizer/anti pest/counseling	-	-	1	7.7
Seed-nuts	1	12.5	2	15.4
Fertilizer/anti pest/seed-nuts	-	-	1	7.7
None	1	12.5	2	15.4
Total	**8**	**100**	**13**	**100**
NGO: None	**8**	**100**	**13**	**100**

Table 13 indicates that government supports/subsidies given to the coconut farmers in North Minahasa are in the area of marketing, price determination, fertilizer, anti pest, seed-nuts and counseling but there is no NGO support. 4 or 50% respondents from Silang having experience of receiving fertilizer and anti pest from government, 2 or 25% have life insurance coverage the amount of P10,000 only which is too small as perceive by respondents. The other 1 or 12.5% get seed nut from government and another 1 or 12.5% get nothing so far. 2 or 25% of respondents of Silang also mentioned that they got salt from government for fertilizer.

Table 14. **Farm Workers Type of Hiring**

Farm Workers /Type of Hiring	Silang		North Minahasa	
	f	%	f	%

Daily	1	12.5	-	-
Weekly	-	-	-	-
Monthly	-	-	-	-
Seasonal:				
Cash	5	62.5	-	-
Fruit sharing	2	25	10	76.9
Cash and fruit sharing	-	-	3	23.1
Total	8	100	13	100

Table 14 shows that the types of hiring coconut farm workers in North Minahasa is seasonal only and the compensation given to workers is mostly fruit sharing (10 or 76.9% respondents). Only 3 or 23.1% respondents compensate the seasonal workers with cash and fruit sharing. In Silang they practice paying cash on seasonal basis (5 or 62.5%) and daily cash basis by 1 or 12.5% respondents. Only 2 or 25% practice fruit sharing.

Table 15. **Types of Selling**

Types of Selling	Silang		North Minahasa	
	f	%	f	%
Coconut selling directly	8	100	10	76.9
Copra process	-	-	3	23.1
Total	8	100	13	100

Table 15 shows that most (10 or 76.9%) respondents in North Minahasa sell old coconut, and a few mixed with young coconut. 3 or 23.1% of respondent process coconut into copra to expect higher income generating. All respondents (100%) in Silang sell the coconut directly after harvest.

Table 16**. Place to Sell the Coconut and Copra**

Types and place to sell	Silang		North Minahasa	
	f	%	f	%
Coconut and copra selling place:				
Public market	-	-	-	-
Local middleman	7	87.5	4	30.8
Regular customer	1	12.5	5	38.4
Coconut oil/process manufacturer	-	-	4	30.8
Total	8	100	13	100

Table 16 indicates that in North Minahasa the farmers usually sell the coconut and copra to regular customer (38.4% respondents), 30.8% respondents sell to local middlemen and the other 30.8% sell directly to Coconut oil/process manufacturer. 7 or 87.5% respondents in Silang sell the coconuts to local middlemen and only 1 or 12.5% sell to regular customer.

Table 17. **Respondents Perception on What will be Produced by Buyers**

Types of Production produced by buyers	Silang		North Minahasa	
	f	%	f	%
Cooking oil	-	-	4	30.8
VCO	-	-	1	7.7
Desiccated coconut	-	-	3	23
Coconut milk	-	-	4	30.8
Copra	-	-	1	7.7
Food/drink	4	50	-	-
Sell again	4	50	-	-
Total	8	100	13	100

Table 17 shows the perception of North Minahasa respondents on what their buyers will do with the copra or coconut they buy. 4 rmilk, 23% perceived it will be processed to desiccated coconut, 7.7% perceived it will be processed to VCO (Virgin Coconut Oil), and the other 7.7% perceived it will be processed into copra if in the case the buyers buy old coconut. In Silang, since all coconuts sold are respondent or 30.8% perceived that it will be processed to cooking oil. Another 30.8% perceived it will be processed to coconut young ones, 50% of respondents perceived that it will be used as food and drink, but the other 50% respondents perceived that it will be sold again because most of the buyers are middlemen.

Table 18**. Other Coconut Tree Products Usually Sold**

Types of Production by coconut buyers	Silang		North Minahasa	
	f	%	f	%
Hust/coir/fiber	-	-	4	30.8
Shell	-	-	-	-
Trunks	4	50	-	-
None	4	50	9	69.2
Total	8	100	13	100

Table 18 shows that 9 respondents or 69.2% in North Minahasa do not sell other products of coconut other than the nuts and only 4 or 30.8% respondents sell the husk for income generating. 4 or 50% of Silang respondents sell only the trunk as lumber when it is senile, and the other 4 or 50% respondents do not have other product they usually sell.

Table 19. **Old/Senile Coconut Trunks**

Old Coconut Trunks	Silang		North Minahasa	
	f	%	f	%
Sell	4	50	9	69.2
Fire wood	-	-	4	30.8
Furniture	2	25	-	-
Lumber	2	25	-	-
Total	8	100	13	100

Table 19 indicates that North Minahasa respondents mostly (9 or 69.2%) sell the senile trunks for income generating and 4 respondents or 30.8% just use it as fire wood for themselves. 2 or 25% of respondents in Silang make use the trunks as furniture while the other 2 or 25% respondents make lumber. The other 4 respondents or 50% just sell the senile trunk as is.

Table 20. **Respondents Membership**

Membership	Silang		North Minahasa	
	f	%	f	%
Association	2	25	3	23.1
None	6	75	10	76.9
Total	8	100	13	100

Table 20 indicates that in North Minahasa most respondents (10 or 76.9%) do not have a membership of any coconut association and only 3 or 23.1% respondents are members of an association. 6 or 75% of respondents in Silang were not members of an association, and only 2 or 25% already become members.

Table 21. **Insurance Coverage Received by Coconut Farmers**

Types of Insurance Covered	Silang		North Minahasa	
	f	%	f	%
Life	3	37.5	-	-
Health	-	-	-	-
None	5	62.5	13	100
Total	8	100	13	100

Table 21 shows that none of Coconut farmers in North Minahasa received any insurance coverage. There are 3 or 37.5% of respondents in Silang received life insurance covered by COCOLIFE.

Part II. Source of Income and Expenditures

Table 22. **Source of Income**

Source of Income	Silang		North Minahasa	
	f	%	f	%
Coconut plantation only	-	-	-	-
Coconut plantation and others	8	100	13	100
Total	8	100	13	100

Table 22 shows that all respondents (100%) in North Minahasa and in Silang have some other sources of income other than coconut.

Table 23. **Coconut Plantation Enough or not Enough to Sustain the Family**

Enough/Not Enough	Silang		North Minahasa	
	f	%	f	%
Enough			4	30.8
Not enough	8	100	9	69.2
Total	8	100	13	100

Table 23 shows that 9 or 69.2% of North Minahasa respondents stated that the income they receive from coconut plantation is not enough for their family needs and only 4 or 30.8% respondents stated that it's enough. All (8 or 100%) respondents in Silang stated that the income from coconut plantation is not enough to sustain their family needs.

Conclusions

Coconut farmers in Silang produce young coconut to generate income and there is no value added created from the coconut trees. To increase income of coconut plantation in Silang, the farmers practice intercrop by planting coffee, banana, pineapple, cassava, papaya, peanuts and other fruit trees. They also have livestock and fowl in the coconut area to generate income. Most farmers do not bring their product to the market but wait for the buyer to come. The widespread cultivation of traditional, tall and low yielding varieties produce low incomes to coconut farmers, particularly under poor management where there is no use of fertilizer, pest, weed and diseases control.

The native, tall varieties have been favored over the new hybrid dwarf varieties because the latter has been observed to have a shorter life span, having small-size nuts and are susceptible to pests and diseases. The only advantage is its low height at maturity which facilitates nut-picking and tuba-tapping. The native tall varieties were most useful for lumber. Copra and old coconut is the major sales of coconut production in North Minahasa and there is no by-products process from coconut trees to generate additional income. Intercropping in coconuts is really acknowledged to have increased family income and incurred mutual benefits for intercrop and main crop in North Minahasa. Income generating from coconut farming currently very low. The more the frequency of harvesting in Silang compared to North Minahasa is because Silang harvests young coconut while North Minahasa harvests old coconut. Farm sanitation, cleaning of the coconut crown area and adoption of a planting spacing are the most potential and practical measures of controlling the rat problem. The seed nuts as planting materials were selected by farmers from their own plantation by picking the biggest bunch in a coconut tree and pick the biggest nut from the selected bunch.

Recommendations

The Local Government Unit must help the farmers in marketing through organized cooperatives. Promote the application of organic fertilizer concerning the health protection and international market requirements. Promote planting and replanting to maximize the land area available with better varieties that provide high-value products. Agri-based industries should be welcomed in the municipality.

Private sector to invest more money in the marketing and processing of coconut, and its by-product, and in the development and dissemination of improved varieties and technologies to produce more coconut. Active involvement of the non-government organizations (NGOs) in promoting improved varieties and technologies, delivering micro-credit to farmers, and organizing coconut farmers into a strong and cohesive group to represent the coconut industry. Farmers' good crop management would significantly increase the yield of coconut by ensuring that it will not be adversely affected by drought or poor drainage, by applying adequate fertilizers, and controlling weeds and pests.

Coconut products development can be achieved through the involvement of all the stakeholders from research scientists, governments, workers, commercial banks, the processors, private sector entrepreneurs, NGOs and farmers. Integrated farming system approach must be enhanced in North Minahasa to diversify the commodity to increase the farmer's income by practicing intercropping and suitable livestock. Further studies should be conducted in certain processing and marketing of coconut by-products.

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