

VALUE CHAIN ANALYSIS REPORT

CAMBODIA, PHILIPPINES & VIETNAM

LINKING SMALL FARMERS TO MARKET PROJECT



ASEAN
FOUNDATION



AsiaDHRRA



Value Chain Analysis Report: Cambodia, Philippines, Vietnam
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ISBN No.: 917-92920-1-7

Printed and bound in Manila, Philippines

Published by:

Asian Partnership for the Development of Human Resources in Rural
Asia (AsiaDHRRA) and the ASEAN Foundation

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This project was undertaken with the support of the ASEAN
Foundation: Linking Small Farmers to Market Program



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INTRODUCTION

This publication contains the initial outputs of the research component of AsiaDHRRA's Regional Project on Linking Small Farmers to Markets. The reports are the actual outputs of the participatory market researches and studies on specific commodities chosen in each pilot country: tea in Vietnam, fresh calamansi fruit in the Philippines, and free-range native chicken in Cambodia. The studies were initiated and participated by farmers themselves, the marketing officer of the project and the people from the LSFM pilot in-country anchors, namely, the Viet Nam Farmers Union (VNFU), the Philippine Partnership for the Development of Human Resources in Rural Areas (PhilDHRRA), and the Cambodian Center for Study and Development of Agriculture (CEDAC).

The researches and studies conducted under the LSFM project were intended to contribute to the process of effectively linking small farmers to market and maximize their benefits from the value chain. In addition, the studies also aimed to help decision-making of the project's in-country anchors and in formulating strategic directions, developing key linkages with industry partners and other institutions. To establish the link, strategies to integrate the Value Chain Analysis (VCA) to the competitive advantage of the small farmers should be developed.

All these would have not been possible without the participation and support of small farmers, the dedicated staff of PhilDHRRA, CEDAC, and VNFU, the advise of friends from the agribusiness and industry sector, the LSFM Project Management Team, and the support of the ASEAN Foundation.



VALUE CHAIN ANALYSIS OF FREE RANGE CHICKEN IN CAMBODIA

PROJECT BACKGROUND

This report was prepared as start-off point in the conduct of Value Chain Analysis (VCA) in the free range chicken clusters in selected areas in the Kampong Cham, Kampong Chhnang and Prey Veng provinces. As a component of the LSFM Project, this study aims to contribute to the process of linking rural industries and enterprises into the mainstream market to harness and maximize the benefits from the value chain. In addition, the study aims to aid the CEDAC Agri-based Enterprise Support Program (AESP) in developing strategic linkages with its target chicken producers, market players and consumers. In this regards, the development of VCA report is providing CEDAC with important information to select an effective marketing intermediation for the chicken product.

OBJECTIVES OF THE PROJECT

The Terms of Reference (TOR) requires the research team to:

1. Conduct a thorough value chain analysis of the free range chicken in the priority producer clusters under the project “Linking Small Farmers to

- Market”. This analysis should come up with hard figures on the incremental values at each level of the chain;
2. Enhance the appreciation of the industry cluster participants, particularly the farmer leaders, cooperative leaders, NGO staff and technical support staff of the impact of these values in their own operation of the impact of these values in their own operation;
 3. To raise the level of awareness and appreciation of stakeholders on the value and importance of dealing with market including financial institutions or level of credit providers.

OBJECTIVES OF THE REPORT

The report aims to present a model for analyzing the value chains of the free range chicken under the Linking Small Farmers to Market Project. Description and mechanism of the model shall be presented to a Technical Working Group for selecting an appropriate marketing intermediation to benefit small farmers and all concerned market players. By using the VCA model, it is also expected that relevant industry policy development themes and specific action agenda will be conceptualized.

THE VCA MODEL

Definition of the value chain

The essence of value chain analysis (VCA) is to improve strategic learning in enterprise development. Specifically, it treats the enterprise not as a singular (autonomous) entity, but as part of an integrated chain of economic functions and linkages across geographic boundaries. It emphasizes on the diverse interrelationships among market opportunities, constraints, and directives at various levels of the supply chain and at different levels of influence, from which specific value-addition takes place. This feature of the VCA lends to its completeness, as a strategic tool in exploring different alternative strategies for poverty reduction.

Description of VCA model components

The purpose of analyzing the value chains of the free range chicken in selected areas is to identify key points of intervention along the chain and to

recommend specific policy directions to enhance the competitiveness of the CEDAC Agri-based Enterprise Support Program implementing the Linking Small Farmers to Market Project.

The major analytical premise in analyzing the chicken is that the different agents across each of the commodity's supply chain behave based on key market signals and on moderating variables provided by the enabling policy, economic, and technical environment. The factors that market, producers, traders, and consumers interact based on specific capital requirements and information they obtain from various market sources. Furthermore, dynamics of market interactions are balanced by the conditions set forth by different market policies, technological advancements, and socioeconomic, cultural, and environmental concerns. The VCA model is shown in Figure 1.

The VCA model thus integrates analysis of the commodity supply chain and that of the associated enabling environment. Hence, the model comprises of the following analytical entry points: (a) Product and Process flow, (b) Information and money flow, and (c) the Enabling environment. Furthermore, these entry points can be classified in two: (1) Primary Activities and (2) Support Activities.

Primary Activities. Primary activities are those functions which are directly involved in the production, processing, and distribution of the product. These activities may fall among the following: Inbound Logistics, Production and Processing, and Outbound Logistics. Inbound logistics refer to management of production and processing inputs; whereas, outbound logistics pertain to product distribution from point of production to final consumption. The production and processing component is involved in the actual manufacture of products ready for sale.

Finally, market information and finance play a pivotal role in the movement of chicken products as these factors send signals of when, where, how, and how much to produce. The seamless flow of market information and efficient financial delivery are very important elements in further enhanc-

ing the efficiency of supply chain activities and in potentially controlling demand for major marketing services such as transportation and storage. Furthermore these build into the system responsiveness and flexibility to address the dynamic end-user preferences.

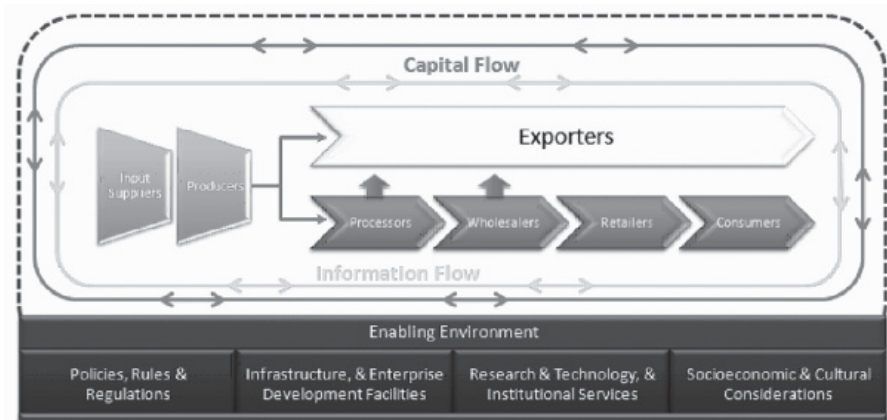


Figure 1. The Value Chain Analysis Model

Support Activities. While support activities are not directly involved in the manufacture and movement of the product, these activities have critical impact on the efficiency of production and distribution. Support activities serve as the value chain’s enabling environment. These support activities include: (1) Policies, Rules, and Regulations, (2) Infrastructure and Enterprise Development Facilities, (3) Research and Technology, and (4) Socioeconomic and Cultural Considerations.

Policies, Rules, and Regulations

Laws and regulations govern standardization of their supply chain services. The commitment of government to supply chain development of the agriculture sector, in general, can be seen from policy directions as contained in its medium term development program as well as in the number and quality of laws and regulations that tend to create a business environment conducive for growth in the value chains of the chicken and food processing industries.

Type and capacity of transport, schedule of deliveries, and responsiveness to customers' requirements (particularly health needs) and preferences (e.g. environment-friendly and organic lifestyle), maintenance and operations costs, and technology and capacity investments are influenced by national and local laws.

Infrastructure and Enterprise Development Facilities

Transportation infrastructure is an important key to the fast and on time delivery of goods which is vital in preserving product quality and value. For multimodal delivery systems such as that of the free range chicken, not only adequacy of transportation mode is important but also the coordination of these transports systems. An efficient transport system can translate to savings in delivery cost, inventory, quality deterioration and wastage.

The fast and reliable movement of products is a function of transport infrastructure. However, processing infrastructures such as slaughterhouse, storage, and packaging facilities are equally important in achieving transportation efficiency and preserving the potential quality of the products.

Information and Communications Technology (ICT) is important in attaining cost efficiency, responsiveness to consumer's requirements and reliability in delivering the right kind of product and volume of product required by the market. ICT application to the chicken and food industries can bring the following benefits to the value chains:

1. Cost savings and price reductions from lower transaction costs
2. Cost savings from reducing non-value activities thus eliminating excess intermediaries.
3. Cost savings and better responsiveness from shortening supply chain/ logistics chain transaction times for ordering and delivery
4. Better and wider choice and more information for customers that could foster higher competition among producers.
5. Collection and analysis of large volume of industry data
6. Gaining access to both domestic and global markets, supplies and distribution channels

Research and Technology, and other Institutional Services

Research and Development institutions, financial institutions, and industry associations play an indirect role in how the supply chain performs. R&D institutions are important in coming up with innovations in product development, packaging and other processes that will allow better handling, storage and transport.

Financial institutions are conduits for capital investments for transportation and processing infrastructure. With access to finance, the Agri-based Enterprise Support Program (AESP), community slaughterhouses, and other players in the supply chain can adequately enhance infrastructure requirements and establish communication systems. Industry associations on the other hand provides the means of integrating industry goals not merely on policy advocacy but in furthering technology transfer and adoption, collective strategy in enhancing existing markets, developing and entering new markets frontiers.

Socioeconomic and Cultural Considerations

Aside from market signals and financial flows, different agents in the supply chain also interact based on social, economic, and cultural nuances. These factors affect the level of participation of supply chain agents. Social and economic concerns and cultural antecedents drive these participants to engage in contracts with market agents. Contrariwise, these factors may hinder effective communication and efficient bargaining among the agents. The cultural nuance may particularly be evident in the LSFM areas.

RESEARCH METHODOLOGY

The VCA Research Process was designed to serve as a guide in the generation and analysis of data for the project. The research process was divided into two main components, namely, the Desk Information Review and Primary Data Collection. Several sub-components and activities were identified under each stage (Figure 2) guided by the TOR. These are summarized as follows:

Desk Information Review

1. We extracted information from previous research results, especially 2007 Chicken survey conducted by 13th Young Graduate and under guidance of Dr. Yang Sain Koma . The secondary data were used for the report. Several CEDAC published action research documents are the main reference materials and data banks for secondary data and other relevant background information
2. After looking at the points of analysis in the TOR, we screened the existing data which are not necessarily collected by surveys or Focus Group Discussions with producers.
3. The research tools were produced based on its necessity.

Primary Data Collection

1. Focus Group Discussions with selected chicken producer groups in Kampong Cham, Prey Veng and Takeo provinces.
2. Our researchers collected data related to costs and prices of each supply chain from middlemen, wholesalers, food processors, retailers and consumers.

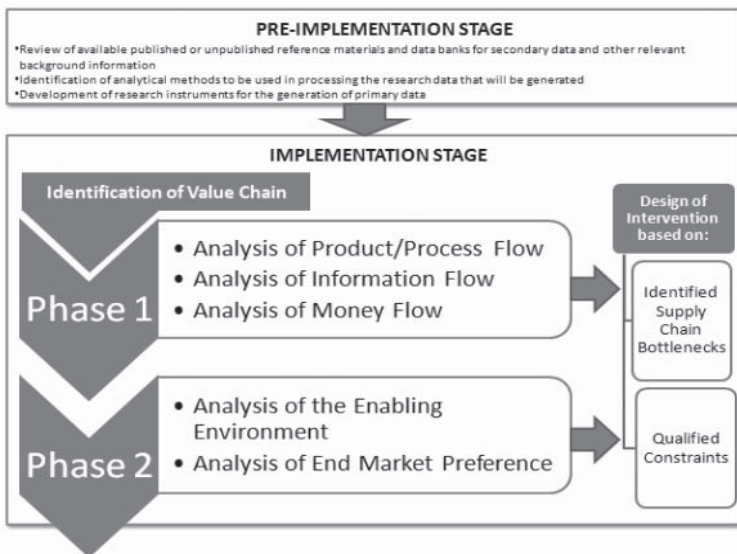


Figure 2. Research Design for Value Chain Analysis

RESEARCH FINDINGS AND ANALYSIS

Product Flow

According to previous studies as shown on the figure 3, free range chicken raised by farmers are mostly by local middlemen at village or district levels. The middlemen buy and transport them to the wholesalers who have been widely marketing the product in the provincial town or city areas. The transportation means are motorbike, minibus, and pick up truck. The logistic arrangement is unethical or unprofessional since they do not use cage or separate place for the transported live chicken. The chicken therefore are stressed and this affects its quality. To gain weight, middlemen usually provide brutally a big amount of food to the stressed chicken. In another way to gain weight, they inject some water into the chicken meat. The wholesalers have their distribution channels including retailers at city market, wedding and party meal organizers, local restaurants, food stalls at market, and street grilled and roasted chicken sellers. For the retailers at market, they only sell the dressed chicken and chicken products to their customers for household consumption.

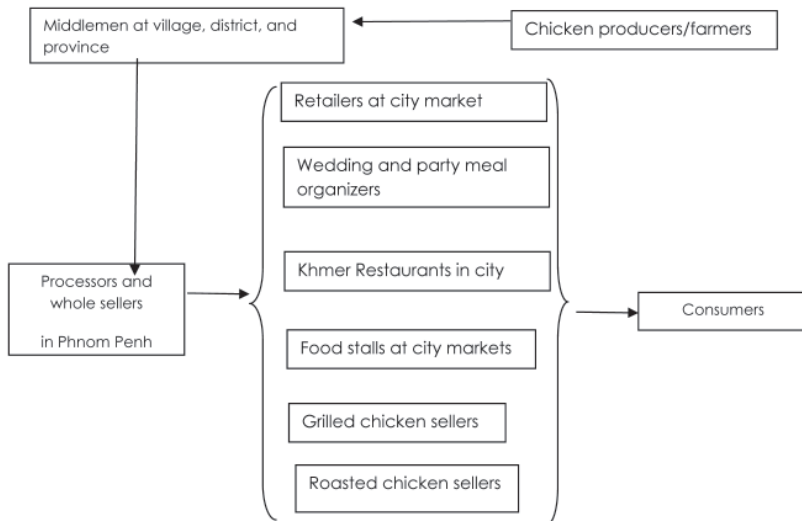
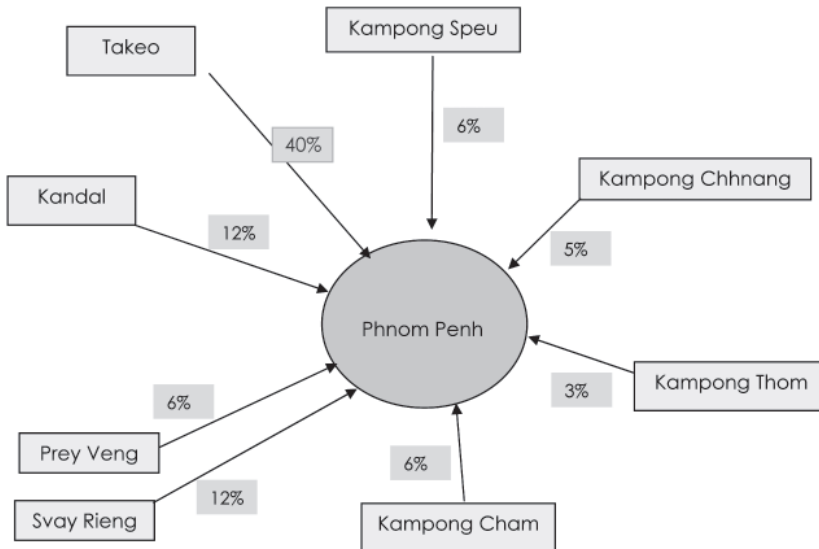


Figure3. Chicken supply chain

Sources of Supply

The previous study on chicken focuses nine main areas: Prey Veng, Svay Rieng, Kandal, , Takeo, Kampong Cham, Kampong Thom, Kampong Chhnang and Kampon Speu provinces where the main chicken supply sources for Phnom Penh market. The result of a recent study shows that about 11 tons of chicken meat per day are supplied and consumed in the Phnom Penh areas. About 80% are the free range chicken raised by small farmers and 20% from farming entrepreneurs who use the technology or animal concentration feed.

The demand of chicken in the provincial town market varies depending on the size and economic potentiality of the town. For example, Kampong Cham town needs about 650kgs a day; Kampong Thom town needs about 230kg a day; Takeo town needs about 280kgs a day; Kampong Chhnang town needs about 550kgs a day; and Prey Veng town needs about 300kgs a day. The average demand of chicken per district town is from 200kgs to 500 kgs. per day which is comparable to the provincial town.



According to CEDAC' chicken market study at the end of 2007, the total estimated demand of chicken in Phnom Penh was 11tons a day. Shown in the figure4, the supply sources are from different provinces around Phnom Penh: 40% from Takeo, 12% from Kandal, 12% from Svay Rieng, 6% from Prey Veng, 6% from Kampong Cham, 6% from Kampong Speu, 5% from Kampong Chhnang, and 3% from Kampong Thom.

Logistic arrangements

The middlemen or traders always use motorbike or pick up truck to transport live chickens to cities and towns for slaughtering or processing. The chickens are tied together and traveled several hours to slaughterhouses. Between 1,000 and 2,000 heads are transported by pick up and between 100 and 200 heads are transported by motorbike.

Some traders have own small slaughterhouse in their home and close to their market. More than often, chicken are stressed and hungry so that they eat much food. Gaining weight by this way, traders can compete easily the chicken price with others in the market since they only sell the whole and uncompleted dressed chicken. Different parts of chicken are also sold at different prices.

The slaughtered chicken or whole chicken body is always tied and transported by motorbike to their customers such as restaurants, food stalls and street grilled chicken stores. The transportation time of chicken suppliers varies depends on order of food processors or retailer service hours. However, the delivered meat must be fresh. It means that the transportation period is less than two hours after they were slaughtered.

Analysis of process flow

The slaughtering process and weighting

To find the percentage part of products and losses, we did experimentation of the slaughtering 6 chickens. The results are shown in the below table:

| No. | Weight of live chicken (kg) | Weight of Dressed chicken (kg) | Dressed chicken excluding crop and inside organ (Kg) | Chicken inside Organ (kg) |
|-----|-----------------------------|--------------------------------|--|---------------------------|
| 1- | 1.20 | 1.10 | 0.95 | 0.10 |
| 2- | 1.80 | 1.70 | 1.50 | 0.15 |
| 3- | 2.00 | 1.85 | 1.65 | 0.20 |
| 4- | 1.50 | 1.40 | 1.20 | 0.15 |
| 5- | 1.00 | 0.90 | 0.70 | 0.10 |
| 6- | 1.30 | 1.20 | 1.00 | 0.10 |

We generalize that the weight of slaughtered chicken meat is equal to 68.40% of the weight of live chicken. Other parts of chicken can be sold at a very cheap price. We calculated the below costs and prices based on this result.

The technology of slaughtering chicken:

At the moment, all slaughterhouses use traditional way of processing chicken. They have not have invested in new technologies to slaughter chicken. Recently, a semi-automatic machine have been used to only clear the chicken feather and hair. This machine can help to speed the slaughtering process. It can complete from 2,000 to 3,000 chickens a day. It is not a modern technology but only a local business innovation.

Cost and price involved

To find out the production cost or farm gate cost, our researchers worked closely with CEDAC field staff involved in chicken raising in the target areas. The cost of production of a chicken weighted 1kg is approximately 7,730R (US\$1.93). The farmers sell at a farm gate price of about 13,000R per kilogram of live chicken to the middlemen. In turn, the middlemen sell at about 14,000R a kilo to its wholesalers in main cities and towns. They get a net margin from 500R to 1,000R per kilo. To be able to sell chicken meat and products, Wholesalers spent a greater amount for processing and coordination and transportation. They actually set selling prices to its distribution channels in order to maintain their customers. To retailers, they sell at about 19,500R; to wedding party organizers, they sell between 19,000R to 20,000R based on the customer loyalty and quantity order. The similar approach

of pricing is applied for other distribution channels. Final consumers are getting higher and higher price, especially the chicken processed products such as deep fried, grilled and roasted chickens. For instance, one kilogram of deep fried chicken can be sold between 24,000R to 30,000R per kilo. The chart below presents the mentioned costs and prices of a kilogram of live chicken from farm gate to consumer levels.

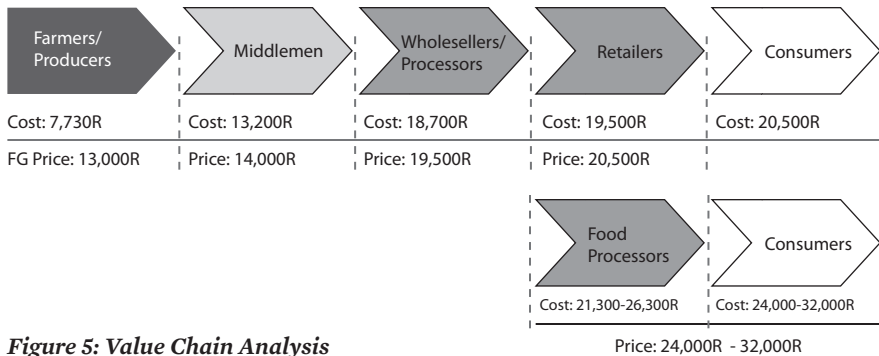


Figure 5: Value Chain Analysis

Cost analysis at the farm gate/production level:

After calculating the estimated cost for raising 110 chickens during 3 month period, we have the following results:

- Cost of feeding food: **6,560R** (small farmers always overlook costs of natural food from their farm, especially rice products and vegetables)
- Cost of labor: **990R**
- Cost of cage preparation: **180R**
- Total cost per 1 kilogram of live chicken: **7,730R**
- Selling price= 13,000R, Margin=5,270R (40.53%)

The more number of chickens are raised, the less production cost will be for small farmers. The above estimated cost is based on 110 chickens produced during three month. If they could not sell them within 3 month period, small farmers get higher cost.

Though the sale margin is considerable, small farmers do not earn much from the current market. They usually sell not more than 20 kgs. of chicken per time. Moreover, they are often cheated the weight by their middlemen.

Cost at middlemen level:

Analyzing the cost of trading 225 heads of chicken by middlemen, we found the following results:

- Cost of purchasing chicken at the farm gate price: 13,000R
- Cost of transportation (gasoline) and other road costs: 150R
- Cost of communication/coordination: 50R
- Total cost per kilo of chicken: 13,200R
- Selling price= between 14,000R and 15,000R, Margin= >800R (6.53%)

Though margin is less than small farmers', middlemen gain better from selling a huge number of chickens. Unethically many middlemen manipulate chicken weight by feeding them.

Wholesalers/processors:

The wholesalers are slaughtering chicken. The overhead or fixed costs are excluded from the below calculation. The selling cost of chicken's inside organs are considered equal to the fixed costs occurred by the wholesalers.

- Cost of purchase from middlemen: **14,000R**
- Cost of processing labor: **500R**
- Cost of weight loss after dressing/processing (25%): **3,500R**
- Total cost of chicken to be sold: **18,700R**
- Selling price= between 19,500R and 20,000R, Margin=>800R (5.70%)

Similar to middlemen, wholesalers gain much benefits from selling a huge amount of chicken products. Some wholesalers also manipulate the chicken weight by ejecting water into dressed chicken. This unethical thing is usually from the current strong market competition.

Cost at retailer level:

- Cost of purchase from wholesalers: 19,500R
- Selling price= between 20,000R and 21,000R, Margin= >500R (2.56%)
- Cost at food processors (restaurant): deep fried chicken and grilled chicken

Retailers get better income from selling a huge quantity of dressed chicken though selling margin is less. In the strong competition, they sometimes

do the same unethical thing to get better income. However, retailers are more flexible in conforming quality requirements since they are close to customers.

1- Grilled chicken

- Cost of purchase: 19,500R
- Ingredient cost: 650R
- Vegetable cost: 400R
- Energy cost: 500R
- Packaging cost: 250R
- Total cost per 1 kg of deep fried chicken: 21,300R
- Selling price= between 24,000R and 26,000R, Margin= >3,700R (17.37%)

2- Deep Fried chicken:

- Cost of purchase: 19,500R
- Cost of ingredients, vegetables, packaging and energy: 6,800R
- Total cost of 1 kg deep fried chicken: 26,300R
- Selling price= between 30,000R and 32,000R, Margin=>3,700R (14.07%)

Food processors usually get highest margin because of processing skills and food innovations. Value added does not only involve the food quality but also customer services.

In conclusion, small farmers still get less benefit than other market players due to many factors. The economy of scale, price bargaining power, and market access are of the main factors. If the smaller amount chicken they raised, the production cost is higher. It means that they get less benefit than middlemen and wholesalers who are trading a huge quantity of chicken everyday.

Analysis of information flow

Training on techniques of chicken raising:

After good result of its action research on chicken raising technique, CEDAC cooperated with the Department of Animal Health and Production of the Ministry of Agriculture, Forestry and Fishery to organize several trainings on chicken raising. A group of 20 farmer participants were trained on the topic. CEDAC project staff usually follows up the outcomes of the training.

All trained farmers have applied the knowledge and skills they have learned. Farmers who did well the job become farmer promoters. Several exposure visits were organized for trainees to the chicken producer groups. They can learn from each other by sharing knowledge and experience.

Pricing and market information:

Chicken pricing at farm gate level is usually set by producers/farmers who get information from mouth to mouth and more than often from middlemen. Most of producers do not access to market price. Only a few radio channels and newspapers have reported main commodities. The farmers who are currently not commercial farmers rarely pay attention to the market information.

The price is usually set by wholesalers who are interacting consumers and aware of market size. The demand and supply are influenced by the wholesalers. The middlemen are profitable from taking partnership with the wholesalers. They have more purchase bargaining power than producers.

Recently, CEDAC introduce the cooperative concept among to its target farmers. Many collective sales of agriculture commodities have been organized by several farmer/ producer groups. The approach has been working well and some farmer associations have gained the sale bargaining power.

In most cases, consumers have alternatives to buy products. However, they are not all aware of product quality and usually cheated by irresponsible traders in terms of price and quality. In meat or protein market, consumers can buy fresh water fish, sea fish, and animal meat other than chicken. The chicken product is not the cheapest one in the protein market.

Calculation of production cost:

Chicken producers have limited knowledge to calculate their production cost since they raised chicken at family level, not at business level. They overlook the cost or ignore it since they feed their chicken by crops considered as residue. They are currently subsistent farmers, and not commercial farmers.

Problem encountered:

Small farmers do not have much price bargaining power. They also have limited knowledge of quality standard requirements and costing their products. The middlemen who take partnership with farmers and consumers are profitable from manipulating the purchasing and selling prices. Some unethical matters behind the chicken market such as weight manipulation become strong barriers for new entrance of this market, especially the responsible traders who would like to promote fair trade and social responsiveness.

Analysis of money/capital flow

Raising chicken, most small farmers usually invest their own money because the amount of investment is affordable. To start this activity, they only have to buy chicks and materials for building cages. Some producers can increase number of chickens from generations to generations, and from seasons to seasons.

To expand this business, some farmers get loan for their capital investment from saving group with rate of approximately 3% per month. Not many cases of loan for this kind of investment are found by the research. If it is the case, farmers can easily return the credit amount to their saving group within less than one year.

Contrarily, we found that the cash flow from this activity is helpful for small farmers to settle loans they applied for other farming activities such as rice cultivation.

Analysis of the Enabling Environment Rules, Regulations and Policies

In 2006, a government sub-degree on management of slaughterhouse was released by the Prime Minister. The purpose of this sub-degree is to improve the environment and sanitation, promote the food safety, and to control bird flu in the country. Up to now, no chicken slaughterhouse complied with the sub-degree. Small scale of chicken slaughterhouse is still operated in main towns and cities. The opened space transportation of chicken from village to towns and cities are still allowed. However, several bird flu prevention programs have been implemented throughout the country. The awareness of the prevention activities have been also raised among CEDAC's chicken groups.

In response to food security, the government urges livestock raising activity which is a part of livelihood improvement for farmers. Many NGOs such as CEDAC have been helping farmers to boost this activity apart from promoting the System of Rice Intensification (SRI).

Technology

At the production level of small scale farming or family business, some farmers are still adapting their conventional way of raising chicken. But CEDAC's target farmers have been exposed to new method of raising chicken which was successfully experimented through action researches. The project staff trains the farmers on simple raising techniques such as spacing, feeding and disease prevention. The farmers have also been sharing their experiences of this activity through meeting and exposure visits.

At the production level of greater scale farming business, the technology has been applied by modern technology from neighboring countries. For example, production of chicken eggs, investors used modern equipment and technology imported from other countries. The modern technique of raising chicken is quite different from the one used by our small farmers. For instance, to prevent diseases and to get chicken fast growth, anti-biotic vaccination and concentration feeding were applied by farming business owners to save time and costs. The productivity of this farming business is much greater than the family business. For example, the chicken of 2kg weight can be raised for only 45 days while the ecological way needs 90 days to raise a chicken of 1.5kgs.

At the processing level of production, no chicken food processing manufacture exists in Cambodia. Only fresh chicken processed food such as grilled, fried or roasted chicken does exist in the main market outlets in cities and towns. No modern technology was used for this processing. Processing equipment is designed by local innovations or benchmarked the ones from other countries.

The free range chicken meat is mostly preferred by local food processors such as local restaurants, and street grilled and roasted chicken while the ones from farming business go mainly to international fast food restaurants, food processors and supermarkets.

Socio-economic characteristics: production and consumption patterns

Raising free range chicken is considered as a part of small farmers' income generation because this activity does not require as much time and effort as to take care of other livestock raising such as pig and buffalo. Beside their own household consumption, a small farmer is able to supply chicken in average 4 times a year and 100 heads a year. However, rate of production varies among small farmers depending on their raising techniques. In several case studies, small farmers who did apply techniques introduced by CEDAC get higher rate of production. To get better yield, two main remarkable points are feeding, spacing/caging and regular monitoring/treatment of parasite.

The free range chicken is essential protein demands of all Cambodian classes. A small size household needs chicken meat from 0.30kg to 0.80kg per time while a medium size needs between 1 and 1.50kgs; and a large size needs between 1.70-3.00kgs. In average, a household demands 1 to 1.50kgs of chicken meat for their meal preparation. In average of consumption frequency, a city household consumes chicken twice a week.

In the trend of economic growth in Cambodia, many people are looking for better product quality. The better quality of chicken protein, especially the safer and better standard quality is able to find their consumers in main towns and cities.

Analysis of the End-Market Preferences

Table shows the price, availability, and supply of different protein sources.

| No. | Protein name | Main source of supply | Availability | Average market price per kilo |
|-----|------------------------------------|------------------------------|----------------------------|-------------------------------|
| 1- | Free range chicken | Small farmers in 8 provinces | Year round | 20,000R-21,000R |
| 2- | Farming chicken | C.P company | Year round | 15,000R-18,000R |
| 3- | Fresh water fish (local standards) | Tole Sap and Mekong | Picked season (Aug to Jan) | 13,000R-14,000R |
| 4- | Sea food: shrimp (local standards) | | Not year round | 25,000-30,000R |
| 5- | Pork | | Year round | 17,000R-18,000R |
| 6- | Beef | | Year round | 25,000R-28,000R |

In the protein market, the free range chicken meat considers as the second highest price among other protein sources. However, the chicken meat from farming business is about 2,000R-3,000R cheaper. According to the evaluation of customers, the free range chicken meat is tastier than the farming business one. Fresh water fish is the most important protein source in Cambodia. Tonle Sap Lake and Mekong River provides the hugest amount of fish in the world. But fish has been exported to neighboring countries. Sea fish and other sea food products are also important source of protein for Cambodians and tourists. Many varieties of sea products are more expensive than chicken due to their availability. Cambodians also consume pork and beef meats. Its price is slightly cheaper than the free range chicken.

In conclusion, the free range chicken is one of important protein sources because of its comparable and affordable price, year round availability, regular supply, and taste. Particularly, domestic chicken raised by small farmers are preferable protein chosen by all classes of consumers. The free range chicken which is controlled quality and standardized by CEDAC program will be added value for food processors and customers. It is a matter of how to process chicken meat into various food products.

Analysis of Industry Coordination

Up to present, no coordination has been made between wholesalers/traders and small farmers. Only middlemen did interaction themselves with small farmers and traders or processors. Under CEDAC programs, the interaction between producers and consumers was occasionally organized through exposure visits of farmers to market and the consumers to farms.

CEDAC programs introduced the cooperative concept to its target farmers. The collective sales of chicken were sometimes facilitated by project staff. The small farmers just started learning about market- they have been exposed to the chicken quality requirements, prices and challenges.

CONCLUSION

Free range chicken is one of important agri-products involved by many small farmers in Cambodia. The chicken product, recognized by local people, becomes the main protein source and market. The current market players are not yet be able to create market intermediation to help those

small farmers since the latter do not gain much benefit from the market supply chain. Moreover, the middlemen and wholesalers who influence the market price, supply and demand are committing many unethical practices.

The value of producers/small farmers are not promoted by the market payers to consumers. The current supply chain has not yet complied with the Government regulations and policies which are aimed at promoting local products and food safety.

RECOMMENDATIONS/ PLANS OF ACTION:

Understood well the supply chain of free range chicken and found the market potentiality, CEDAC initiated a chicken market intermediation mechanism which is hopefully to help its target small farmers. Under its Agri-based Enterprise Support Program, CEDAC is strengthening about 700 chicken producer groups through technical support, and cooperative policies. A part from this, several Farmers' Markets will be built to sell as many as possible agricultural products, especially natural agri- products.

This initiative would be able to help small farmers in terms of market access, price bargaining power, and economy of scale. In addition, community chicken slaughter house, a part of the market intermediation, will help small farmers to expose another supply chain or new market and to understand the quality standard requirements.

Last but not least, Natural Agri-Product shops and Country Bird Restaurants are playing frontier roles of its organic market.

APPENDIX 1.

List of Data Needs and analytical tools for Value-chain Analysis

| Point of Analysis | Data Needs | Data Collection | Methods Analysis |
|---|---|---------------------|---|
| 1. Identification of value chain | Selection Criteria: Restrictions | Secondary | |
| 2. Analysis of Product/Process Flow | Product Source and Destination, Logistical Function (Cost/Function/unit), Spec. Processing Activities (Farm-level to Mkt Level or consumption level) | Secondary FGDs/KIIs | Supply Chain Analysis: Descriptive Analysis Cost/price involved Analysis of transportation and processing, Price Differentials, Description of Logistical Activities, Geographic Flow |
| 3. Analysis of Information Flow | Pricing, Market Outlets, Input Sourcing, Technologies, Product Quality | Secondary FGDs/KIIs | Descriptive Analysis: Timeliness, Availability, Relevance of Information; Horizontal Linkaging |
| 4. Analysis of Money Flow | Capital Requirements, Sources of Capital, Credit Needs, Sources of Credit, Capital Utilization | Secondary FGDs/KIIs | Financial and Cash Flow Analysis: Solvency and Liquidity; Timeliness, Availability of Credit |
| 5. Analysis of the Enabling Environment | Inventory of Rules Reg. & Policies on chicken, Available Technology-Matching (Cost and Capacity), Ethical Issues, Socio-Economic Characteristics of VC Stakeholders | Secondary FGDs/KIIs | Descriptive Analysis: Policies Rules & Regulations, Technologies Available; VC Stakeholder Participation & Analysis |
| 6. Analysis of the End-Market Preferences | Product Quality, Quantity, Price (Critical Success Factors) vs non-organic chicken | FGDs/KIIs | Competitiveness: Analysis of USP and CSF |
| 7. Analysis of Industry Coordination | Mapping of industry stakeholders, decision-making processes and influences | Secondary FGD/KII | Stakeholders Analysis focusing on decision-making and coordination / who does the integration within the chain |

APPENDIX 2.

Focus Group Discussions Schedule

| Day | Topic | Resource Persons | |
|------------------------------------|---|------------------|----------------------|
| Day 1: Using the Survey Instrument | | | |
| | Project Overview | Sim Kong | Keam Makrady |
| | Discussion on the Value Chain | Sim Kong | LimSokundarun |
| | Using the Survey Instrument a. Parts of the Instrument b. Data Inputs | Chhay Song Leang | |
| | Conducting the FGDs | Chhay Song Leang | Chheng Nakry/Ear Oiy |
| | a. Preparations | Chheng Nakry | Chhay Song Leang |
| | b. FGD proper (processing information during FGDs) | Lim Sokundarun | |
| Day 2: Data Processing | | | |
| | Components of the Data Processing Worksheet | Lim Sokundarun | Chhay Song Leang |
| | Data encoding | Lim Sokundarun | |
| | Data Tabulation | Lim Sokundarun | |

APPENDIX 3

Research tool for VCA

I- Basic information and product flow

- 1- Name of farmer/producer: _____
- 2- Address: _____
- 3- Producer cluster: _____
- 4- Family members: _____
- 5- Cultivation land: _____ ha
- 6- Land access: Owned _____ Tenant _____ Leased _____
Other, please specify _____
If leased, what is the price per year/season? _____
- 7- Land for chicken raising: _____ Sqm
- 8- Number of chicken raised per year: _____
- 9- Most frequent Market outlets:
Sold to middlemen at the village: _____
Sold at the nearby market: _____
Sold to neighbors: _____
Sold to producer groups at farm gate (collective): _____
Other: _____
- 10- Farm Gate price per kilo: _____
- 11- Production cost _____
- 12- How many chicken or kilo did a farmer sell per season/year?:

- 13- How much for own consumption?: _____

II- Information flow

- 14- Did the producers have been trained? Yes _____ No _____
If yes, who provide the training? NGOs _____ Government Officers _____
Others _____
- 15- Where is the main source of market and price information?:
Radio _____ Producer group _____ Newspapers _____ Other _____
- 16- What are the problems with production, price, and market information?

III- Financing analysis

- 17- Amount of investment for chicken per season/per year: _____
- 18- Finance sources for the production:
Saving group _____ Own resources _____ Private loan _____
Local micro-finance agency _____ Other _____
- 19- If a loan, what is the interest rate? _____ and
What is the maximum amount of loan? _____
- 20- Amortized rate: _____
- 21- Loan documents: _____
- 22- Loan period: _____
- 23- Any problems related to the finance? _____

IV- Value Factors Analysis

- 24- Type/breed of chicken: hybrid _____ domestic _____ other _____
- 25- Production period _____
- 26- Weight standard for marketing _____
- 27- Means of transportation used by traders to the market _____
- 28- Transportation period _____
- 29- Cost of transportation per kg/chicken to the market _____ Riels
- 30- Any problems related to the value factors/quality standard

V- Socioeconomic and Cultural Analysis

- 31- How many persons in each household are involved in the production?
- 32- Gender: men or women are mostly involved?
- 33- How much percentage of the household income from chicken?
- 34- What are consumers of chicken? Low class income _____
middle class _____ high class _____ All classes _____
- 35- How many percentage of Cambodian people do not like eating chicken
meat? _____
- 36- Any problems related to socioeconomic and Cultural Analysis:

VALUE CHAIN ANALYSIS OF CALAMANSI IN THE PHILIPPINES



PHASE ONE

OVERVIEW OF THE CALAMANSI INDUSTRY

The calamansi (*Citrus madurensis*) is considered as one of the major fruit crops in the Philippines, which is indigenous to the country. 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 easier.

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 concentrate³. 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.

OBJECTIVES OF THE STUDY

This study aims to achieve the following objectives:

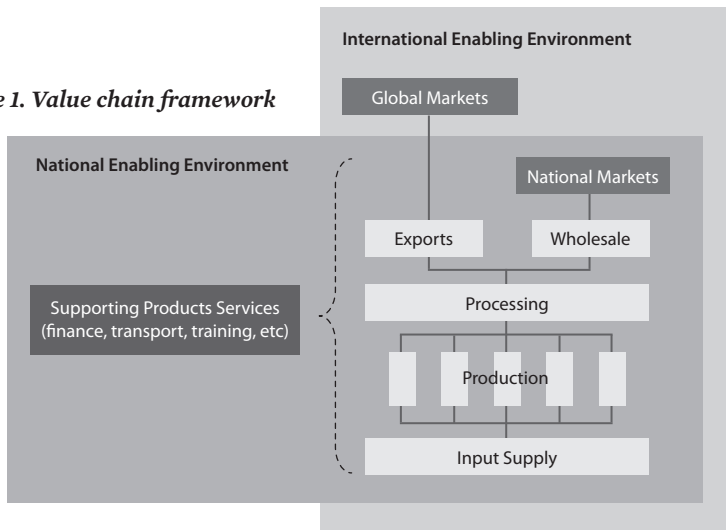
1. To describe the market chain and the chain actors involved in calamansi production and marketing
2. To understand the dynamics in the calamansi market
3. To identify production and marketing constraints

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.

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.

| 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 | |

MARKET CHANNELS

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 vari-

ous 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% |

| Region | Volume of production (in MT) | Share to total production |
|---------------------|---------------------------------|---------------------------|
| 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% |

| Item | Cost per hectare | Cost per kilogram | Share to total cost |
|-------------------------------|------------------|-------------------|---------------------|
| 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.

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 is 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.

Prices

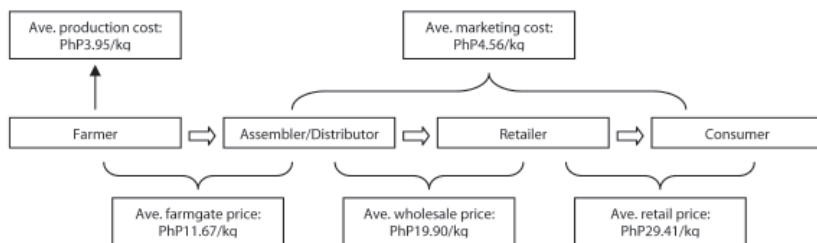
Prices of calamansi from 2000 to 2005 is shown in the table below. The average farmgate price is PhP11.67 per kilogram. The average wholesale and retail prices are PhP19.90 and PhP29.41 per kilogram, respectively. These give the following average price margins: PhP8.23 price margin from farmgate to wholesale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



ISSUES AND RECOMMENDATIONS

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

1. pests and diseases
2. high cost of inputs
3. lack of water/irrigation facilities
4. bad weather/calamities
5. poor soil condition
6. low price due to low quality of produce and oversupply
7. too many competitors
8. frequent price fluctuation/unstable prices
9. delayed payment of goods or non-payment of credit
10. inadequate farm to market road/poor road conditions resulting to high transport cost
11. absence of permanent market stalls/no buyer or market outlets
12. lack of information in farm technology
13. inadequate capital to finance the buying and selling of goods
14. lack of marketing information/skills
15. 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:

1. provide technology updates/conduct of seminars on calamansi production and marketing
2. provide facilities where financial assistance/loans can be availed of
3. organize farmers' cooperatives
4. organize market outlets; establish processing plants as outlets to address possible oversupply
5. address price stability issue on process of farm inputs and farmers' produce
6. improve road condition
7. provide inputs and post harvest facilities

REFERENCES:

1999. Bureau of Agricultural Statistics. Costs and Returns of Calamansi Production.

2002. Bureau of Agricultural Statistics. Survey on the Utilization of Selected High Value Commercial Crops (Calamansi).

2003. Bureau of Agricultural Statistics. Marketing Costs Structure for Calamansi. Marketing Costs Structure Study Series 1 No. 6.

2004. Bureau of Agricultural Statistics. Situationer on Calamansi 1999-2003. Volume 1 No. 1.

2005. Villas, Florante. Small and individual poor calamansi farmers and economy of scale. Xavier Agriculture Extension Service (XAES).

2006. Bureau of Agricultural Statistics. Situationer on Calamansi July-December 2005. Volume 2 No. 8.

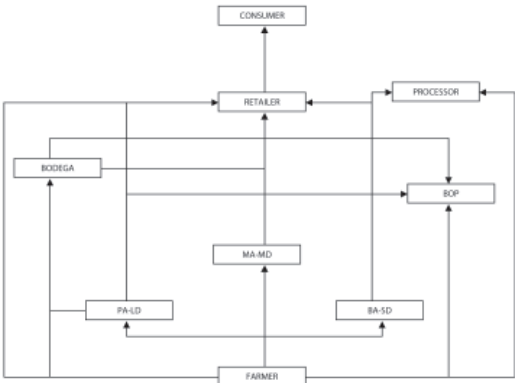
2007. Bureau of Agricultural Statistics. Crops Statistics of the Philippines 2001-2006: National and Regional.

2007. Bureau of Agricultural Statistics. Crops Statistics on Major Crops 2001-2006: Regional and Provincial.

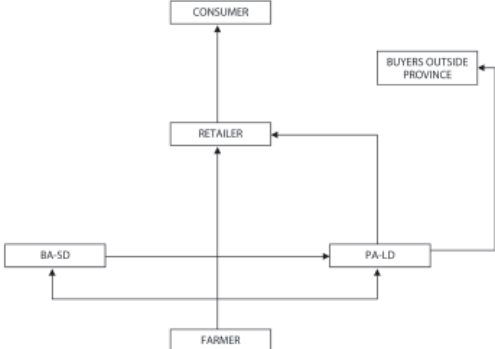
ANNEX A.

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

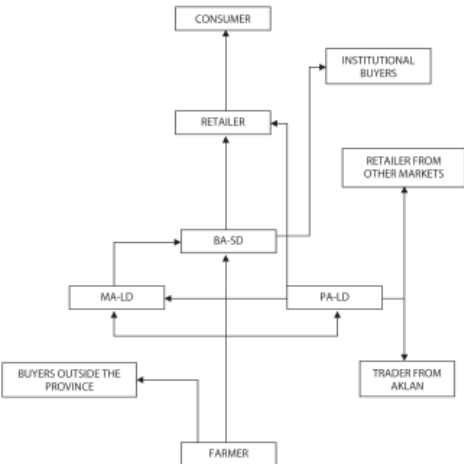
Mindoro Oriental



Quezon



Guimaras



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 | |
| Supply 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 |

VALUE CHAIN ANALYSIS OF CALAMANSI IN THE PHILIPPINES

PHASE TWO

I. INTRODUCTION

This report takes off from the VCA phase 1. To recall, the phase 1 report generated the following information:

1. Overview of the calamansi industry in the Philippines
2. Level of production and costs incurred in calamansi production
3. Geographic flow of calamansi in selected provinces
4. Marketing channels and costs
5. Production and marketing problems faced by farmers and traders

The phase 1 report generally focused on the production and marketing of fresh or raw calamansi. For this phase 2 report, the processed form of calamansi will be looked into. The specific objectives of this study are as follow:

1. Validate the cost data from the phase 1 report
2. Identify end consumers of calamansi
3. Identify costs in processing calamansi from raw to its other by-products
4. Provide a situationer of the calamansi processing industry in the Philippines

II. METHODOLOGY AND LIMITATION OF THE STUDY

The phase 1 report greatly utilized data from the Bureau of Agricultural Statistics (BAS). For phase 2, primary data gathering is done through key informant interviews. The farmers production inventory survey was also completed and data from this activity will be used. Website research and information from existing literature will also be utilized. For the validation of the cost data, interviews with farmers in Oriental Mindoro was also carried out.

A limitation of the study is the inadequate information gathered from calamansi processors. For one, the manufacturers of calamansi by-products are not willing to provide their company's information in terms of pricing and

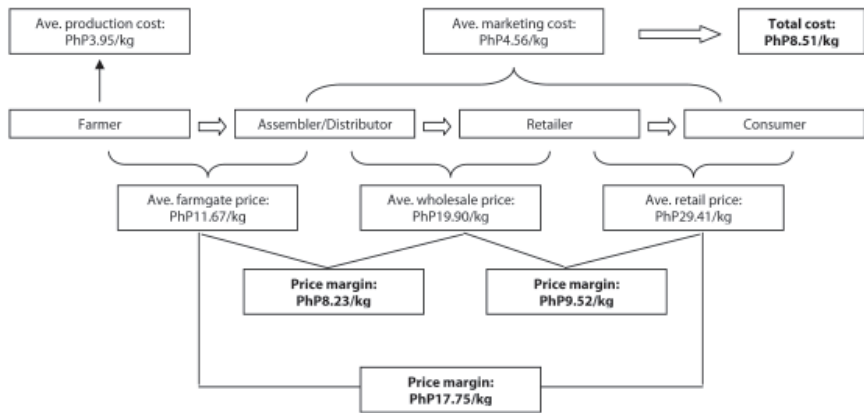
cost structure and procurement of fresh calamansi. The prices reflected in this report are mainly consumer prices scanned across various sources (e.g. supermarket, online stores, interviews).

III. RESEARCH FINDINGS

A. Validation of cost data

The phase 1 of the VCA report presented the production and cost data culled from the BAS. To recap, average production and marketing cost per kilogram of calamansi is PhP 8.51. Again, the cost discussed in the phase 1 report is the production, marketing, and transportation of fresh calamansi. The figure below shows costs and prices of fresh calamansi.

Figure 1



Note: Production cost data is consolidated data in 1997 (Oriental Mindoro, Batangas, Quezon, Leyte, and Guimaras) and 2005 (Zamboanga Sibugay). Marketing cost data is in 2003 (Oriental Mindoro, Quezon, and Guimaras).

Based on a recent interview with farmers in Oriental Mindoro, production cost is mainly on inputs and labor. Calamansi seedling cost is PhP 10 to PhP 15 and will bear fruit after two three years from planting. The farmers interviewed harvest around 9,000 kilos of calamansi per hectare of land per year. For a hectare of land with 1,500 bearing trees, the average cost per kilo is PhP8.44. This amount includes procurement of seedlings. Since this cost item is a one-time cost, the average production cost per kilo of calamansi is PhP6.36. The variance between the BAS data (1997) and current data is PhP2.41 per kilo.

Table 1

| Cost item | Cost (in PhP) | Cost per kilo (in PhP) |
|---|--|-------------------------------|
| Seedling* | 18,750 per hectare (for 1,500 seedlings) | 2.08 |
| Inputs (fertilizer, pesticide, other materials) | 21,250 per hectare per year | 2.36 |
| Labor | 3,000 (average of PhP550 per picker) per month | 4 |
| Total | 76,000 per hectare per year | 8.44 |
| Total (without seedlings cost) | 57,250 per hectare per year | 6.36 |

* The farmers interviewed stated that 1,500 trees are planted per hectare of land, on the average

B. Forms of calamansi

1. Calamansi puree/extract

Calamansi maybe processed into various forms. From its fresh or raw form, the juice can be extracted or what is known as calamansi puree/extract. Before extracting the juice, washing or disinfecting is important. The fruits must be soaked in chlorinated water to ensure that it is thoroughly cleaned. Juice extraction may be done manually or using a fruit juice extractor. For the calamansi puree/extract to increase its shelf life, blast freezing is needed. The blast freeze process requires that the product be reduced from a temperature of +20°C to -3°C in no more than 240 minutes. Liquid nitrogen is used in blast freezing.

Scanning of calamansi puree/extract being sold either in local markets or for export, a number of products were found. Calamansi puree/extract prices range from PhP73 to PhP120 per kilogram (or US\$1.3 to US\$2.61 per kilogram), depending on the packaging of the product, volume to be purchased, and where it was processed. For instance, a foreign company imports fresh calamansi from the Philippines and processes the fruits in France, raising the price of the puree/extract to US\$18.45 per kilogram. Packaging includes the use of bottles, plastic bags, plastic pails, and trays.

Information on how the manufacturers of the product extract the juice is unknown so comparison on the price of manually and mechanically-extracted puree can not be done.

Table 2

| No. | Product | Packaging | Volume (in kg) | Price (in PhP) | Price (in US\$) | Value PhP/kg) | Value (US\$/kg) |
|-----|--|------------------------------|----------------|----------------|-----------------|---------------|-----------------|
| 1 | PREDA Fairtrade Product: Calamansi Puree | 220 kg bag in used drum | 220 | 13,156* | 286 | 59.8* | 1.3 |
| 2 | PREDA Fairtrade Product: Calamansi Puree | 25 kg bag in box | 25 | 1,495* | 32.5 | 59.8* | 1.3 |
| 3 | PREDA Fairtrade Product: Calamansi Puree | 1 kg x 20 bags = 1 container | 20 | 1,702* | 37 | 85.1* | 1.85 |
| 4 | Vergers Boiron deep-frozen calamansi puree | Container | 1 | 848.7* | 18.45 | 848.7* | 18.45 |
| 5 | DGS Food Innovators Calamansi Puree | Bottle | 1 | 120 | 2.61* | 120 | 2.61* |
| 6 | Gel tropical Fruit: Calamansi Puree | Plastic bag | 1 | 73 | 1.59* | 73 | 1.59* |
| 7 | Dalisay Sweets Calamansi Puree | Bottle | 1 | 75 | 1.63* | 75 | 1.63* |
| 8 | Marsman Drysdale Frozen Calamansi Puree | Plastic pail | 18 | -- | -- | -- | -- |
| 9 | Marsman Drysdale Frozen Calamansi Puree | Box | 20 | -- | -- | -- | -- |

* These prices had been converted using US\$1 = PhP46
 -- no data available

2. Calamansi concentrate

After extracting the juice, calamansi may either be processed to produce calamansi concentrate or to convert it into powdered form. In making calamansi concentrate, sugar, xanthan gum, and water is combined with the calamansi puree/extract. For every cup of calamansi puree/extract, one cup of sugar and one cup of water is needed. The syrup is then boiled at 85 degrees Celsius. A 750-ml bottle of concentrate can make 20 to 22 12oz glasses of calamansi juice drink, the drink containing 1 part concentrate and 7 parts water.

Calamansi concentrate is widely sold both in the local and export market. Similar to calamansi puree/extract, prices vary depending on the packaging of the product, where it was processed, and volume to be purchased. Prices range from a minimum of PhP90 to as high as PhP175 per liter (US\$1.96 to US\$3.8 per liter).

Table 3

| No. | Product | Packaging | Volume (liters) | Price (PhP) | Price (in US\$) | Value (PhP/ liter) | Value (US\$/ liter) |
|-----|--|----------------|-----------------|-------------|-----------------|--------------------|---------------------|
| 1 | South Valley Farm Calamansi Concentrate | Plastic bottle | 1 | 150 | 3.26* | 150 | 3.26* |
| 2 | Cebri Calamansi Concentrate | Plastic bottle | 0.5 | 70 | 1.52* | 140 | 3.04* |
| 3 | Cebu Calamansi Concentrate | Plastic bottle | 1 | 150 | 3.26* | 150 | 3.26* |
| 4 | Tinadاران Small Farmer MPC Calamansi Concentrate | Plastic bottle | 0.5 | 75 | 1.63* | 150 | 3.26* |
| 5 | Pick & Squeeze Calamansi Concentrate | Plastic bottle | 0.75 | 418.14* | 8.53 | 523.17* | 11.37 |
| 6 | Lemon-C Calamansi Juice Concentrate with Honey | Plastic bottle | 1 | 165 | 3.59* | 165 | 3.59* |
| 7 | Lily's Calamansi Concentrate | Plastic bottle | 0.33 | 35 | 0.76* | 106.06 | 2.31* |
| 8 | Lily's Calamansi Concentrate | Plastic bottle | 0.5 | 65 | 1.41* | 130 | 2.83* |
| 9 | Lily's Calamansi Concentrate | Plastic bottle | 2 | 180 | 3.91* | 90 | 1.96* |
| 10 | Tugdaan Calamansi Concentrate | Plastic bottle | 1 | 175 | 3.8* | 175 | 3.8* |
| 11 | Charles & Charlie Concentrated Calamansi | Plastic bottle | 0.5 | 60 | 1.3* | 120 | 2.61* |

| No. | Product | Packaging | Volume (liters) | Price (PhP) | Price (in US\$) | Value (PhP/liter) | Value (US\$/liter) |
|-----|--------------------------------------|----------------|-----------------|-------------|-----------------|-------------------|--------------------|
| 12 | Lemonada Calamansi Drink Concentrate | Plastic bottle | 0.75 | 110.4* | 2.4 | 147.2* | 3.2 |
| 13 | Citrus Farms Calamansi Concentrate | Plastic bottle | -- | 296.24* | 6.44 | -- | -- |
| 14 | Good Sense Calamansi Concentrate | Plastic bottle | 0.8 | -- | -- | -- | -- |

* These prices had been converted using US\$1 = PhP46
 -- no data available

3. Powdered calamansi

This section will detail on the processing, prices, and uses of powdered calamansi. Based on the website search and review of relevant documents, this product has a very good market potential. The market segments for powdered calamansi are as follow:

- detergents and other cleaning products – soaps and laundry bars, dish-washing liquids
- beverage industry – fruit juices, nectars, and drinks
- sugar confectionery market – hard and soft candies
- noodle industry – pancit canton
- condiments – food seasonings, salads, soups, sauces
- cosmetics industry – whitening soaps, body scrubs, and cleansers

Tropical fruit powders such as calamansi have a lucrative ready market in the European countries as indicated by an increasing export trend for convenient food items. The most potential markets are Netherlands, Germany, United Kingdom, France, Switzerland, Japan, and the United States. Calamansi puree/extract can be converted into powdered form after undergoing a process called spray drying. In this process, the juice or puree is dispersed or atomized to form droplets and sprayed into a heated chamber where it is dried and forms a “flowing” powder. The Industrial Technology Development Institute of the Department of Science and Technology (DOST) in 1996 conducted a study to develop spray dried calamansi powder,

detailing raw material specifications, processing conditions, and packaging requirements. Some of the significant findings of the study are as follow:

- The maturity of raw material had a significant effect on the quality of the final product. Unripe fruits gave a flavor similar to tamarind fruit and has a very prominent tangy to bitter taste. Both fruit maturity and size affected yield. Higher yield was obtained if fruit size was at least 12 grams.
- In the establishment of processing conditions, factors considered were the effects of pre-treatment/juice preparation, addition of carrier, and drying conditions. For the extraction of calamansi juice, methods studied were manual extraction, use of pulper/finisher, and use of expeller. High degree of bitter flavor was obtained for calamansi juice extracted using the pulper/finisher and expeller. Consistency and clarity of the juice were also significantly affected by machine extraction method. To minimize these problems, pre-treatment such as blanching of fruits prior to juice extraction and enzyme treatment and centrifugation prior to drying were conducted.
- The addition of alginate as a carrier resulted to better rehydration characteristics of calamansi powder while gum arabic and cassava starch imparted off-flavor to the calamansi powder. Best results were obtained using malto dextrin as flavor carrier and drying aid.
- Drying conditions using the spray drier were studied. Factors considered were inlet and outlet temperatures, feed rate, and atomizer speed. Parameters measured were solubility/sinkability, sensory attributes, and moisture content of the calamansi powder. Based on the results, optimum inlet and outlet temperatures were 160 degrees Celsius and 80 degrees Celsius, respectively; suitable atomizer speed was between 14,000 to 20,000 rpm (revolutions per minute). Results indicated that to further improve the solubility and sinkability of calamansi powder, agglomeration as a final step in the production should be studied.
- Finally, packaging requirements and shelf-life testing were established. Two types of packaging materials were considered: high-density polyethylene (HDPE) and vacuum metallized linear low density polyethylene (LLDPE). These materials have good barrier property against water vapor. No caking was observed for at least one year at 28 to 30 degrees Celsius.

Compared to spray drying, the more common technologies such as convection, cabinet, and drum drying are more costly and labor intensive. The spray drying process also has a higher retention of vitamin C and the pro-vitamins A and beta-carotene. Recovery rate is 10 to 12%, which means that for every 1 kg of fresh calamansi, 100 to 120 grams (or 0.10 to 0.12 kilograms) of powdered calamansi can be produced.

Scanning of powdered calamansi sold in the market (either locally or for export) yields minimal result. A kilogram of powdered calamansi is sold at a minimum price of PhP2,538 to a maximum price of PhP13,980. What makes the product expensive is the cost of the spray-drying machine used to convert calamansi puree/extract into powder. Packaging and marketing also adds to the cost of the product. The powdered form is more convenient and requires less storage space compared to the fresh fruit. For instance, the label of one product stated that one powdered calamansi single is equivalent to 7 calamansi fruits.

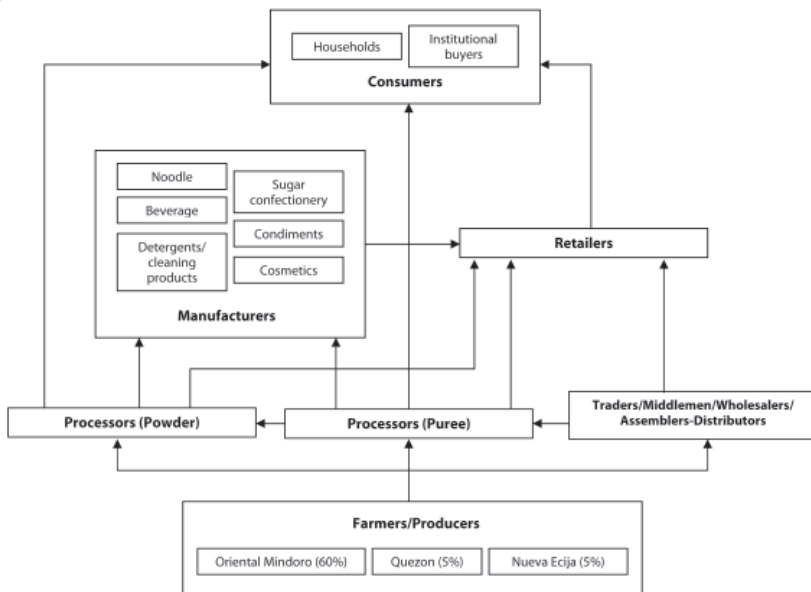
Table 4

| No. | Product | Packaging | Volume (in kg) | Price (PhP) | Price (US\$) | Value (PhP/ kg) | Value (US\$/ kg) |
|-----|--|--------------------------|----------------|-------------|--------------|------------------|------------------|
| 1 | Health First Powdered Calamansi Singles | Box (12 singles per box) | -- | 125 | 2.88* | -- | -- |
| 2 | Health First Calamansi Extract Powdered | Canister | 0.132 | 365.7* | 7.95 | 2,770.45 | 60.23 |
| 3 | Mother's Choice Phil. Lemon Powder (Calamansi) | Bottle | 0.023 | 207* | 4.50 | 9,000 | 195.65 |
| 4 | Noah Herbal Calamansi Powder | Canister | 0.13 | 330 | 6.60 | 2,538.46 | 50.77 |
| 5 | McSpice Calamansi (Philippine lemon) Seasoning | Canister | 0.023 | 321.54* | 6.99 | 13,980 | 303.91 |

* These prices had been converted using US\$1 = PhP46
 -- no data available

The next figure shows the process flow and players in the calamansi industry. Calamansi farmers or producers provide supply of fresh calamansi to processors and wholesalers/middlemen. Two-thirds of the supply of fresh calamansi come from Oriental Mindoro. But there are cases where farmers themselves who are members of cooperatives or assisted by NGOs undertake extraction or pureeing. The middlemen meanwhile provide supply to retailers or puree processors. Puree processors/extractors could supply calamansi puree/extract to any of the following: a) processors of powdered calamansi, b) manufacturers who use calamansi as input to their goods, c) retailers of calamansi puree/extract, and/or d) directly to consumers through trade fairs and showrooms. Processors of powdered calamansi have a ready market from manufacturers, retailers, and direct consumers. In the Philippines, only one company has been identified that owns a spray-drying machine to convert calamansi puree/extract to powder. The cost of the spray-drier is expensive¹ that's why this company has monopoly over the powdered calamansi market.

Figure 2



¹ The price of a spray drier, based on website search, is in the range of US\$50,000 to US\$85,000.

The value chain

This report provided an overview of the three by-products of fresh calamansi. The figure below shows the variation of calamansi, from the fresh fruit to its by-product. Comparison of these in terms of shelf-life, selling price, and recovery rate will be useful in the value chain analysis.

Figure 3



Calamansi puree/extract, concentrate, and powder have relatively similar shelf-life if stored properly and at the right temperature. For calamansi puree, the extracted juice will last only for hours if not blast frozen. The products also come in various packages, as required in shipping or transporting the good.

Table 5

| Product | Shelf-life | Packaging |
|-------------------------|--|-------------------------------|
| Fresh calamansi | 2 to 3 weeks | Crate, box, buriki, basket |
| Calamansi puree/extract | Less than 1 day (fresh), 12 months (frozen) | Bottle, bag, plastic pail |
| Calamansi concentrate | 6 to 12 months | Bottle (plastic or glass) |
| Powdered calamansi | 10 to 12 months | Bottle, canister, pouch packs |

It is also imperative to determine the recovery rate of each by-product, that is, the yield or amount of usable materials that have been removed from its original form. The table below shows the average yield that can be extracted from 1 kilogram of fresh calamansi. Puree that has been manually extracted (i.e. hand-squeezed) has a smaller recovery rate at 33%. On the other hand, using an extractor will yield 70 kg of juice or a recovery rate of 70%². Calamansi concentrate has the highest recovery rate at 94%. The high yield per kilogram of fresh calamansi is due to the addition of other ingredients such as sugar and water to the calamansi puree/extract. Thus, recovery rate is

² Based on experience of calamansi farmers in Zamboanga Sibugay under the XAES and CRS Partnership on the PACES PRAP Project

higher than that of puree/extract. Finally, powdered calamansi has the lowest recovery rate at 11%. To sum, a kilogram of fresh calamansi can produce any of the following: a) 0.33 kg of puree if manually extracted, 0.70 kg if an extractor was used, b) 0.94 liters of concentrate, and c) 0.11 kg of powdered calamansi.

The equivalent average selling price for the corresponding amount of yield is shown in the table below. It can be noticed that as the product requires higher technology for processing, the higher is the selling price. Of importance, and could serve as proxy indicator for the cost of processing (e.g. labor, materials, equipments) and marketing (e.g. packaging, transportation), including markup, is the price margin between fresh calamansi and its by product. For instance, manually extracted calamansi puree is sold in the market with a 117% price markup from the fresh ones. Powdered calamansi, processing of which entails high end equipment and are sold mainly in export markets, have on the average a price markup of 6,383% from fresh calamansi. In essence, the price margin is the potential profit that calamansi farmers may recoup if they engage in processing.

Table 6

| Form | Average yield | Recovery rate | Equivalent ave. selling price (in PhP) | Price margin from fresh calamansi | |
|---|---------------|---------------|--|-----------------------------------|--------|
| | | | | (in PhP) | (in %) |
| Fresh calamansi | 1 kg | 100% | 12* | - | - |
| Calamansi puree/ extract (manual extraction) | 0.33 kg | 33% | 26 | 14 | 117% |
| Calamansi puree/ extract (using an extractor) | 0.70 kg | 70% | 55 | 43 | 361% |
| Calamansi concentrate | 0.94 liters | 94%** | 130 | 118 | 985% |
| Powdered calamansi | 0.11 kg | 11% | 778 | 766 | 6,383% |

* average farmgate price, BAS 2007

** Average yield of Nazareth Women's Association (i.e. produces 200 bottles of 500-ml volume from 189 kilograms of fresh calamansi) and Upland Marketing Foundation, Inc. (i.e. produces 3 bottles of 450-ml volume from 1 kilogram of fresh calamansi)

The table below shows the equivalent amount of fresh calamansi needed to produce 1 kilogram of each by-product, including the price of each corresponding amount. Since it is already apparent that calamansi is the main input in producing these goods, other variables are needed in processing. The last column shows the share of cost in buying fresh calamansi to the total selling price. Though the selling price is not the actual cost in producing the good, it could serve as proxy indicator in determining the share of the cost of other inputs/ingredients or the cost of using high-end equipments in producing the good. 1 kilogram of manually extracted puree requires almost 3 kilograms of fresh calamansi and almost half of its selling price could purchase another kilogram of fresh calamansi. There is an almost one-to-one correspondence between a kilogram of fresh calamansi and a liter of concentrate. However, only 9% of its equivalent selling price is allocated to buying the fresh fruit, the remaining 91% of the selling price goes to the cost of other inputs (e.g. sugar, xanthan gum), packaging, and markup. An even lower share of fresh calamansi cost to selling price can be observed in producing powdered calamansi, at 2%.

Table 7

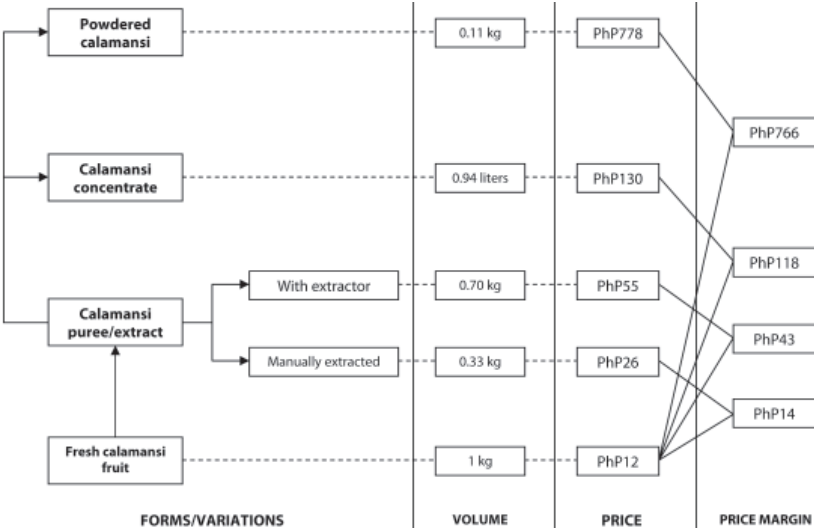
| Form | Volume | Equivalent selling price (in PHP/kg) | Required amount of fresh calamansi (in kg) | Procurement price of fresh calamansi (in PHP) | % of fresh calamansi cost to selling price |
|---|---------------|---|---|--|---|
| Fresh calamansi | 1 kg | 12* | - | - | - |
| Calamansi puree/ extract (manual extraction) | 1 kg | 79 | 3.03 | 36 | 46% |
| Calamansi puree/ extract (using an extractor) | 1 kg | 79 | 1.43 | 17 | 22% |
| Calamansi concentrate | 1 liter** | 138 | 1.06 | 13 | 9% |
| Powdered calamansi | 1 kg | 7,072 | 9.09 | 109 | 2% |

* average farmgate price, BAS 2007

** Since kilogram is a unit of mass and liter is a unit of volume, information on the density of the substance is needed to convert liter to kilogram. We assume that calamansi juice has the same density as water. Using this assumption, then the conversion is 1 kilogram = 1 liter.

The figure below shows the value chain of calamansi, from its fresh to processed form. Though the selling price is used as indicator for the “added value” of each chain, it shows that calamansi farmers stand to gain if they will be involved in processing or converting their fresh produce to other forms. As earlier mentioned, the PhP14 to PhP43 price margin of fresh calamansi to puree/extract is the potential profit that can be gained by farmers if they decide engage in this business. Profit can also be increased (PhP29 per bottle) if puree extraction is done mechanically (i.e. with an extractor) compared to hand-squeezed extraction.

Figure 4



IV. CONCLUSION

This report established that calamansi is a highly potential agricultural commodity to invest on. It has various uses and can be processed into various forms. Further, value-adding in the commodity entails investment in technology.

REFERENCES:

1999. Bureau of Agricultural Statistics. Costs and Returns of Calamansi Production.

2002. Bureau of Agricultural Statistics. Survey on the Utilization of Selected High Value Commercial Crops (Calamansi).

2002. Tañafranca, D. et al. Development of Spray Dried Calamansi Powder. Packaging R & D Center of the Philippines, Industrial Technology Development Institute, Department of Science and Technology (DOST).

2003. Bureau of Agricultural Statistics. Marketing Costs Structure for Calamansi. Marketing Costs Structure Study Series 1 No. 6.

2004. Bureau of Agricultural Statistics. Situationer on Calamansi 1999-2003. Volume 1 No. 1.

2005. Villas, Florante. Small and individual poor calamansi farmers and economy of scale. Xavier Agriculture Extension Service (XAES).

2006. Bureau of Agricultural Statistics. Situationer on Calamansi July-December 2005. Volume 2 No. 8.

2007. Bureau of Agricultural Statistics. Crops Statistics of the Philippines 2001-2006: National and Regional.

2007. Bureau of Agricultural Statistics. Crops Statistics on Major Crops 2001-2006: Regional and Provincial.

VALUE CHAIN ANALYSIS OF TEA IN THAI NGUYEN PROVINCE VIETNAM



INTRODUCTION

Tea is a key industrial plant with high economic value in Thai Nguyen province. Thai Nguyen farmers own a lot of experiences in growing and processing tea. They know how to make use of land and climate advantages for making their tea a special flavor. Presently, there is 16.413 ha of tea, of which there is 14.122 ha of harvesting tea with an average yield of 6,7 ton/ha and a production of 95.000 tons. Based on the land and climate conditions of the province, the tea areas are divided into two major areas.

The first area is material one for green tea production. This area covers Thai Nguyen city and such districts as Dai Tu, Phu Luong, Dong Hy, Pho Yen, Song Cau, Vo Nhai with a total area of 12.400 ha, representing 73% the total tea area of the whole province, of which there is 4.000 ha of special tea with such famous areas as Tan Cuong, Phuc Xanh, Phuc Triu (Thai Nguyen city), La Bang, Khuon Ga - Hung Son (Dai Tu), Tai Ca- Minh Lap, Song Cong (Dong Hy) and Phuc Thuan (Pho Yen). The second area is a material tea area for black tea production that covers the majority of Dinh Hoa, Phu Luong with a total area of 4.000 ha, representing 27% total area of the province. Thai Nguyen tea is sold in both domestic and foreign markets, of which the domestic market share for green tea and special tea is 70%. The tea

growing and processing industry has been of socio-economic significance to the province. Tea is really a plant for poverty reduction and rich making in Thai Nguyen.

Before the economic renewal “Doi Moi” (1986) initiated by the Communist Party of Vietnam, farmers in general and tea growers in particular are either members of old type cooperatives or workers of state farms. After 1986, farmer families are considered as autonomous units and granted with the long term right to use land. Many households have good development and large scale in production and business considered as farm households. The old type cooperatives are shifted to the new type ones. In addition, with the support of the local authority, mass organizations, NGOs, particularly CECI many new cooperatives were established.

Before 90s, most tea were sold to the state farms for processing, then sold to VINATEA for export. However, after that, along with the development in production, there was appearance of various forms in tea production and processing such as private processing establishments, production-cum-processing households, private companies, tea processing and export joint venture companies, assemblers, wholesale traders.

Therefore, there are many stakeholders in the tea value chain. Based on the actual situation, the survey team identified the following key stakeholders:

1. state farm households: these are farm workers who received land from the state farms when these state farms was converted into the state companies in accordance with the Decree 01 issued by the Government in 1995, and those households who have land and sign contracts with tea companies;
2. farm households are the ones who have large production scale and not members of state farms;
3. freelance households are the ones who have small scale production and not members of the state farms neither;
4. cooperative households are members of cooperatives (including members of groups). In processing and marketing, there are processing establishments, production-cum-processing households, private tea companies, tea processing and exporting joint ventures, assemblers, wholesale traders,....

Supporting agents are Department of Agriculture and Rural Development, Department of Trade, NGOs, mass organizations such as the Farmers' Union, the Women's Union, the Youth Union. The survey team also identified 4 major market channels and the value chain analysis is more focus on identifying opportunities and constraints for increasing the value of small farmers' products and helping them get easier access to market.

OBJECTIVE OF VCA:

1. To describe market channels and stakeholders in the channels.
2. To describe and analyze values added by various stakeholders in various market channels.
3. To identify opportunities and constraints in production and marketing in order to make recommendations for adding value to small farmers' products.

VALUE CHAIN ANALYSIS FRAMEWORK AND METHODS

Value chain analysis Framework

Value chain refers to the full range of activities that are required to bring a product (or a service) from conception, through the different phases of production, to delivery to final consumers and disposal after use (Kaplinsky and Morris 2001). Further, a value chain exists when all the stakeholders in the chain operate in the way to maximize the generation of value along the chain. 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 for increasing benefits of stakeholders operating throughout the industry. The value chain framework used for this study is illustrated in Figure 1.

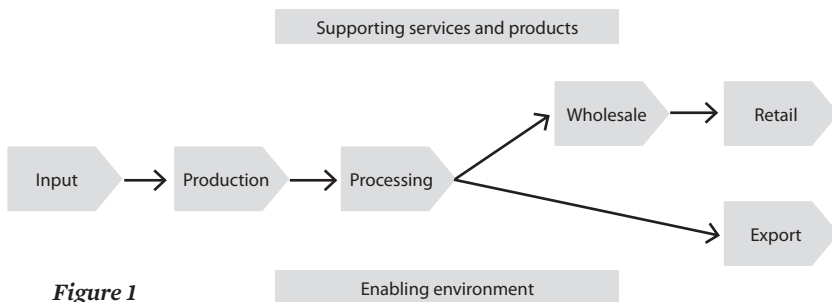


Figure 1

RESEARCH METHOD:

The research used data and information collected from the survey and available data and information of previous surveys. The research method consists of quantitative and qualitative methods through interviewing governmental officials, the Farmers' Union, producers, processors and marketing persons. There is combination between individual interviews and group discussions. The survey team conducted the survey and analysis based on the tools provided by AsiaDHRRA.

Within a limited resource and time frame, the survey team was not able to collect adequate data, information and analyze all aspects of tea production and marketing. Therefore, the survey team, try to use data and information collected from this survey and materials available from the previous studies with a view to describing a overall practical picture of tea value chain in Thai Nguyen, identifying opportunities, constraints and challenges to increasing value to small farmers' products and making appropriate recommendations as well. It is worth noting that the survey team use income criteria in this analysis instead of profit or margin criteria as producers almost use family labor aimed at generating income. It is similar to assemblers, wholesale, household processors. It is also very difficult and probably not precise to calculate labor costs as there are no statistic data of working days or working hours/day of every participants.

Brief introduction to tea production and processing:

It is necessary to understand basically tea production and processing in order to assist the process of analyzing and making practical conclusions. The survey shows that all interviewed households undergo 2 stages of tea production: growing stage (basic construction and business tea) and processing stage.

1- Cultivation Production stage:

100% households applied the same techniques in transplantation of tea plants in a basic construction period of 3-4 initial years. There is difference in basic fertilizer application "much for some, less for the others"

Shaping period

Initial cut: 1 year after transplantation, buds are cut to have branches and in year 3, branches are trimmed, and after every year, tea growers shape tea

plant by cutting branches and leaves at the beginning of cold season. It is called initial cut.

Hurt cut: Cutting to shape tea plants after 9-10 years of harvest is called hurt cut

2- Processing production stage:

Manual harvesting techniques:

In Year 4, farmers shape tea plants to broaden tea shadows for high yield based on picking techniques:

- Picking one bud + 2 young leaves
- Increasing yield by picking leaves in an order that leaving the third and fourth leaves
- Mixing soil and applying balanced NPK
- Avoid making tea buds crashed when picking tea leaves.

(Farmers know when it is possible to have the second harvest by experience)

Processing techniques:

Fresh tea after harvested should be timely processed, avoid being crashed, staled (staled tea will make its quality decrease when being dried).

Dehydrating tea:

Drying fresh tea is a key stage to improve the quality of products. Tea drying experience is that the temperature should be regularly adjusted and color of tea should be observed: tea leaves change from green to light green, we feel sticky when we hold tea in hands, tea stem can be bended without being broken and tea comes up with aroma.

Crumpling tea:

Crumpling is to break sticky cells making tea leaves curled. Crumpling decides aromatic flavor and shape of tea.

Drying:

After dehydrating and crumpling stages, it is drying stage, light should be small to reduce water content.

Preservation:

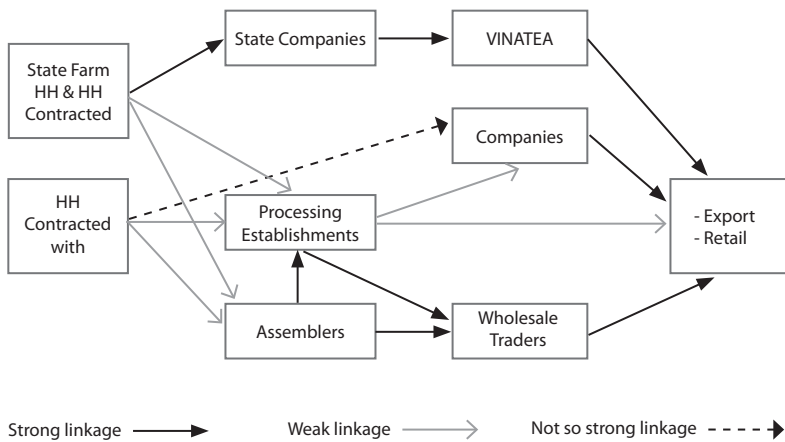
Preservation is to maintain the flavor of tea. Let tea cool, put it into thick paper bags, fold closely (this is a weak stage of framers as farmers sell tea immediately after drying it).

3- Market channels

1- Contracted market channels

1.1- Through state farm households:

Figure 2



State farm households:

According to the land assignment contracts, the land ownership belongs to the State, the land using right belongs to the households. The households can transfer this land using right to others, but they cannot use this land using right as a collateral for bank loans. They can grow tea only in this land, not another crops, and they have to sell all products to the State enterprises.

Compared to freelance households and cooperative households, these households have bigger production scales, higher education and cultivation levels as they were technically trained by the technicians of the state enterprises. They have capacity of capital and are provided with inputs on credit by the State enterprises so they rarely borrows money from banks.

All processing and marketing activities are taken care by the state enterprises. The households just concentrate on producing high yield and quality tea. Tea produced in this channels are mainly for export, only small amount for domestic market.

The households sell fresh tea to the state enterprises at prices not mentioned in the land assignment contract, while there is often price fluctuation in market, however, they in return can enjoy technical assistance, input provision on credit, health care, children education, especially stable sale. Therefore, this linkage is relatively strong and stable (Figure 2). However, it tends to be weakened when the market change disadvantages the households or the quality of the households' products does not satisfy the quality requirements of the state enterprises. In both cases, the households either sell fresh tea to assemblers, processors or process by themselves and sell dry tea for income enhancement.

Contracted farmers: There are two types:

The first type consists of farmers who buy the land using right from the state enterprises and sign contracts with these enterprises exclusive social insurances (households contracted with the State Companies). The land ownership belongs to the State. The households have the land using right, but cannot use this right as a collateral for bank loans. There is technical and information assistance provided by the state enterprises in many cases. Inputs are either provided by the state enterprises on credit basis or cared by the households themselves. In this linkage, the households do not have to take care of marketing their products, therefore, it is rather strong, stable and flexible (Figure 2). Actually, almost products of the households are sold to the state enterprises, even sometimes at lower prices as against the market one due to regular procurement, relatively stable prices with market based adjustments, sometimes higher than the market prices.

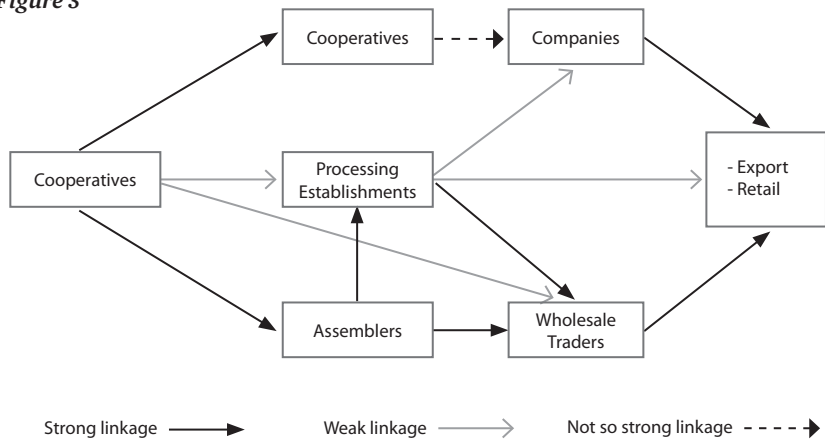
The second type consist of farmers who sign contracts to produce and sell products to companies. This type has been encouraged since the Decision No.80 on encouraging contract based agricultural product procurements issued by the Government in 2002. The contracts in this linkage are very diversified. In some cases, the companies provide farmers with inputs, technical guidance and buy farmers' products at prices agreed at the begin-

ning of the crop. In other cases, companies sign contracts to buy products of farmers at agreed prices without any service provision. The input services are often provided by local authorities, mass organizations or cared by farmers themselves. This linkage is really firm when the buying prices offered by the companies are the same or higher than the market prices. These contracts are easily broke especially when the market prices is higher than the prices offered by the companies (Figure 2). In additions, it is very difficult to solve the disputes in terms of contract violations. This linkage is not strong at present and will be better developed in the future if the farm size is bigger and more practical legal bindings are in place.

From the above analysis, we can see that the main actors in this channel are state enterprises, companies and VINATEA. The role of state farm households and contracted households using the state farm land is limited. The freelance contracted households play a certain important role, but not clear.

1.2- Through cooperatives or groups

Figure 3



After the cooperative law issued in 1995, many cooperatives were established to improve the production and marketing capacity and living conditions of their members. With the support from the local authorities, mass organizations and NGOs, many tea cooperatives in Thai Nguyen were

established, but a small size, only dozen members. CECI itself supported to establish 6 cooperative since 2002.

The cooperatives carried out such activities to support their members as irrigation, land preparation, electricity, technical training, input on credit, market information at the same time attracted assistances from individuals and organizations inside and outside the country. The marketing of products in the cooperatives is conducted in the way that the cooperatives sign contracts with buyers in advance, then collect tea from their members. The buyers then sell to retailers or companies for package and export (Figure 3).

However, the volume of products sold through cooperatives remains very small. Take Phuc Thanh cooperative as an example, only 10% of members' tea is sold through the cooperative, the remaining has to be sold to retailers, assemblers or wholesale traders. Nevertheless, the fact shows that farmers are still eager to join cooperatives with expectation that their living conditions will be improved in the future. This linkage will be stronger if appropriate support is in place.

The survey shown that there are some limitations to the development of the cooperatives such as: the leaders of the cooperatives are elected farmers, who have low education levels, limited contacts with other partners, though trained, their capacity in management, marketing,... remain weak. The working capital of the cooperatives is small. It comes mainly from contributions of the members and external financial support. This fund is enough for only administration, communication, and not able to assist the cooperative leaders to seek for market expansion, to carry out information and advertisement campaigns.

The members produce on individual family basis, some members have processing facilities, some do not, and their application of techniques in production and processing are not the same, therefore, the quality of the products is not similar, especially when collected for contracts. The visual benefits of the cooperative members are not considerable, while they, with support from the local authorities, mass organizations, can still borrow money at low interest rates, access to market information, buy input on credit,... Therefore, the bindings of the members in the execution of the con-

tracts is loose, thus leading to the break of the contracts, particularly when the market prices higher than the contract prices.

Beside formal cooperatives, there are some other forms of informal linkages and cooperation such as groups, clubs. This is a preliminary step for development of formal cooperative later on. These forms of linkages were established mainly by the support of programs and projects with a view to supporting farmers to produce safe tea and organic tea, step by step establish trade marks and expand production and business. The results of the discussions with local leaders and farmers revealed some difficulties facing safe and organic farmers as follows:

1. Taste and flavor of safe tea, especially of organic tea is lower than that of conventional tea.
2. Compared to conventional tea production, production of safe tea, especially of organic tea require a strict following of technical procedures, higher production costs, but in return tea appearance is not nicer and yield lower that of conventional production. In markets, it is not possible for the consumers to differentiate safe tea, organic tea and conventional tea. The selling price in many cases is the same or lower than that of conventional tea (while the price of organic tea in the world is about 3 times higher than that of conventional tea). For persuading consumers to trust in their products, some cooperative spent not a small amount of money to get quality certificates.

For example, the costs for an international quality certificate is about 4000-5000 USD. This amount is too big for a small cooperative. Therefore, it is normally funded by NGOs. This is a real difficulty for cooperatives or groups to get access to markets of this kind of products. In reality, there is neither national organic standards and nor organic certification organizations in Vietnam. There were standards for safe products, but the local quality certificates are not strong enough to get full trust from consumers. This is making safe and organic tea producer more difficult in marketing their products.

3. Safe and organic areas are still mixed with conventional tea area where there is abuse of fertilizers and pesticides, therefore, insects move from the conventional tea areas to damage the safe and organic tea areas mak-



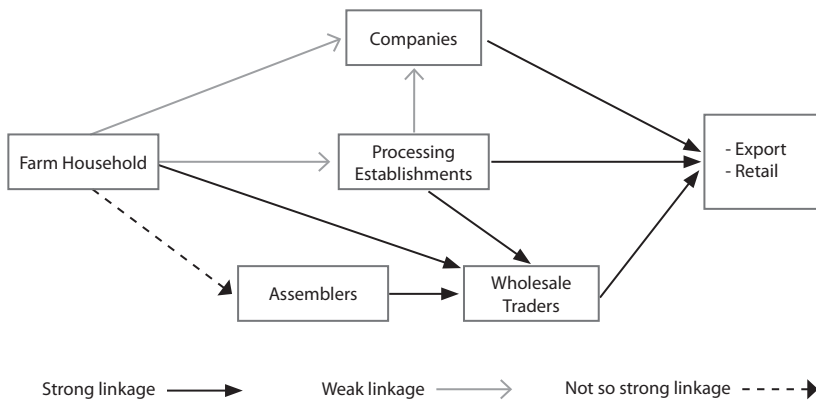
ing the quality and yield of tea in these area decreased. Moreover, the transitional period from conventional production to organic one takes 3 - 5 years, thus making impatient farmers less interested.

4. Cooperatives are facing difficulties in establishing trade marks for their products and in maintaining their trade marks.

2- Market depended channels:

2.1- Through farm households:

Figure 4



These are households who have large production and business scale. According to the government criteria, these household should have a production area of over 1 ha each and annual income of over 6 million VND each. However, based on the actual situation of surveyed areas, the survey team considered those households who have over 0,3 ha each as farm households in the process of analysis.

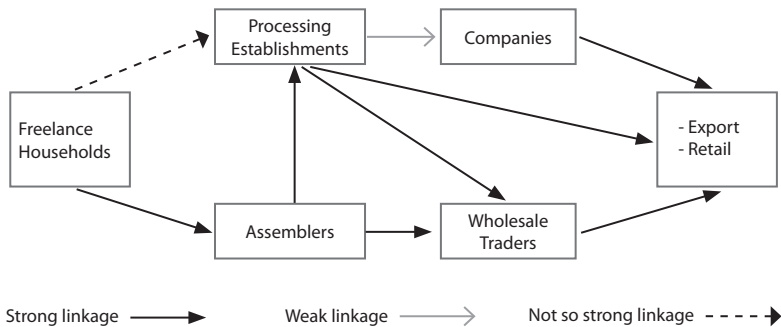
These households generally have education and cultivation level, production capital, market access higher than those of cooperative and freelance households (up to 80% family heads finished lower secondary school). They are very dynamic and sensitive to market changes, active in updating market information, scientific and technical progresses, initiative in setting up trials to improve yield and quality of tea. They also receive technical support from

programs and projects financed by the local authorities, NGOs, mass organizations. They have financial capacity, so they rarely have to borrow money.

Almost of the households have processing facilities, but simple. Harvested fresh tea of the households are kept for processing. They sometimes buy fresh tea from other households to process. They only sell fresh tea at a good profitable times or sell low quality fresh tea to assemblers or processing establishments. Their processed tea are mainly sold to wholesale traders, then delivered to retailers or sold to tea companies for export (Figure 4). They have financial capacity, therefore, they normally preserve and keep processed tea till they can get good prices. In this channel, the farm households play a very active and important role. On one hand, these households expand production and business, on the other hand, act as an active catalyst to link different households together in production and business.

2.2- Through freelance households:

Figure 5



These households have the smallest production scale, the lowest education and cultivation level among 4 groups of households (60% heads of households just finished primary school). They often lack of capital and have poor living conditions. Therefore, their absorption and application of techniques is limited, though they are provided with technical training from the local authorities, mass organizations and NGOs. Their cultivation is mainly based on traditional experiences and exploitation of soil fertility. It degrades soil quality and reduce yield and quality of tea. In terms of capital, with the

support of mass organizations such as the Farmers' Union, they can borrow loans from banks at low interest rates without any collateral, but they do not often use it efficiently.

Very few households are able to procure processing machines. They either hire other to process or process themselves with traditional processing facilities. The quality of their processed tea is low and not uniform and low due to low processing skills and techniques, and low quality input materials. They are not often able to preserve and keep processed tea until they can get good prices due to their difficult economic conditions. They usually sell fresh tea right after harvest or they sell dry tea right after processed even at very low prices. They often sell tea to assemblers, the assemblers sell to processing establishments for fresh tea, to wholesale traders for dry tea (Figure 5). They rarely receive real market information. Even when they know very well that the price they get for their products is low, they still have to accept in order to have some income to cover family expenditures. Therefore, they seem to be price takers in market. The transactions in this channels depend on market without any specific linkages/cooperation, except some households produce special tea based on agreements with buyers in advance. However, these transaction base on trust and acquaintance, not on contract, so it is sometimes risky.

3- Comparisons of different market channels

3.1- Comparisons of production cost, selling price and income for fresh tea:

Production costs:

The production costs, especially for fertilizers and pesticides of farm households and state farm households are higher than those of cooperative and freelance household. The reason is that they have bigger capital and better cultivation level so that they can use balanced, appropriate and timely fertilizers. For the state farm households, they are often provided input on credit, so they have input available on needs. The other reason is that they use a lot of bio-fertilizers and bio-pesticides, thus making the costs higher, but it is good for environment, their health and product quality. The cooperative households and freelance households have lowest production costs, particularly for fertilizers and pesticides as they mainly use traditional cultivation techniques and experiences, exploit soil fertilities and sometimes buy unknown toxic pesticides at cheap prices.

Therefore, the higher costs of fertilizers and pesticides does not necessarily go along with higher danger to environment and health of people. The prices of some fertilizers at survey time are as follows: 312,50-343,75 USD/ton Urea, 112,50 USD/ton Phosphate, 137,50-193,50 USD/ton potassium, 293,75-300,00 USD/ton NPK. Table 1 shows us that the costs/1 ton fresh tea for state farm households and farm households is very high, the highest is for the farm households at 168,13 USD/ton, while it is very low for the cooperative households and freelance households, the lowest is 79,38 USD/ton the freelance households.

Table 1: Comparisons of production costs, selling prices, income among surveyed groups for fresh tea. (US\$)

| Criteria | Cooperative HH | Freelance HH | State farm HH | Farm HH | Average |
|--------------------------|----------------|--------------|---------------|---------|---------|
| Costs for fertilizers/ha | 362.50 | 337.50 | 718.75 | 793.75 | 481.25 |
| Costs for pesticides/ha | 106.25 | 87.50 | 187.50 | 150.00 | 125.00 |
| Costs/ 1 ton fresh tea | 96.25 | 79.38 | 143.13 | 168.13 | 110.00 |
| Price/1 ton fresh tea | 166.25 | 138.13 | 157.50 | 137.50 | 149.38 |
| Income/1 ton fresh tea | 70.00 | 58.75 | 14.38 | -30.63 | 39.38 |
| Income/cost | 45.63 | 46.25 | 6.25 | -11.25 | 22.50 |

Source: Survey

Price

Price of fresh tea for cooperative households and state farm households is the highest with 166,25 USD/ton for cooperative households, while it is the lowest for the freelance households at only 138,13 USD/ton due to low quality and poor knowledge of market price and living conditions. The fresh tea price of farm households is the lowest because they sell only low quality fresh tea, and they keep high quality one for their process.

Income

In terms of income/1 ton fresh tea (unprocessed), it is the highest for the cooperative and freelance households, in which, the cooperative obtain the highest income of 70 USD/ton fresh tea. For the state farm households and farm household, the income/kg fresh tea is very low, even minus for the farm households. The income/production cost is only 0,36, while the average level in Thai Nguyen city is 0,80. Moreover, average yield of all house-



holds is at only 5,35 ton/ha, the state farm households have the highest yield, just 6,21 ton/ha while the average yield of Thai Nguyen city is at 7,53 ton/ha. Therefore, to increase income of producers from fresh tea production, it is very important to help them improve yield and quality of products.

3.2- Comparison of processing costs, price, income for processed tea (dry tea).

Costs

In general, the farm households and cooperative households use simple processing facilities, but mechanized. The freelance households normally hire others to process or process themselves with traditional and backward processing facilities. The Table 2 shows that the costs/ 1 ton dry tea for the farm households is the lowest at 343,75 USD/ton, while it is very high for freelance households and cooperative households, 496,88 USD/ton and 521,88 USD/ton respectively (Table 2).

Price:

Price of dry tea is opposite to that of fresh tea. The dry tea price of farm households is the highest as their tea has high quality thanks to their better processing techniques and better input materials, better knowledge of market and regular buyers. The state farm households get the lowest prices as their tea has low quality due to their input materials are those tea do not satisfy the quality requirements of the state companies. The freelance households have high processing costs, but low selling price due to many reasons such as low quality tea, lacking of market information, lacking of money for family expenditures and production leading them to sell products right after processed even at a not good price period.

Table 2: Comparisons of production costs, selling prices, income among surveyed groups for dry tea (US\$)

| Criteria | Cooperative HH | Freelance HH | State farm HH | Farm HH | Average |
|------------------------|-----------------------|---------------------|----------------------|----------------|----------------|
| Costs/ 1 ton dry tea | 496.88 | 521.88 | 382.50 | 343.75 | 436.25 |
| Price/1 ton dry tea | 2022.50 | 1856.88 | 1796.88 | 2637.50 | 1968.13 |
| Income/1 ton fresh tea | 1525.63 | 1335.00 | 1414.38 | 2293.75 | 1531.88 |
| Income/cost | 191.88 | 160.00 | 231.25 | 416.88 | 219.38 |

Source: Survey

Income:

In terms of income /1 ton dry tea (processed tea), the farm households have the highest income at 416,88 USD/ton, while the freelance households have the lowest at 160 USD/ton. The processing costs/1 ton dry tea of farm households is the lowest due to bigger scale, while it is the highest for the freelance households as they have to hire others to process their products. Income/ton dry tea of farm households is nearly 3 times higher than that of freelance households. In terms of income/costs, it is the lowest for the freelance households, equal to 1/2 that of farm households and 82,6% that of cooperative households.

The main reason is that the farm households and cooperative households rarely sell fresh tea (the farm households sell only about 10% fresh tea production). The analysis also shown that income/processing cost is much higher than income/productin cost, it is 9,75 times on average, or 3,39 times even for the freelance households. For factories with modern processing technology, profit/processing cost is about 0,4. It reminds us on 3 important points. Firstly, large scale production with adequate capital and technical conditions as well as available cooperation among households will bring more benefits than small production without any linkages. Secondly, processing is the most possible and feasible stage to help producers increase their income or added value to their products. Thirdly, if the producers are supported with modern technology, they can have larger increase of added value to their products.

4.3- General analysis of costs, selling price and income in Tea Value Chain

| Type of households | % added unit costs | % Retail price | % Unit profit * |
|---------------------------|---------------------------|-----------------------|------------------------|
| Producers | 18.49 | 4.48 | 1.44 |
| Processors | 54.98 | 54.53 | 54.43 |
| Assemblers | 2.11 | 1.69 | 1.60 |
| Wholesale traders | 6.84 | 3.37 | 2.62 |
| Retailers | 17.58 | 35.94 | 39.92 |

Note: *Unit profit here means unit income.
Source: Survey



Table 3B: Costs, selling price and income in tea value chain (in absolute figures)

| Type of households | Added unit costs | Unit margin | Unit profit* |
|--------------------|------------------|-------------|--------------|
| Producers | 109.78 | 149.38 | 39.38 |
| Processors | 326.47 | 1818.75 | 1531.88 |
| Assemblers | 12.50 | 56.25 | 43.75 |
| Wholesale traders | 40.63 | 112.50 | 71.88 |
| Retailers | 104.38 | 1198.75 | 1094.38 |

Table 3A shows that the processors represent the highest proportion in the total added costs (54,98%), following is producers and retailers, and the lowest is for assemblers and wholesale traders. The proportion of processors in price is also the highest (54,53%), following is retailers. This proportion is very low for producers, assemblers and wholesale traders, the lowest is for the assemblers at only 1,60%. In terms of income, the processors represent the highest proportion (54,43 %), next is retailers (39,92%). From here, we can see that the processors and retailers have high costs, but high income. In opposite, producers bear high costs, but low income (1,44%).

Assemblers and wholesale traders have low proportions of income, a little higher than that of producers, but they still have good income due to large transacted volume. Therefore, processing is probably a very potential stage that the small producers can be supported to increase the most value to their products. In additions, if small producers are well supported in marketing their products, the chance for increasing added value to their products and income will be bigger.

According to the result of ADB research, assemblers and traders have similar unit profits (roughly 3,13 USD/ton), although higher volumes managed by traders imply a higher profitability. From the standpoint of processors, profits from green tea were higher than those from black tea. Also in this research, at the producer level, the production costs represent the majority in the value chain (70%). Household producer-processors receive a much higher share of profits (31%) in the value chain, suggesting greater gains within the chain by adding value through processing. The highest share of profit (46%) is found among retailers.

IV- CONCLUSIONS

Production:

In general, scale of production is small, cultivation level low, old varieties still used, yield and quality of products low and in uniform, fertilizers and pesticides abused. Households lack of information, technical training, capital, especially freelance households. Many households linked and cooperated with each other to produce safe tea and organic tea, but facing such difficulties as low yields, low quality of products, selling price is just the same, a little higher, even lower than that of conventional tea, and it is difficult for consumers to differentiate safe tea, organic tea and conventional tea,...

Processing:

Material input is not stable, quality of input is not high; processing technology is low, processing facilities simple, except some big companies, joint-venture companies, therefore, it is difficult to produce diversified products with high quality; many processing establishments just concentrate on expanding their scale, not yet focus on investing to improve processing technology. Products of contracted market channel are mainly processed with modern technology and are mainly for export markets, therefore, much depending on export market. For the other market channels, processing technology is simple, quality of processed tea low, especially that of freelance households. Their products are mainly for domestic market.

Marketing:

In the contracted market channel, producers (state farm households) do not have much influence on selling price. It is decided by the enterprises, but in return, they can enjoy social welfare and stable output. Farm households have strong influence on price, while freelance households seem to be price takers

Linkages in production and marketing:

With the support from local authorities, mass organizations and NGOs, the linkages and cooperation in production and marketing is promoted and obtained some achievements. However, these linkages and cooperation just concentrated on production and are limited in marketing.

Income:

The analysis shown that income from production is low, income from assembling and wholesale is mainly based on quantity of transacted products, while income from processing is the highest.

RECOMMENDATIONS

1. It is necessary to provide technical training for producers so that they can improve yield and quality of products.
2. Support them with capital, market information, especially for freelance households; promote production of safe tea and organic tea, particularly safe tea.
3. Support households to expand and improve processing technology. It's practical to support freelance households with simple processing and preserving facilities so that they are able to improve their income.
4. Issue policies to support to improve market channels, information and advertisement campaigns, establish trade marks for tea production area or tea production and processing establishments.
5. Strengthen close cooperation and coordination among local authorities, mass organizations and NGOs in assisting farmers.

About the LSFM Program

The fast pace of agricultural trade liberalization and the opening up of various market offers both threat and opportunity for small farmers in Asia. In the liberalized market, small farmers and agricultural producers are unable to maximize the benefits of their production efforts. The income derived from farming is low because they are unable to benefit from the price differential that happens after their produce leaves the farm and reaches the consumers. Moreover, various studies have already shown that most small farmers have lost their livelihoods due to the influx of cheap agricultural product from other countries. However, there are also successful cases where farmers with appropriate support were able to capture opportunities in the liberalized market.

This project will focus on building the capacity of women and men leaders of small farmers' organization and cooperatives together with their partner NGOs/agri-agencies to respond to agricultural marketing issues confronted by small farmers and producers. It shall undertake the formation and or strengthening marketing intermediation mechanisms that will link small farmers to the markets, reduce transaction costs and increase the benefits of small farmers in the process of engaging with the market.

LSFM is currently being piloted in Cambodia, Philippines and Vietnam with the support of the ASEAN Foundation and in Indonesia with the support of the World Rural Forum (WRF).

About AsiaDHRRA

The Asian Partnership for the Development of Human Resources in Rural Asia (AsiaDHRRA) is a regional partnership of eleven social development networks and organizations in ten Asian nations that envisions Asian rural communities that are just, free, prosperous, living in peace and working in solidarity towards self-reliance. Its mission is to be an effective promoter and catalyst of partnership relations, facilitator of human resource development processes in the rural areas and mobilizer of expertise and opportunities for the strengthening of solidarity and kinship among Asian rural communities. AsiaDHRRA's regional policy advocacy work has always been anchored on its commitment to bring forward the voices of its partner peasant organizations to the frontline of the advocacy arena. AsiaDHRRA organized the five Farmers' Exchange Visits which eventually led to the formation of the Asian Farmers Association for Sustainable Rural Development (AFA)

About the ASEAN Foundation

Established by the ASEAN Leaders on 15 December 1997 during ASEAN's 30th anniversary, the ASEAN Foundation aims to help bring about shared prosperity and a sustainable future for the peoples of ASEAN whose member countries are Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, the Philippines, Singapore, Thailand, and Viet Nam. The Memorandum of Understanding on its establishment was revised in July 2000 and ratified by all ten member countries in July 2007. The Foundation has two objectives:

- promote greater awareness of ASEAN, and greater interaction among the peoples of ASEAN as well as their wider participation in ASEAN's activities inter alia through human resources development that will enable them to realize their full potential and capacity to contribute to progress of ASEAN Member States as productive and responsible members of society
- endeavour to contribute to the evolution of a development cooperation strategy that promotes mutual assistance, equitable economic development, and the alleviation of poverty.

On 20 November 2007, the ASEAN Leaders signed the ASEAN Charter at their 13th Summit held in Singapore. Article 15 of the ASEAN Charter mandates the ASEAN Foundation to:

- support the Secretary-General of ASEAN and collaborate with the relevant ASEAN bodies to support ASEAN community-building, and
- promote greater awareness of the ASEAN identity, people-to-people interaction, and close collaboration among the business sector, civil society, academia and other stakeholders in ASEAN.

The ASEAN Foundation is based in Jakarta, Indonesia.

