Value Chain Analysis of Calamansi

Draft Report (As of June 3)

I. Introduction

a. Overview of the calamansi industry

The calamansi *(citrus madurencis)* is considered as one of the major fruit crops[1] in the Philippines, which is indigenous to the country[2]. This plant is characterized by wing-like appendages on the leaf-stalks and white or purplish flowers. Its fruit has either a spongy or leathery rind with a juicy pulp that is divided into sections.

Calamansi is said to be a good source of vitamin C. Its fruit has been processed into syrups, juices, concentrates, and purees. Its juice is used as a flavoring or as an additive in various food preparations to enhance iron absorption. It can also be a preserve ingredient for sweet pickles or marmalade.

The calamansi fruit also has many medicinal uses. It can be a good treatment to itchy scalp and for hair growth. It can also heal insect bites, remove freckles, clear up acne, cure pimples, and deodorize underarms. It is a popular medicine for cough. Aside from its food and medicinal uses, homemakers are awed by its power to remove heavy stains on fabrics, which makes laundry duties a pleasure.

According to the Bureau of Agricultural Statistics (BAS), this marvelous fruit crop has contributed greatly in the export market at a value of US$238.85 thousand for the year 2005, either in the form of fresh fruit, juice, or concentrate[3]. A large proportion of the calamansi production came from Mindoro Oriental (69.04%), Quezon (3.7%), and some provinces in Mindanao, like North Cotabato (2.2%) and Agusan del Sur (2.1%).

The Philippine government through the Department of Science and Technology (DOST) has been conducting studies about the calamansi to further aid small–scale farmers in the market. This resulted in the different uses of calamansi parts and the encouragement of near–farm processing to further minimize losses owing to spoilage and to increase farmers' income.

For the purpose of assisting small–scale farmers in gaining strong hold in the fresh calamansi market, this report is prepared to depict the various functions or activities in the calamansi industry.

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[1] Bureau of Agricultural Statistics, Costs and Returns of Calamansi production, September 1999
[2] http://www.fnri.dost.gov.ph/nutrinet/index.html
[3] Bureau of Agricultural Statistics, Situationer on Calamansi, July – December 2005

b. Objectives of the Study

This study aims to achieve the following objectives:

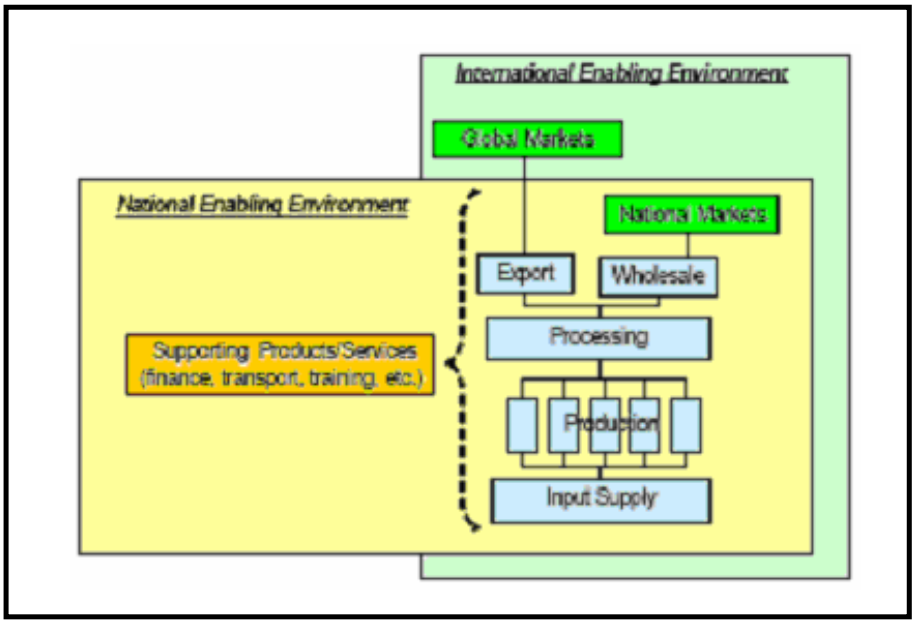
- To describe the market chain and the chain actors involved in calamansi production and marketing
- To understand the dynamics in the calamansi market
- To identify production and marketing constraints

The study does not intend to present a full-scale industry analysis of calamansi. However, it presents important data on production and marketing of the commodity that are necessary in evaluating the efficiency of current practices by small farmers and traders. The constraints mentioned by small farmers themselves will enable readers of this study to formulate recommendations and target specific programs to aid small-scale calamansi farmers.

II. Framework and Methodology

As defined by Kaplinsky (2000), the value chain describes the full range of activities which are required to bring a product or service from conception, through the different phases of production (i.e. involving a combination of physical transformation and the input of various producer services), delivery to final consumers, and final disposal after use. The value chain analysis seeks to understand the various factors that drive the incentives, growth, and competitiveness within a particular industry and to identify opportunities and constraints to increasing benefits for stakeholders operating throughout the industry. The value chain framework adapted by this study is seen in Figure 1.

Figure 1. Value chain framework



The study team will utilize secondary data culled from various studies on calamansi. A majority of the documents are from the Bureau of Agricultural Statistics (BAS) and from case studies conducted by the Xavier Agriculture Extension Service (XAES).

This study focuses on the production and marketing practices of three top calamansi-producing provinces, namely, Mindoro Oriental, Quezon, and Guimaras (Table 1). These three provinces comprise almost 70% of total national production of calamansi. Cost and return data for Batangas, Leyte, and Zamboanga Sibugay were also secured.

Table 1. Top producing provinces of calamansi, 2006

Rank	*Province*	*Production (in MT)*	*% share*
1	Mindoro Oriental	119,938	61.01
2	Quezon	8,877	4.52
3	Nueva Ecija	5,957	3.03
4	North Cotabato	5,304	2.70
5	Davao del Norte	4,935	2.51
6	Guimaras	4,645	2.36
7	Cagayan	4,623	2.35
8	Agusan del Sur	4,050	2.06
9	Compostela Valley	3,591	1.83
10	Batangas	3,582	1.82
11	Zamboanga Sibugay	3,445	1.75
12	Leyte	2,145	1.09
13	Iloilo	2,074	1.06
14	Aurora	1,701	0.87
15	Pangasinan	1,578	0.80
16	Sorsogon	1,265	0.64
17	Isabela	1,127	0.57
18	Cebu	937	0.48
19	Davao City	856	0.44
20	Zamboanga City	844	0.43
Philippines		**196,595**	

III. Market Channels

a. Production, Cost, and Returns

Calamansi is easy to cultivate. The plant grows well in cool and elevated areas and in sandy soils rich in organic matter. Waterlogged areas are not suitable for cultivation because calamansi plants cannot tolerate too much moisture. Calamansi can be propagated by seeds using its vegetative parts. To produce big, luscious fruits, applying fertilizer, such as ammonium sulfate or urea, around each tree one month after planting is essential. The trees will start to bear fruit one or two years after planting. Its trees have an average life span of five years.

National production of calamansi exhibited decreasing trend from year 2000 until 2004 (Table 2). This decrease in production is attributed to various typhoons that struck the northern and southern parts of Luzon. Production soared in 2005, with a 12.17% percent change. According to the BAS, the gain can be attributed to the increased number of bearing trees in Mindoro Oriental and Zamboanga Sibugay and control of aphids in Nueva Ecija. In terms of area devoted to calamansi production, the data exhibits a positive trend. Decreasing trend for yield per hectare of land can be seen from 2000 until 2004 and increases by 2005.

Table 2. National volume of production, Area planted, and Percent change

Year	*Volume of Production (in MT)*	*Percent change*	*Area planted (in has.)*	*Percent change*	*Yield per hectare (in MT)*
2000	180,844		19,418		9.31
2001	181,747	0.50%	19,668	1.29%	9.24
2002	180,999	-0.41%	19,781	0.57%	9.15
2003	180,923	-0.04%	19,947	0.84%	9.07
2004	179,020	-1.05%	20,013	0.33%	8.95
2005	200,808	12.17%	20,209	0.98%	9.94
2006	196,595	-2.10%	20,253	0.22%	9.71

Disaggregated per region, MIMAROPA, where Mindoro Oriental is located, has the highest volume of calamansi production at 61.4%. Per island group, the total production is as follow: Luzon – 80.0%, Visayas – 6.2%, and Mindanao – 13.8%.

Table 3. Volume of calamansi production and share to total production per region, 2006

Region	*Volume of production (in MT)*	*Share to total production*
CAR	451	0.2%
Ilocos Region	3,163	1.6%
Cagayan Valley	6,104	3.1%
Central Luzon	9,444	4.8%
CALABARZON	13,884	7.1%
MIMAROPA	120,709	61.4%
Bicol Region	2,295	1.2%
Western Visayas	7,489	3.8%
Central Visayas	1,360	0.7%
Eastern Visayas	2,401	1.2%
Zamboanga Peninsula	5,549	2.8%
Northern Mindanao	1,159	0.6%
Davao Region	10,124	5.1%
SOCCSKSARGEN	6,536	3.3%
CARAGA	4,787	2.4%
ARMM	1,141	0.6%

The production and cost variables that will be discussed in this section is based on a survey by BAS of 200 sample calamansi farmers in the provinces of Batangas, Quezon, Mindoro Oriental, Leyte, and Guimaras. The study found that the average farm size of calamansi farmers is 0.25 hectares and below. A significant portion (one-fifth) owns more than 1 hectare of land.

Costs of producing calamansi can be categorized in three: cash costs, non-cash costs, and imputed costs. Cash costs account for production inputs such as fertilizer, pesticides, hired labor, rentals, transportation costs, irrigation fee, and other items that are paid out in cash. Items that are accounted as non-cash costs include laborers and overseers that are paid in-kind and lease rental. Imputed costs are those that are not directly incurred but are actually borne. These include operator/family laborers, depreciation, interest on operating capital, and rental value of owned land.

Another way of categorizing production costs is to differentiate between variable and fixed costs. Variable costs are those whose amounts depend on the volume of production. Items under this category include fertilizer, pesticides, labor, food expenses, transportation cost, fuel and oil, rentals, and irrigation fee. Fixed costs, on the other hand, are items that are paid regardless of production volume. These include land tax, depreciation, interest on operating capital, land lease, and rental value of owned land.

On the BAS study, the average yield per hectare of land is 6,662.41 kilograms or 6.6 metric tons and the average area of harvested bearing trees is 0.85 hectares. Table 4 disaggregates production based on cash, non-cash, and imputed costs. The total cost of production is PhP26,125 or PhP3.95 per kilogram. Hired labor has the largest cost share at 46.4%. In addition, imputed costs comprise one-third of total production cost.

Table 4. Average production costs, 1997 (in PhP)

Item	*Cost per hectare*	*Cost per kilogram*	*Share to total cost*
Cash costs	17,616	2.66	67.4%
Fertilizer	2,160	0.33	8.3%
Organic	112	0.02	0.4%
Inorganic	1,987	0.30	7.6%
Foliar	61	0.01	0.2%
Pesticides	896	0.13	3.4%
Hired labor	12,132	1.83	46.4%
Wages for overseer	313	0.05	1.2%
Land tax	362	0.06	1.4%
Rentals			0.0%
Land	29	0.004	0.1%
Machine, tools, equipment	26	0.003	0.1%
Fuel and oil	182	0.03	0.7%
Transportation cost	184	0.03	0.7%
Interest on crop loan	9	0.001	0.0%
Food expenses	573	0.09	2.2%
Repairs	744	0.11	2.8%
Irrigation fee	6	0.0009	0.0%
Non-cash costs	599	0.10	2.3%
Hired labor (paid in kind)	40	0.01	0.2%
Wages for overseer (paid in kind)	168	0.03	0.6%
Landlord's share	44	0.01	0.2%
Harvester's share	202	0.03	0.8%
Lease rental	145	0.02	0.6%
Imputed costs	7,910	1.19	30.3%
Operator/family labor	2,153	0.33	8.2%
Exchange labor	6	0.0009	0.0%
Depreciation	480	0.07	1.8%
Interest on operating capital	2,430	0.37	9.3%
Rental value of owned land	2,841	0.42	10.9%
Total costs	**26,125**	**3.95**	**100.0%**

In the case study of small farmers in Zamboanga Sibugay conducted by XAES (2005), the average cost of production for 1 hectare of land is PhP25,002 or PhP3.32 per kg (Table 5). The average yield per hectare is 7,520 kilograms.

Table 5. Average production cost in Zamboanga Sibugay, 2005

Item	*Cost per hectare*	*Cost per kilogram*	*Share to total cost*
Crate	5,886	0.78	23.5%
Picking	8,066	1.07	32.3%
Pruning	3,500	0.47	14.0%
Fertilizing	4,800	0.64	19.2%
Others	2,750	0.37	11.0%
Total cost	**25,002**	**3.32**	**100.0%**

Base on the above studies, it is safe to assume that the total cost of producing calamansi is in the range of PhP25,000 to 27,000 per hectare. 2007 data from BAS shows that the average farm-gate price is PhP11.67/kg and production per hectare of land is 7,740 kilograms. This translates to PhP90,325 of revenue for calamansi farmers. Deducting the cost, the farmer will earn a profit in the range of PhP63,325 to PhP65,325 per hectare of land.

b. Trading and Marketing

On the BAS study (1997), disposition of calamansi is disaggregated base on its utilization. 97.5% of production was sold. Wastage accounted for 1.2%. This is due to improper handling, rotten and pest-infected fruits. Harvesters get the bigger share relative to laborers and landowners.

Table 6. Disposition of calamansi production, 1997

Utilization item	*Percent from total production*
Sold	97.5
Harvester's share	0.3
Laborer's share	0.1
Landowner's share	0.1
Lease rental	0.2
Consumption	0.2
Given away	0.4
Wastage	1.2

A similar study conducted by BAS in 2002 covering 120 farmers indicated that wastage actually increased to 2.1% of total production. On the traders' side, wastage accounted for 1.4% of total procurement.

Base on the reviewed studies, four types of traders exist. These types can also be classified according to geographic coverage and volume of transactions. These are as follow:

- Assembler – procures calamansi from farmers and/or traders in the supply areas; usually has agents or relatives responsible for procurement and assembly. Further classifications include barangay assembler, municipal assembler, provincial assembler, and regional assembler.
- Distributor – sells calamansi to other traders and consumers. Since his/her business is primarily to sell than to procure, he/she provides more services to his/her buyers than to his/her suppliers. They can also be classified according to the relative volume of commodities and to the geographic sphere of his/her selling operations (location of buyers). These further classifications are small, medium, and large distributor.
- Assembler-Distributor – uses the same efforts and resources in procuring and selling a commodity. He/she usually finances farmers and traders in supply areas and has agents responsible for procurement. He/she sells commodities to other traders. Several combinations based on scope and coverage can be identified, such as barangay assembler-small distributor, municipal assembler-medium distributor, regional assembler-large distributor, etc.
- Retailer – sources his/her stocks either directly from the farmers or traders and directly sells the goods to consumers.

The succeeding section will be focusing on the marketing practices of Mindoro Oriental, Quezon, and Guimaras (BAS, 2003). It is assumed that since these are the top producing provinces of calamansi, they are representative of the common practices in the marketing of calamansi.

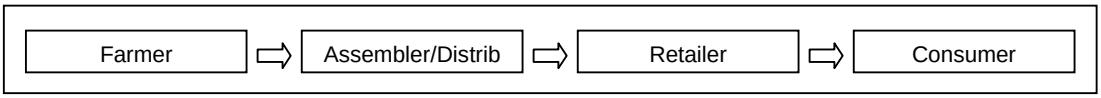
In the supply province, traders procured calamansi from the production area within the province. There are also cases where traders buy their commodity in other provinces in addition to the supply of calamansi within the province. From the supply areas, the common flow of the commodity is that they are taken to trading centers and will finally be transported to demand areas. Table 7 shows the major sources and destinations of calamansi covered by the BAS study (2003). It is worth noting that all the provinces supply calamansi outside their own province. Also, Metro Manila has the most number of outsourced locations.

Table 7. Major sources and destinations of calamansi, by location and by province

Province/City/Area	Source		Destination	
	Within the province	**Outside the province**	**Within the province**	**Outside the province**
Metro Manila	Pasay City Manila Quezon City	Mindoro Oriental Cabanatuan Davao City Baguio City Nueva Ecija Zamboanga City	Pasay City City of Manila Quezon City Pasig City	Cavite Bulacan Rizal Laguna
Mindoro Oriental	Naujan Pola Gutad Calapan Victoria Baco Bagong Silang Lumang Bayan		Calapan Bilboa Puerto Galera Victoria	Metro Manila Batangas
Batangas	Tanauan City Pola Calapan	Mindoro Oriental Roxas	Nasugbu Balayan Batangas City	Manila Pangasinan Laguna Cavite
Quezon	Lopez Gumaca Alabat Atimonan Caglate Tagcauayan Caridad Magsino		Atimonan Lucena Gumaca Lopez Calauag Catanauan	Daet Rizal Metro Manila
Guimaras	Buenavista Sibunag San Lorenzo Jordan Gaban Camansi		Buenavista Jordan	Negros Oriental Palawan Bacolod Iloilo Cebu Metro Manila
Iloilo	Guimbal La Paz Iloilo City Langkas Tabon	Guimaras Aklan	Guimbal La Paz Jaro Miagao Mandaue	Antique Capiz Roxas Negros Occidental Masbate Metro Manila

The common geographic flow of calamansi is seen in Figure 2. From the farmers, the calamansi is sold to assemblers/distributors, several types of which were discussed earlier in this section. The commodities are then sold to retailers who, in turn, supply calamansi to final consumers.

Figure 2. Common geographic flow of calamansi



The specific marketing channels for calamansi in Mindoro Oriental, Quezon, and Guimaras are seen in **Annex A**.

Of importance to this study is the cost of marketing calamansi. The marketing costs from the farm up to the retail level entailed several costs that include labor, transportation, material inputs, other operating expenses, and depreciation. Each of these cost items will be discussed in detail below.

Labor

The activities in procuring calamansi from the farm include hauling, handling (i.e., loading and unloading from the farm to the truck/vehicle), and sorting. Shipping costs included fees for handling, arrastre (i.e., pulverizing), and stevedoring (i.e., loading and unloading of cargo in ships). In addition, labor costs in the distribution of calamansi include the following cost items: hauling, handling, sorting, selling, packing, weighing, and cleaning. The table below shows the average labor cost by marketing activity for both the supply and demand provinces based on the BAS study. The average labor cost is PhP1.17 per kilogram of calamansi, with distribution cost comprising more than half of total cost.

Table 8. Labor costs by marketing activity, 2001

Marketing Activity	*Average cost (in PhP per kg)*	*Share to total cost*
Procurement	0.40	28%
Shipping	0.09	6%
Distribution	0.77	53%
Salaries and wages	0.18	13%
Total	**1.43**	**100%**

Transportation

Transportation cost depends on the distance and destination of the commodity, that is, the farther the distance from the supply to the demand areas, the higher the cost that will be incurred. The average transportation cost is PhP1.61 per kilogram (Table 9). One-third of total transportation cost is devoted to pre-marketing and another one-third for distribution.

Table 9. Transportation costs by marketing activity, 2001

Marketing Activity	*Average cost (in PhP per kg)*	*Share to total cost*
Pre-marketing	0.49	30%
Procurement	0.29	18%
Shipping	0.35	22%
Distribution	0.48	30%
Total	**1.61**	**100%**

Material inputs

Material inputs include containers (e.g. "kaing", sacks, plastic bags, "bilao", basket, or wooden box), twine, old newspapers, and other materials used in packing and transporting calamansi. Aside from these, banana leaves, needle, tie wire, and different types of bags and sacks are also used in selling calamansi. For the study provinces, the average cost of material inputs if PhP0.50 per kilogram, as seen in Table 10.

Table 10. Material inputs costs by marketing activity, 2001

Marketing Activity	*Average cost (in PhP per kg)*	*Share to total cost*
Procurement	0.15	29%
Distribution	0.35	71%
Total	**0.50**	**100%**

Miscellaneous and other operating costs

Some items that fall under miscellaneous and other operating expenses include business permits and licenses, market fee, telephone and other communication expenses, water, gas and oil, electricity, and repair and maintenance. Costs of meals and beverages while transporting the commodity are also accounted as operating costs. Wastage is accounted as miscellaneous cost. The average miscellaneous and operating cost based on the study provinces is PhP0.76 per kilogram (Table 11). Worth noting is that shrinkage/wastage accounts to one-fourth and toll fee accounts to one-fifth of total cost.

Table 11. Miscellaneous and other operating costs, 2001

Item	*Average cost (in PhP per kg)*	*Share to total cost*
Permits and licenses	0.04	5%
Market fee/rental fee	0.10	13%
Electricity/light	0.01	1%
Telephone	0.03	4%
Water	0.01	1%
Shrinkage/wastage	0.19	25%
Gas and oil	0.02	2%
Weighing scale calibration	0.01	1%
Repair and maintenance	0.07	9%
Toll fee	0.15	20%
Interest on loan	0.05	6%
Meals and beverages	0.08	11%
Total	**0.76**	100%

Depreciation

Depreciation is defined as a non-cash or imputed cost that reduces the value of an asset as a result of wear and tear, age, or obsolescence. The BAS study also computed the depreciation costs of materials (e.g. chairs and tables, sorting can, basin, wooden box, etc.), equipments (e.g. weighing scale, calculator), facilities (e.g. cart/stall, storage), and transportation vehicles used in the marketing of calamansi. On the average, depreciation cost is PhP0.26 per kilogram where depreciation of materials used gets the biggest share from total cost (Table 12).

Table 12. Depreciation costs by item, 2001

Item	*Average cost (in PhP per kg)*	*Share to total cost*
Materials used	0.13	50%
Equipments	0.05	19%
Facilities	0.06	24%
Transportation	0.02	7%
Total	**0.26**	**100%**

Total marketing costs

Aggregating all the above items, the total marketing cost of calamansi is PhP4.56 per kilogram, as seen in Table 13. The cost items include cash, non-cash, and imputed costs. Of all the cost items, transportation expense gets the biggest share from total cost. One-third of total cost is also spent on labor.

Table 13. Total marketing costs by item, 2001

Item	*Average cost (in PhP per kg)*	*Share to total cost*
Labor	1.43	31%
Transportation	1.61	35%
Material inputs	0.50	11%
Miscellaneous and other operating cost	0.76	17%
Depreciation	0.26	6%
Total	**4.56**	**100%**

Annex B shows the estimated costs of transferring calamansi from the supply barangays to the different trading/demand areas for the provinces of Mindoro Oriental, Guimaras, and Quezon.

c. Prices

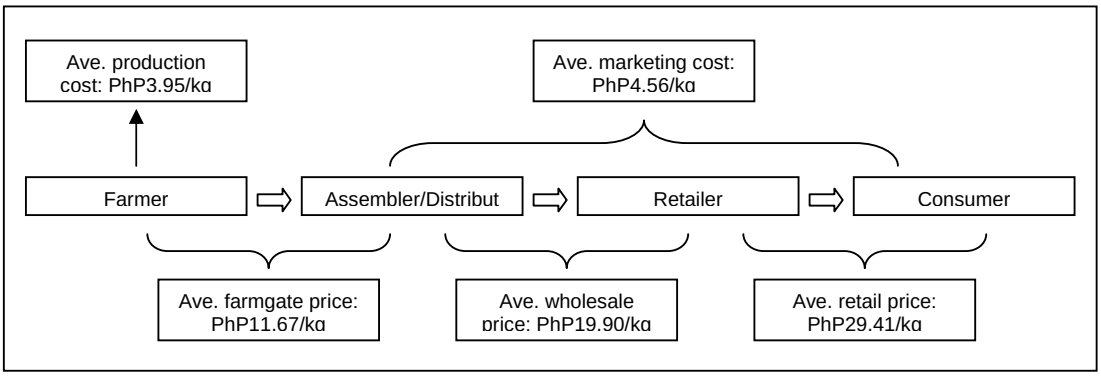
Prices of calamansi from 2000 to 2005 is shown in the table below. The average farmgate price is PhP11.67 per kilogram. The average wholesale and retail prices are PhP19.90 and PhP29.41 per kilogram, respectively. These give the following average price margins: PhP8.23 price margin from farmgate to wholesale prices, PhP9.52 from wholesale to retail, and PhP17.75 from farmgate to retail.

Table 14. Farmgate, wholesale, and retail prices of calamansi, 2000-2005 (in PhP per kg)

Price	*2000*	*2001*	*2002*	*2003*	*2004*	*2005*	*Average*
Farmgate	11.02	8.06	14.93	11.09	11.67	13.23	11.67
Wholesale	21.31	19.66	20.37	19.49	18.41	20.14	19.90
Retail	30.50	28.43	29.32	29.28	28.08	30.87	29.41

Using the above production and marketing costs, total cost of calamansi from production to retail is PhP8.51 per kilogram (i.e. PhP3.95/kg production cost and PhP4.56/kg marketing cost). With the price margin of PhP17.75 from farmgate to retail, net profit is equivalent to PhP9.24 per kilogram. This amount is divided amongst the various players in the calamansi value chain. Figure 3 shows the various players in calamansi production and marketing, including cost and prices data.

Figure 3. Production and marketing players for calamansi



IV. Issues and Recommendations

Below are some of the production and marketing problems mentioned by farmers and traders in the study provinces:

- pests and diseases
- high cost of inputs
- lack of water/irrigation facilities
- bad weather/calamities
- poor soil condition
- low price due to low quality of produce and oversupply
- too many competitors
- frequent price fluctuation/unstable prices
- delayed payment of goods or non-payment of credit
- inadequate farm to market road/poor road conditions resulting to high transport cost
- absence of permanent market stalls/no buyer or market outlets
- lack of information in farm technology
- inadequate capital to finance the buying and selling of goods
- lack of marketing information/skills
- spoilage/wastage

Based on the problems identified, the following are the recommendations mentioned by the farmers and traders for further improvement of the calamansi industry:

- provide technology updates/conduct of seminars on calamansi production and marketing

- provide facilities where financial assistance/loans can be availed of
- organize farmers' cooperatives
- organize market outlets; establish processing plants as outlets to address possible oversupply
- address price stability issue on process of farm inputs and farmers' produce
- improve road condition
- provide inputs and post harvest facilities

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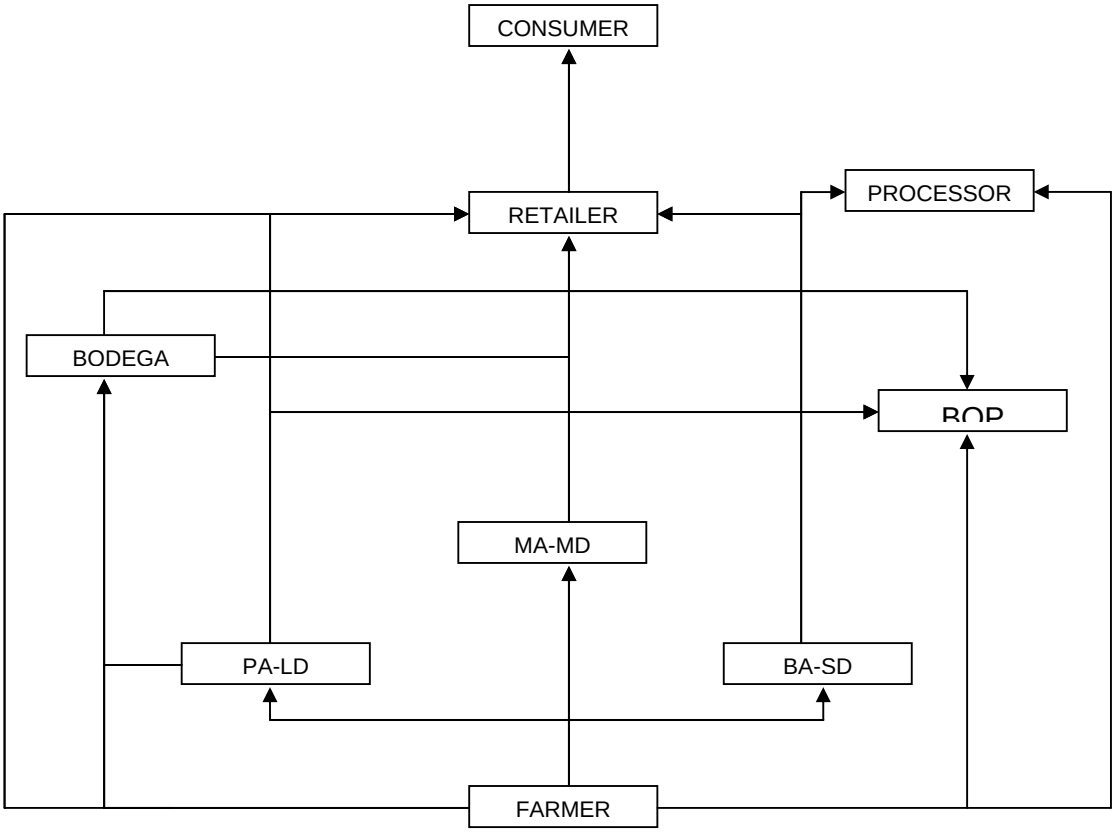
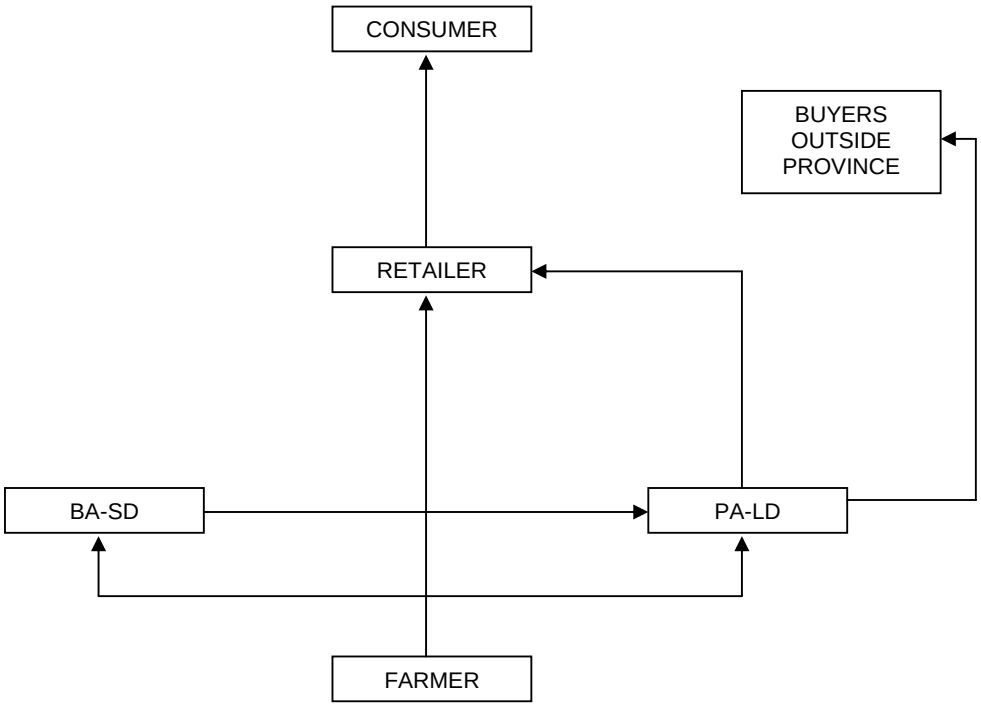
Annex A.

Marketing channels for calamansi in Mindoro Oriental, Quezon, and Guimaras.

MINDORO ORIENTAL



QUEZON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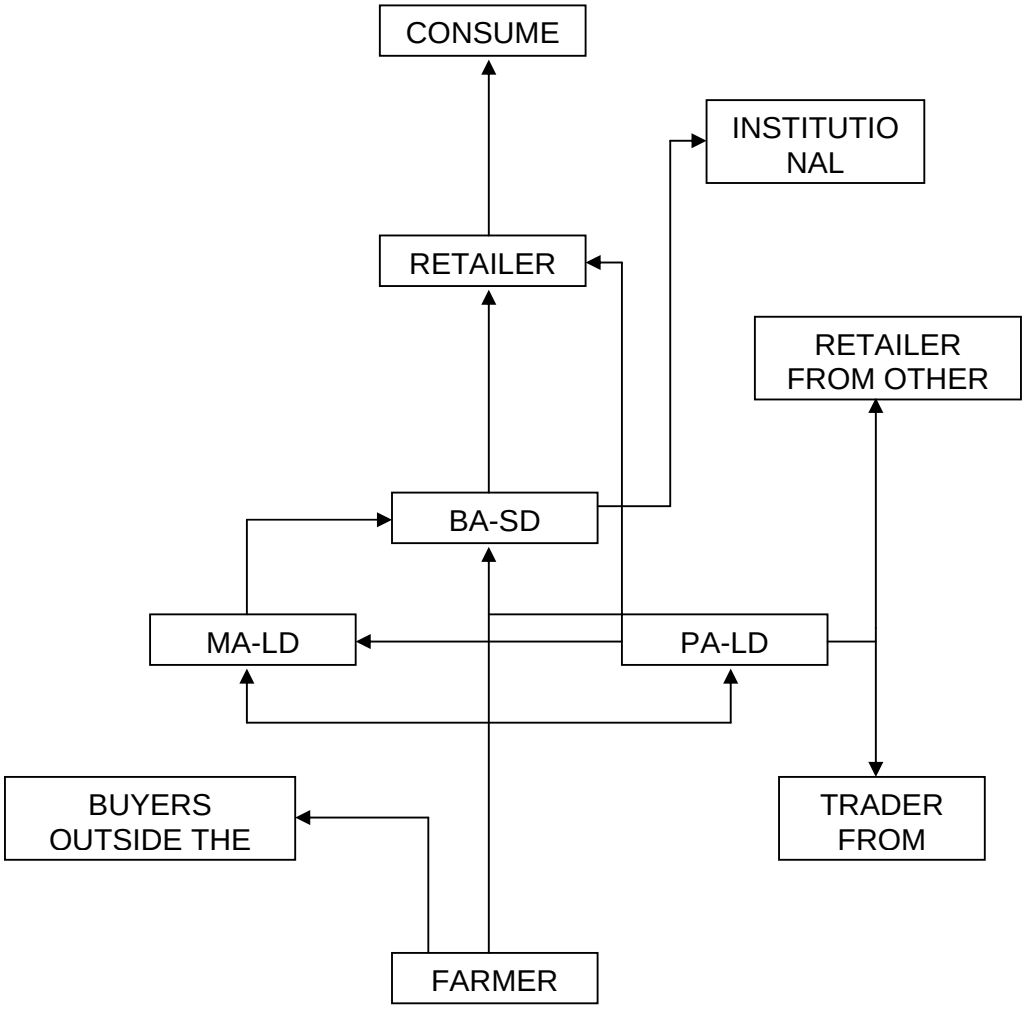
GUIMARAS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Annex B.

Marketing costs for calamansi by point of destination, 2001

Supply area/destination	*Marketing costs (in PhP/kg)*
Mindoro Oriental	
Supply area to markets within the province	2.36
Supply area to Batangas	1.91
Supply area to Metro Manila	1.62
Quezon	
Suypply area to markets within the province	1.23
Supply area to Rizal	1.13
Guimaras	
Supply area to markets within the province	0.66
Supply area to Negros Occidental	0.80
Supply area to Metro Manila	0.89