



Southeast Asian Network for Agroforestry Education

Cashew nuts supply chains in Vietnam: A case study in Dak Nong and Binh Phuoc provinces, Vietnam

Case study in Vietnam prepared for SEANAFE's 2nd Regional Workshop on
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ABSTRACT

Derived from the hedonic pricing model under households' perspective, this study analyzes factors affecting cashew nut's farmgate price variation in Binh Phuoc and Dak Nong provinces in 2006. The estimation model indicates that increase in quality or price information attainment helps to improve farmgate price. Farmers in indebtedness circumstance and/or having a few choices of buyers receive lower farmgate price than those without any selling obligation. Infrastructure creates a positive impact on farmgate price. More educated farmers receive higher price for their more adaptation to market and advanced technique in production. While there has remained a lack of formal sources of market information, transactions under non-competitive relationship; an improvement of farmgate price and efficiency in agricultural market have required the government, related institutions, processing enterprises and farmers' participation to take into account some issues of infrastructure and purchasing service, more effectively accessible sources of market price information, the coincidence between technical support and marketing consultation under a package of the government's strategic policies.

The analysis of value added in the supply chain of cashew nut bean has proved that the monthly farmers' earnings are lowest among stakeholders. There has a concern that a high vulnerability in cultivation has however obtained a moderately low gain compared to other stakeholders in the cashew nut supply chain. However, by performing post-harvest activities for their own processing business, farmers can gain a profit of 10% in selling price of cashew nut kernel in addition to 5% of labor cost arriving either to their own pocket or to hired labor.

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1. INTRODUCTION

1.1 PROBLEM STATEMENT

Dak Nong and Binh Phuoc provinces are typical upland in Vietnam. There are approximately 20% and 40% ethnic minorities in corresponding Binh Phuoc and Dak Nong provinces (Binh Phuoc GSO, 2006; DaK Nong, GSO, 2006). The provinces have encountered several upland matters including poor infrastructure, relatively low educational level, poor information on advanced technologies, poor access to market and instable crop harvest. Especially, the poor access to market resulting from poor infrastructure, a lack of marketable supports, household's inadequate bargaining position has become a growing concern.

The people's livelihoods in the provinces, especially the poor and the native people largely depend on forest-based activities and AFTPs. As farming systems is gradually changed from shifting cultivation to settle agriculture with more agroforestry oriented, cashew nut tree is the suitable tree to the ecology condition in the provinces besides other industrial crops including pepper, cashew, coffee and rubber. Among these industrial plants, cashew nut becomes one of the most important sources of households' livelihood, especially the poor and/or ethnic minorities for its popular plant with stable price, low investment cost and simple cultivation requirement. As a plant under the government's 327 program for the green cover for virginal upland and hills, cashew nut has played an important socioeconomic role and been an essential source of food security and cash income in the area with nearly 25 percent⁴ Binh Phuoc local households' cultivation, especially to the ethnic minority people in the improvement of living conditions (GSO, 2002; DoTT, 2001).

For farmers, income is derived and strongly affected by their produce's farmgate price. Unfortunately, farmgate price of cashew nut is inadequate, as it does not correspond to its appropriate market value due to the above-mentioned constraints. In perspective of households, the local market limitations' growing concerns have been revealed as follows:

- Infrastructure development and availability of purchasing services have affected farmgate price;
- Restriction on information has made farmers unable to reach the market price;
- Some constraints on crop finance cost, working capital and certain non-competitive relation induce farmers to lose out on competitive price for their indebtedness.
- Lack of the linkage among the producers with the participation of community-based organization in the supply chain have excluded small farmers and ethnic minority to access a shorter chain in their cashew nut supply;
- Post-harvest activities at household level to increase value added

Objective of the study

As an efficient agricultural market is getting more essential strategies for transforming land and other assets into the livelihood outcome, the research of affecting factors of farmgate price is found crucial for more profitable participation of farmer into the market and obviously then for agriculture and rural development. Once the underlying factors are significantly detected, the more actionable supports need attention to such impacts regarding the government's policies.

In view of current constraints on farmers' access to cashew nut market in Dak Nong and Binh Phuoc provinces, the research focuses on the determinants of farmgate price under households' perspective. These are directly involved to their cashew nut transaction including product, size of

transaction; infrastructure and availability of purchasing services; purchaser who makes transaction with households, households' characteristics and their follow-up of market information.

This study leaves out for further research on related macro-variables; the other indirect market factors as well as the cashew nut's economic value allocation among market participants. Such a research would be able to cover the whole feature of cashew nut market system.

Concerning the differences in production scale, market favorableness, ethnic groups and value added in the supply chain, an analysis of cost and benefit in the supply chain of cashew nut bean and cashew nut kernel and a comparison among different supply chains are examined in order to get insights of farmers' selling practices and their preference of marketing outlets. For this, in-depth interviews of various stakeholders along the different supply chains have been implemented, with a special focus on constraints and opportunities as regards the different existing value chains, relationships between buyers and purchasers as regards distribution of information, commitments, risk sharing, input and service supply; advantages and drawbacks of farmers; quality control; costs and benefits; prospects.

In short, the study focuses on the two main objectives: exploring the affecting factors of cashew nut farmgate price in households' transaction and analysis of value added in the supply chain to assess marketing performance of different farmer groups in Binh Phuoc and Dak Nong provinces.

1. 2 RESEARCH QUESTION

General research question

- What are determinants of cashew nut's farmgate price in Binh Phuoc and Dak Nong provinces from households' perspective and how to increase cashew nut's farmgate price?

Specific research questions

- Among factors including cashew's quality and quantity (or transaction size), season (time of selling), distance, buying competitiveness, household's characteristics and bargaining position, infrastructure and information; which variable is statistically significant to farmgate price?
- What are the linkages amongst stakeholders in the cashew nut value chain including costs, margins and benefits occurring along the value chain at each stage of the plantation and processing?
- Which supports do households expect from the government to improve their cashew nut's farmgate price?

1. 3 RESEARCH HYPOTHESES

- Factors including quality and quantity of cashew, season, distance, buying competitiveness, household's bargaining position, and infrastructure are all statistically significant to farmgate price.
- While the ethnicity variable does negatively impact on the farmgate price, the educational level and the female sex of selling person creates the positive ones.
- Households with more information will obtain higher farmgate price.
- The fewer middlemen appear in transaction, the higher price farmers expectedly obtain.
- The ethnic minorities, small-scale farmers are expectedly excluded from directly – selling practices for their small transaction and unfavorable market infrastructure.

1. 4 DATA COLLECTION AND METHODOLOGY

A linear regression is applied in this study to find out the determinants of the cashew nut farmgate price. Dependent variable is cashew nut's farmgate price received by household during the studied year 2005 and explanatory variables are infrastructure, buyer, product, household characteristics, seasonal effects and information.

In-depth interviews of various stakeholders along the market chain in each particular farmer group is implemented to get insights of farmers' transaction and to assess their cashew nut marketing performance. A qualitative description is to demonstrate alternative cashew nut supply chains and their characteristics in the marketing performance of different groups in the two provinces.

Data sources

Secondary data are collected from Department of Statistics, the DARD, DoTT, districts and commune officers in Binh Phuoc and DakNong provinces. Primary data will be obtained from the household survey and the in-depth interviews.

Study site and interview areas

DakR' Tih commune, Dak R'Lap district is the study site in Dak Nong Province for its populousness of ethnic minorities (80% of total population in the commune). In Binh Phuoc province, Bu Dang, Phuoc Long and Dong Phu are three selected districts in view of the largest crop volume and highest plantation households in the whole province, the high percentage of ethnic minority farmers in Bu Dang, the high market infrastructure in Dong Phu and the high production scale in Phuoc Long

Questionnaire and sample size

The questionnaires are designed to interview all stakeholders in the value chain of cashew nut including farmers, traders and manufacturing companies. For farmers, it is to explore three main areas namely, general households' information, transaction behaviors and factors determining farmgate price under the hedonic pricing approach. The interviewees are persons who take responsibility of household's cashew nut sale, commonly household's head. The sample size is 100 households under cashew plantation at least three years old. There are possibly two to five different cashew nuts' farmgate prices for all transactions during the study year. Totally, 253 observations/transactions conducted by these 100 households entered into the estimation.

For traders and processing company, a semi-structure questionnaire will be utilized in the in-dept interviews with stakeholders in alternative cashew nut supply chains. These questionnaires aim to analyze cost and benefit in their cashew nut business, their trading relationship. There are 18 samples of traders including purchasing station level 01, purchasing station level 02, and dealers in the two provinces. As in DakNong province there is not any purchasing station level 01, trader interviewees are only dealers and purchasing station level 02. There are also two samples of processing companies, one in Binh Phuoc province and one in DakNong province.

1. 5 STRUCTURE OF THE PAPER

The paper is structured in five sections. Following this introduction we provide a brief literature. Section three introduces the cashew nut industry in Vietnam. Section four explores the main research results including value added analysis, descriptive analysis of affecting factors on farmgate price and regression model. The final section draws together the main conclusions.

2. LITERATURE REVIEW

2.1 BASIC CONCEPTS

Price and agricultural prices

Generally, as defined in Macmillan Dictionary of Modern Economics (Pearce, 1992: 340), “The price of a good or input shows what has to be given up in order to obtain a good or service. It is usually denoted in money terms although payment need not be in a monetary form.”

Agricultural product prices have some specific characteristics. According to Tomek and Robinson (1990), how agricultural prices are determined depends on government regulations and market conditions. In addition, prices of agricultural products are more volatile than those of non-agricultural ones. The level of farm incomes is strongly influenced by agricultural product prices.

Farm-gate price

Farm-gate price is simply defined as the price that has farm-gate to be the pricing point. Farm-gate has certainly been understood as the geographical site or the object who receives the price. Our interest is the latter one. The term farm-gate price in this study reflects the one that farmers receive although farmers sell their products at farm, at home or any other places.

Farm-gate price determination

Evidently, price is determined by the supply and demand in the market. More particularly for the case study of cashew nut, on the basis of the price of processed cashew nut in the market either domestic or international, the processing companies firstly determine the purchasing price of cashew nut bean to their level 01 purchasing stations⁵. These stations accordingly decide the price to their sellers who are purchasing stations level 02, dealers or farmers. Purchasing station level 02 and dealers in turn point out the farm-gate price of cashew nut bean to farmers. These operations do work under a marketable manner. As most of cashew nut bean in Binh Phuoc province are exported from processing companies; the main market factors are the exporting price of processed cashew nut in the international market that the Vietnamese processing companies can obtain in the international market and the volume of cashew nut bean supplied from farmers in each annual crop and others macro factors.

Apart from these aspects, there have appeared differences in farm-gate price among farmers within a range of change in price in each annual crop. The study focuses on this disturbance variation in farm-gate price of cashew nut among farmers during the annual cashew nut crop. To understand influencing factors that contribute to farm-gate price, one of popularly used methods is Hedonic price model. Thus theories forming the environment for hedonic price model will in turn be examined before this model is taken into account in detail.

Table 01. The disturbance variation in farm-gate price of cashew nut

Year	Variation in farm-gate price (VND/kg)	Average price* (VND/kg)
2003	8,200 - 6,000	7422
2004	10,000 - 7,000	
2005	16,000 - 11,000	

⁵ Purchasing station level 01 sells cashew nut bean directly to processing companies, while purchasing station level 02 after collecting cashew nut bean from farmers or dealers, can only resells to purchasing station level 01, not directly to processing companies.

Source: Informal data from the local officials

Note: *: data from survey in 2003 and 2006

Transaction Cost

Ronald Coase (in Escobal, 2001: 2), who initiates the ideas for Transaction Cost Theory, argues that market exchange has costs. He also emphasizes the important role of transaction costs in “contractual arrangement”. Market transactions occur based on the principle of minimizing transaction costs. According to Escobal (2001), transaction costs can be grouped into three types: information, negotiation and monitoring. Due to the existence of transaction costs, farmers may have more chances to integrate into the market as transaction costs are lowered (Escobal, 2001). Thus transaction costs are closely related to and have significant impacts on transaction among parties including farmers and dealers, then result in certain effects on farmers’ selling price.

Market efficiency is understood as both economic and social ones such as “cost savings”, “improvement in agency costs”, and the formation of more efficient market structures (Gu and Hitt, 2001: 85). The latter may result from either economic or social efficiency. In agricultural market, market efficiency can be interpreted as reducing unreasonable costs occurred to both farmers and dealers. The formation of more efficient agricultural market structures in which farmers are not inferior also reflects the importance of market efficiency in improving farmers’ selling price.

The above theories have formed the environment in which factors affecting farm-gate prices can be addressed in Hedonic price model.

2.2 LITERATURE REVIEW ON HEDONIC PRICE MODEL

Being popularly used, hedonic regression is a method in which the price of goods is expressed as a function of characteristics of those goods (Silver,?; Portugal and von Oppen, 1999). Thus price is the dependent variable and products’ characteristics are independent variables. The estimated coefficients can be considered as contributions of those characteristics to the prices. Dummy variables are employed to represent non-numerical characteristics of goods.

Since the study aims to examine factors affecting farm-gate price, those factors will in turn be discussed into 6 groups: infrastructure, buyers, product, household characteristics, seasonal effects and information.

Infrastructure

According to Harrigan *et al.* (1992), infrastructure development has affected producers, traders and consumers depending on pricing and marketing systems. Due to these influences, traders often try to bargain to lower producer prices when they have been in difficulties reaching the farm-gate. Minten (1999) has mentioned that the distance to main road, the road quality and the access to other infrastructure have closely been related to price variation. Communities with low level of infrastructure incur lower prices than others with better infrastructure conditions. Minten (1999) also concludes that an improvement in infrastructure can help to improve producer prices, to reduce variation in price and to widen access of farmers to the market.

Buyers

Minten (1999) also discussed about the number and type of traders when examining the determinants of market access and prices. He stated that farmers could obtain higher selling prices when they can choose traders. Thus the more the number of traders is, the better the possibility of farmers to choose whom to sell.

The farmers’ choice in deciding whom to sell also reflects their power in negotiating with buyers. Escobal (2001) raised the problem of remote farmers in choosing traders since very few traders

come to see them. If there is only one buyer, farmers have no choice except selling their products to that buyer. Oppositely, if there are many buyers, farmers can have an opportunity to choose the ones they want to sell their products to. Farmers may choose this buyer instead of others due to many reasons including the previous relation between farmers and buyers.

Product

Factors concerning about product are the quality, grading or ranking, the quantity, and types of products sold. Referring to the price differences associated with quality, Tomek and Robinson (1990) emphasized that the quality characteristics of agricultural products such as size, color, moisture level, protein content, and the ratio of defects or impurities can make differences among agricultural products. Differences in quality create difference price levels of products sold. Thus, quality is one important factor deciding whether the selling prices are high or low.

The more abundant the quantity of a product, the lower its price is. Concerning our case, the relationship between the quantity of products and the selling prices he can get are intended to be analyzed. Finally, the types of products sold have also influenced the selling prices. Products can be sold in different types such as in fresh, after being dried, before harvest time, in package and others. Each of these types of products sold decides the selling prices that farmers receive.

Household characteristics

As mentioned in the market bargaining power of farmers, some characteristics of households will be chosen as factors that influence the ability of farmers in negotiating with traders, then affecting selling prices farmers get. Those characteristics cover job, educational levels, ethnicity, and experience in cashew production of sales-decisive person.

Experience in cashew production is measured by the number of years that household heads have been involved in cashew production. The inclusion of experience in the study implies that farmers with a long time involved in cashew production have more bargaining power and thus obtain higher prices than those who get less experience. According to Escobal (2001), the possibility of getting higher selling price belongs to farmers with higher education level. Thus educational level is expected to have a positive relationship with the bargaining power of farmers and also the selling prices that farmers obtain. Job and ethnicity are included based on the justification that differences in job and ethnicity will result in differences in negotiating ability of sales-decisive person.

Seasonal effects

Minten (1999) stated that agricultural production has significantly affected by seasonality. It is expected that farmers can get higher price if they sell their products in the lean season. In contrast, the prices they obtain will be lower in the harvest season since the products are abundant. To less perishable agricultural products, like cashew nut, storage to get higher prices seems to be more reasonable. However, there are also many reasons that cause farmers to sell their products immediately in the harvest season or even before the harvest season when their products are undervalued. Another cause of price differences over time can be accused for the differences in production conditions, storage and transport costs (Minten, 1999). Those factors vary through time and significantly differ between dry and rainy seasons. This is also seasonal effect that influences selling prices of farmers.

Information

Market information is a very important factor. As discussed by NDA (?), market information can help farmers to decide whether they should sell their products immediately or whether storage is necessary or not. With information, farmers know where and whom to sell. They also can check on the prices they get with the reported market prices especially in case that they sell in auction or

prior arrangements with traders. If the pattern of prices is going to rise up, storage can be a good solution. In contrast, it is not necessary to keep products in store.

According to FAO (?) farmers can use information on market to check whether the prices they get are reasonable or not. Vakis et al. (2003) conclude that transaction costs will be reduced when farmers are informed about prices information. Concerning the bargaining power, the shortage of information, late and inaccurate receipt of information may cause disadvantage for farmers in negotiating with traders and make their bargaining power weak (Poole, 2001; Escobal, 2001). As a result, farmers' selling price can be improved based on price information attainment.

2.3 LITERATURE REVIEW ON SUPPLY CHAIN

Concept of value chain

A value chain is considered as the full range of activities to bring a product from the original concept to the final consumer by going-through the different phases of growing and processing (Kaplinski and Morris, 2001, p.4). Value chain analysis focuses on not only the flow of products and services (tangible assets) along the chain, but also the flow of intangible assets (i.e. information and knowledge) and of power relations within the chain.

Concept of supply chain

Supply chain analysis is a broadly defined as successive stages of value creation and capture in a vertically organized set of stakeholders (Sergio et al., 2001, p.9). It includes all activities associated with the transformation and transportation of goods from the raw materials to the end user plus the information and financial flows.

Value - adding to agro-forestry products

Value-adding includes any process or service in the supply chain that adds to or enhances the market value of products to customers (AFFA, p.6). Richard S. and Brendan D. (2004, p. 6) concerned how a relative small share of the prices consumers pay for products is constituted the prices farmers receive for the raw commodity 'at the farm gate'. They found reasonable to ask why the difference is so great, and what could be done to capture some of that difference by performing activities beyond the farm gate. Thus, they consider possibilities those farmers can modify further process or transform the basic commodities produced on farm.

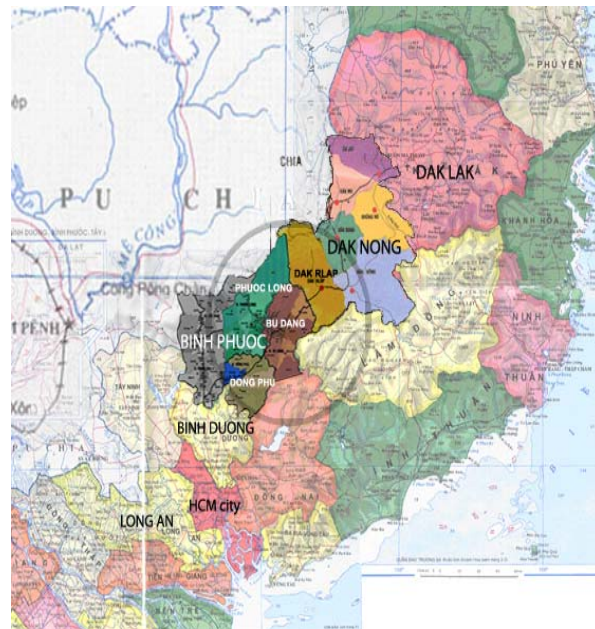
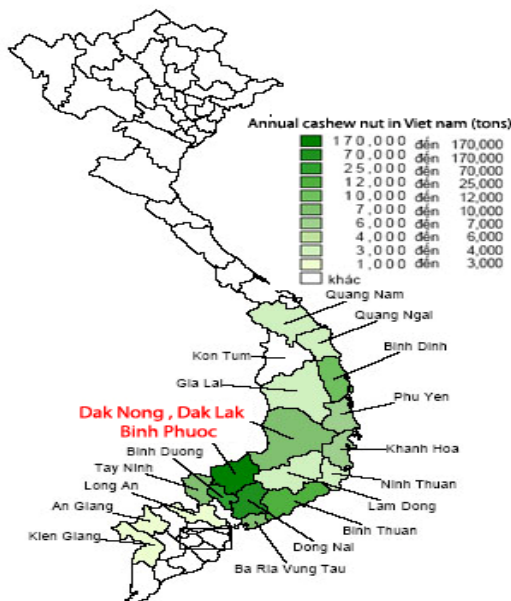
AFFA (1999, p.6) pointed that value can be added in agricultural product as a result of transforming raw products into highly processed or manufactured products, a change in the distribution between markets; or gearing toward better meeting consumer demand. Richard S. and Brendan D. (2004, p. 6) have also emphasized indirect benefits from value –adding to farmers as follows: (i) value-adding creates an additional business—often non-farm business; (ii) value adding potentially results in significant changes in on-farm production as the value-added product requires specific requirements on farming production.

However, value adding from the involvement in processes beyond the farm gate is usually attained with the capital investment, time and employment commitment. The tasks carried out in the value chain beyond the farm gate usually require a range of special skills and focuses, which may not naturally reside in farmers used to dealing with the particular challenges of farm production. Adding value to farm commodities always incurs costs as well, and the question is whether the extra value exceeds the extra costs. Among other things, it is important whether the farmer can conduct the value-adding task better than existing businesses.

'Marketing margin' is defined as 'the difference between the price paid by the consumer and that obtained by the producer' (Tomek and Robinson, 1990). The increase in this margin is associated with the added cost. However, the disparity between the added value and the added cost has motivated farmers to capture higher marketing margin through the value-adding themselves. Paul (2004) pointed that value adding performance ultimately obtains "fair" margin and price integration along the chain.

3. CASHEW NUT INDUSTRY IN VIETNAM

3.1 SAMPLE DESCRIPTION



Map 01. Annual cashew nut output in Vietnam **Map 02. Study sites of Binh Phuoc and Dak Nong provinces**

This section accordingly proceeds to provide a brief explanation of sample area, an indispensable introduction of focused interviewee, questionnaire and sample size employed in the empirical study.

Cashew nut planted areas in Vietnam have mostly been allocated in the South, especially in the Southeast of Vietnam (see Map 01). Being prominent among these provinces, Binh Phuoc and Dak Lak which has now been divided into Dak Nong and Dak Lak provinces have highly attained large planted areas and high output. Ranked number 02 among several multi-year industrial crops namely, coffee, rubber, pepper and cashew, cashew nut in Binh Phuoc province has accounted for 35% of planted areas in the whole country (see Table 02). This appreciation has come from not only cashew's highest production area, its supply for the development of processing industry, export performance but also from its important socioeconomic role to farmers (GSO 2002, p. 76; DoTT, p.134). Following coffee, cashew nut is also ranked number 02 among several multi-year industrial crops in Dak Nong province. Cashew nut in Dak Nong has achieved the highest annual growth rate of planted area, especially in 2004 and 2005 at 266% and 314% respectively.

Empirical study site

Cashew planted area has rapidly increased, posting an annual growth rate of over 10% in 2002-2005. Export performance has annually grown higher than 40% in 2001-03; in the recent two years 2004-05, though the export growth rate has not been highly achieved, it has still remained at high volume. Among districts in Binh Phuoc, Bu Dang, Phuoc Long and Dong Phu have the highest cashew nut production, amounting to 83% in total production and 85% in total output in 2005 (Appendix 2.2). These three districts have currently the highest portions of households under cashew cultivation and the largest crop volumes, reporting at 80% in total households and 84% in total cashew nut respectively; well as their different development states (Appendix 2.3). We therefore choose Bu Dang, Phuoc Long and Dong Phu for our empirical study.

In the same manner, we find Dak Rlap district as a prominent one in cashew nut production. Within the district, we choose particularly QuangTin and Dak Rtih for their highest planted areas of cashew and populousness of ethnic minority (Appendix 2.4, 2.5 and 2.6).

Table 02. Cashew plantation, output and export in Vietnam 1999-2005

	1999	2000	2001	2002	2003	2004	2005
Planted area (Ha)							
Vietnam	185,200	195,600	199,200	240,200	261,500	295,900	328,000
Binh Phuoc	64,830	70,524	69,887	95,554	99,539	107,939	116,029
Dak Nong	2,498	2,491	2,790	2,534	2,507	6,665	20,930
Gross output (Tons)							
Vietnam	35,600	67,600	73,100	128,800	164,400	204,700	232,000
Binh Phuoc	9,570	19,214	19,396	61,919	69,032	98,130	114,985
Dak Nong	759	321	1,526	1,269	1,940	3,728	6,653
Export (Tons)							
Vietnam	18,400	34,200	43,600	61,900	82,200	104,600	108,800
Binh Phuoc	1,372	1,426	2,163	3,417	4,908	5,406	4,712
Dak Nong						23,406 ⁶	7,861

Source: GSO (2006), Binh Phuoc GSO (2006), Dak Nong GSO (2006)

Sample size, questionnaires and interviewee

The questionnaires (see Appendix 01) are designed to interview all stakeholders in the value chain of cashew nut including farmers, traders (dealers, purchasing stations and manufacturing companies). For farmers, it is designed to explore three main areas namely, general households' information, transaction behaviors between household and trader and factors determining farmgate price under the hedonic pricing approach. For traders and processing company, the questionnaires aims to analyze cost and benefit in their cashew nut business, their relationship between farmers and their buyers either processing companies or purchasing station level 01.

The household interviewees are persons who take responsibility of household's cashew nut sale, commonly household's head. The sample size is 100 households under cashew plantation at least three years old. As for each household, there are possibly two to five different cashew nuts' farmgate prices for all transactions during the study year. Totally, 253 observations/transactions conducted by these 100 households enter into the estimation. Appendix 4.2 and 4.3 gives statistic description of dependent variable and explanatory ones in the empirical estimation.

As for traders, there are 18 samples of traders including purchasing station level 01, purchasing station level 02, and dealers in the two provinces. As in DakNong province there is not any purchasing station level 01, trader interviewees are only dealers and purchasing station level 02. There are also two samples of processing companies, one in Binh Phuoc province and one in DakNong province.

⁶ Export volume is higher than the output in cashew nut production in the area as the local processing companies can purchase cashew nut bean from neighboring provinces like Binh Phuoc for their processing and exporting

3.2 POLICIES AND INSTITUTIONAL FACTORS

Institutional factors in cashew nut industry

Figure 01 describes participants and stakeholders in the cashew nut industry. Farmers demand several input factors for their production which are supplied by both private and public sectors including seed, fertilizer, pesticide, irrigation, water, electricity, technology and others. While some factors are better supplied under market mechanism, other input factors have called for the GoV's participation and other supporting program such as irrigation, electricity and technology. These factors are detailed in supporting factors. Four main supporting factors in cashew nut production are technology transfer either from Agricultural Extension Center (AEC), Plant Protection Division (PPD)⁷ or directly from the research institution and universities like Nong Lam University; sale on credit support from fertilizer and pesticide companies; input support from the Government's program like supporting price of highly yielded seed and other market supports such as information on the market price in the international market.

Prominent among these four factors, technology transfer has popularly been carried out in DakNong and Binh Phuoc through the AEC, PPD, and agricultural companies under their marketing strategies, research institution and university. Farmers have received technology transfer and usually in accompany with samples of advanced seed, newly developed fertilizers and pesticide. Financial supports include supporting price of seed, and credit program which has gone together with certain kind of crops or animals under the GoV's recommendation including cashew nut as a strategic crop. The fact that has highly achieved in Binh Phuoc, not yet in DakNong is sale on credit from fertilizer and pesticide companies. A poor farmer as a member of Farmer Association can purchase fertilizer and pesticide on credit at 50%, repayable remaining 50% after their harvesting. The requirement for such a sale on credit performance is the existence of a formal organization as a legal entity in making transaction with companies. These are either Farmer Association or Farmer Club in Binh Phuoc. Though Farmer Association in DakNong has already established, it has however not performed such an activity to serve its members.



Meeting with local authorities



Research team discussion

The cashew nut industry's performance is also observed by the GoV, particularly the DARD and MARD in regard to planning on planted area, output and yield; the AEC and PPD regarding more detailed on technology, control on fertilizer and pesticide; Vietnam cashew nut Association (VINACAS) as a representative of cashew nut processing companies considering cashew nut's

⁷ AEC and PPD belong to the Department of Agricultural and Rural Development

quality and trading in the local market. In addition, individual purchaser and processing companies has also more direct control and evaluation on cashew nut's quality in the market.



Working at night with farmers



Group discussion with farmers

Cashew nut bean from farmer is sold to the market mostly into two channels (1) dealers, purchasing station level 01 and processing companies; (2) purchasing station level 02, purchasing station level 01 and processing companies. The fact that farmer sells cashew nut directly to purchasing station level 01 is so rare in Binh Phuoc. And there is no such a case in Dak Nong as there is not any purchasing station level 01 in DakNong. Farmers in some cases have kept a part of their cashew nut bean as seed in the next crop.

Some farmers have started certain post-harvest activities to increase value added in Binh Phuoc province while such activities have not yet performed in DakNong province. Processing can be divided into 04 main steps, namely drying, steaming, peeling and kernel processing. Within these four steps, the first three steps can now be carried out by farmers. Though processing companies have also performed all processing activities in their premise, they gradually hand over the first three steps to farmers and traders. Farmers conduct these post-harvest activities for their own cashew nut and then sell partially processed product (by-product) to processing companies for further processing step instead of cashew nut bean. Alternatively, farmers perform these post-harvest activities for others to receive their based-product wage as processing labor cost.

Relevant policies in cashew nut industry

- Policies on cashew plantation

Sale on credit of input production from companies: Cashew nut has now been considered as a strategic plant in Binh Phuoc and DakNong provinces. There have three main policies on plantation in Binh Phuoc and DakNong provinces. The first is sale production input on credit to farmers without any interest rate. As mentioned, this activity has not yet been achieved in DakNong. Actually, such a performance is not the GoV's policy, but it has derived from the demand and supply in the input market. Farmers have demanded fertilizer and pesticide but they are in lack of capital for investment, while input supply companies can sell these inputs on 50% credit repayable after 12 month period of this annual crop.

Supporting highly yielded seed from the GoV' s program: The program has carried out through AEC and PPD so as to encourage farmers to apply highly yielded seed, change from old variety to grafted cashew nut variety. However, the program's achievement is still a controversial issue as such a new variety application also requires high investment of capital, technology and labor which is not easily attained for the ethnic minority farmers and in remote area and poor farmers.

GoV's support for the operation of Farm Association, Farm Club and AEC and PPD: Most of these organization operations are technology transfer through training and seminars.

Other supporting policies are (1) exemption of tax on using agricultural land to perennial crops including cashew nut, (2) building up grafted cashew model and (3) credit support program in general to poverty alleviation.

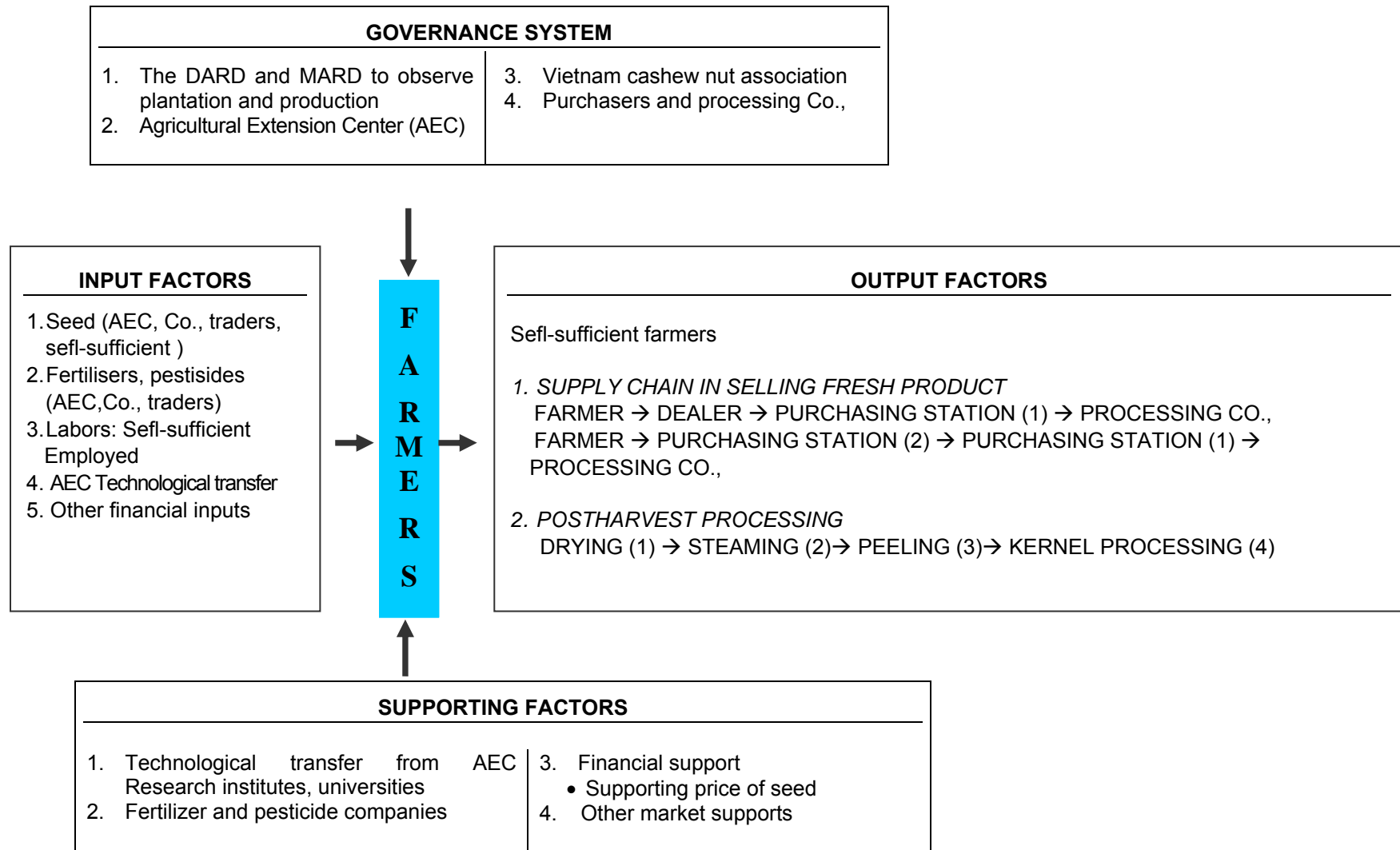
- **Policies on cashew nut trading**

Permission of newly established purchasing stations of processing companies outside the province: Since 2003, the Department of Trade and Tourism has permitted the establishment of purchasing station of processing companies outside the province. The increase in numbers of purchasing stations in Binh Phuoc province has actually enlarged the demand for cashew nut not only from local processing companies but only from processing companies outside the province.

Bonus for export volume to processing companies: This is the GoV's policy to encourage processing companies' exportation. Processing companies will receive a bonus from the GoV's budget at a certain high exportation volume.

Vietnam cashew nut Association (VINACAS) as a representative of cashew nut processing companies has also efforts to observe cashew nut's quality and trading in the local market. In 2003, it tried to determine the purchasing price among its member in the local market; the price however operated under the market mechanism. Such a price determination has not been appeared since it has been unable to put in action. In 2005 and 2006, to keep the cashew nut's quality in the local market, it has strictly observed the quality through setting up criteria for each grade. Such guidance has found useful in trading as both farmer and trader has a base in making transaction.

Figure 01. Sub-sector map



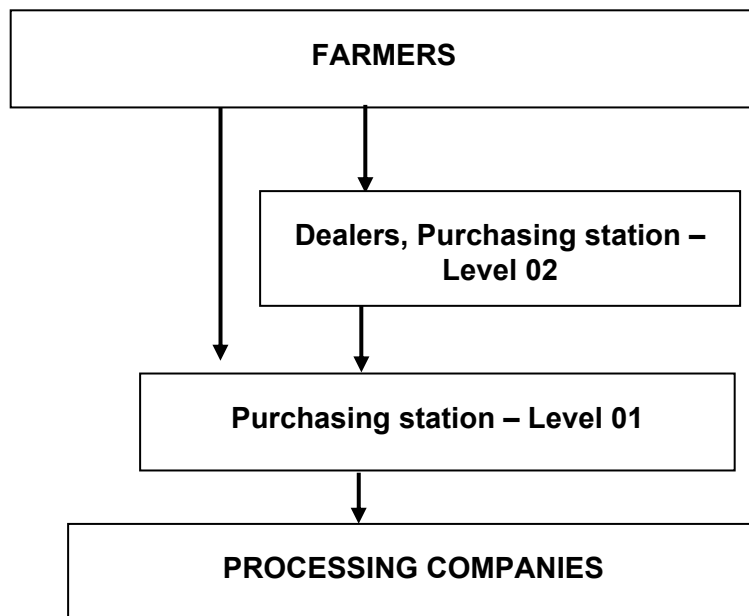
3.3 ORGANIZATION OF COMMODITY CHAINS

3.3.1 Cashew nut bean

Farmers sell cashew nut to processing companies through three channels, namely (1) direct sale to purchasing station level 01, which is so rare in Binh Phuoc province, (2) to collector/ assembler at farmer's house or farm and (3) sale at purchasing station level 02 (see Figure 02). There is not the first channel in Dak Nong as there is not any purchasing station level 01 in DakNong.



Figure 02. Cashew nut chain in Binh Phuoc and DakNong



The collector is the first link between farmer and other middlemen in purchasing system. He buys smaller lots of scattered cashew nut production by his own capital, combines and classifies these into fewer types and finally resells them at a certain location, usually a purchasing station level 01. In addition to assembly, such a person to some extent makes a deal in connection of providing transportation.

Level 02 purchasing stations, as middle-actors in cashew nut purchasing system, also purchase cashew nut from farmers and dealers, then resell cashew nut to their parent-station, that is, level 01 purchasing station. The distinction between the two levels is to whom cashew nut is resold. While purchasing station level 01 makes a direct sale to processing companies, one level 02 is unable to reach to processing factory, but distributes cashew nut to its parent-station. As a commitment in direct dealing with processing companies, purchasing station level 01 is responsible to guarantee a proposed collected amount of cashew nut in supply of material, unless it loses out on level 01 position.

About 60% of cashew nut in Binh Phuoc has provided to local processing manufactories for exportation and domestic market. Remaining 40% has distributed to other provinces such as Binh Thuan, Binh Duong, Long An, HCM city. Since 2003, under high demand for cashew nut bean as raw material in processing, Binh Phuoc has started its permission of 3,175 tons of dried cashew nut from India in 2003. According to official experts from DoTT and DARD, such an importation has not induced any impact on farmgate price because it conducted under the government's observation usually in the post -harvest time without any local supply only to sufficiently meet the demand of local processing units.

Table 03. Production capacity of cashew nut processing companies in Binh Phuoc province and Dak RLap district

	No. of processors	Total capacity
Dong Xoai	3	15,920
Dong Phu	2	170
Phuoc Long	44	22,048
Bu Dop	2	450
Bu Dang	20	5,500
Binh Long	3	800
Chon Thanh	5	3,300
<i>Binh Phuoc</i>	<i>79</i>	<i>48,188</i>
<i>Dak Rlap</i>	<i>2</i>	<i>na.</i>

Source: Binh Phuoc DOT, 2006

In DakNong, there have currently only two cashew nut processing companies; one has not yet operated and one has started its processing since 2005. The latter has its own purchasing station in Binh Phuoc province. Cashew nut in DakNong has actually arisen in the recent three years, mostly in DakR'Lap district. Accordingly, the purchasing capacity has not well established without any purchasing station level 01. There has only purchasing station level 02 and dealers in this study site.

In Binh Phuoc, the highest purchasing capacity has attained in Phuoc Long due to its highest supply cashew nut capacity, its long and high development state regarding portion of urban population, infrastructure and motorway status (see Table 03, Appendix 2.3). Being separated from Dong Xoai since 1999, Dong Phu's development state is not as high as Dong Xoai - the most developed precinct and such development state has not caught up Phuoc Long. Though Bu Dang is the worst among three districts, it has also many processors. The number of purchasing stations and processing units partly somewhat reflect purchasing activity because they are only quantitative numbers. Due to the second position in cashew nut supply, these numbers in Bu Dang are quite high. However, its purchasing capacity each is still low and scattered at small scale. The appendix 2.3b has provided Binh Phuoc purchasing availability in 2003, since then on, the number of purchasing stations has not been observed and collected as it can be increased under the market mechanism.

3.3.2 Processed cashew nut at household level

Within the four main steps in processing, namely drying, steaming, peeling and kernel processing, the first three steps can now be carried out by households. Though processing companies have also performed all processing activities in their premise, they gradually hand over the first three steps to households which are farmers, traders or household processors. Farmers conduct these post-harvest activities for their own cashew nut and then sell partially processed product to processing companies for further processing step instead of cashew nut bean. Alternatively, farmers perform these post-harvest activities for others to receive their based-product wage as processing labor cost.

Some households have started certain post-harvest activities to increase value added in Binh Phuoc province while such activities has not yet performed in DakNong province. It is because cashew nut plantation has just developed in DakNong in the recent five years and thus purchasing and processing infrastructure has not so well-established so as to spread to households.



Cashew nut drying and steaming at household level



Cashew nut peeling at household level (relatively small investment in equipment, tool and labor)

4. SURVEY RESULTS

Survey results include five main parts. The first presentation is a description of value added in the supply chain of cashew nut bean. The discussion then moves to the post-harvest activities at household level in Binh Phuoc province which has not been performed in DakNong province. The third part aims to provide a descriptive analysis of the impact of explanatory variable on the dependent variable of cashew nut farmgate price in the household survey. The regression result of cashew nut's farmgate price is presented in the next part. Some recommendations for the cashew nut farmgate price improvement are then drawn out in the final part of the discussion.

4.1 VALUE ADDED IN THE SUPPLY CHAINS

This presentation aims to analyze the value added in each trading point in the distribution chains of cashew nut. To analyze the cost and benefit of each stakeholder in the value chain of cashew nut from farmer to the processing company, we first consider farmers' production costs (see Appendix 3.1), and then trace the value added in the cashew nut value at the point of processing company. We examine the three supply chains in Binh Phuoc province, including (i) farmer – purchasing station level 02 – purchasing station level 01 – processing company, (ii) farmer – collectors – purchasing station level 01 – processing company, and (iii) farmer - purchasing station level 01. While the first two chains are common, the latter is so rare with the large scale production. The present of distribution of costs, profits, margins for the first chain are in Tables 4.1 and 4.2. The second chain's analysis is in Appendix 3.5.1 and 3.5.2.

Table 4.1 Distribution of costs and profits in cashew nut value chains

Actors/cost items in the value chain	Unit*	Value	%
• Farmer			
Total cost	d/kg	2,637.31	30.91
- Initial investment cost	d/kg	162.31	
- Annual cost	d/kg	2,475.00	
Farmers' net profit	d/kg	5,494.69	64.40
Farmgate price	d/kg	8,132.00	
• Purchasing station level02			
Margin (selling price – purchasing price)	d/kg	200.00	
Total cost	d/kg	132.10	1.55
Cost of capital		6.69	
Normal loss	d/kg	80.00	
packing	d/kg	14.81	
weighing machine	d/kg	2.30	
labor cost	d/kg	22.91	
transport cost and communication	d/kg	5.00	
Profit	d/kg	67.90	0.80
Purchasing price of Level01	d/kg	8,332.00	
• Purchasing station level01			
Margin	d/kg	200.00	
Total cost	d/kg	101.72	1.19
Cost of capital		22.82	
Normal loss	d/kg	0.00	
packing	d/kg	32.67	
weighing machine	d/kg	0.88	

labor cost	d/kg	23.18	
transport cost and communication	d/kg	22.00	
Profit	d/kg	98.28	1.15
Purchasing price of processing company	d/kg	8,532.00	
Total profit	d/kg	5,660.87	

Source: Survey data, 2006; 1 USD is equivalent to 15580 VND

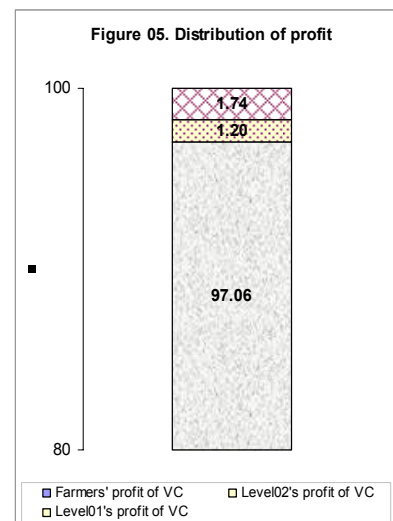
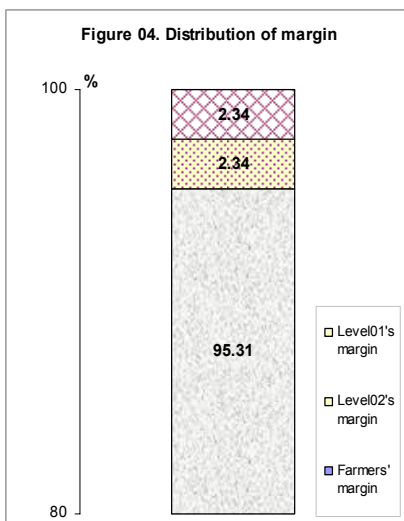
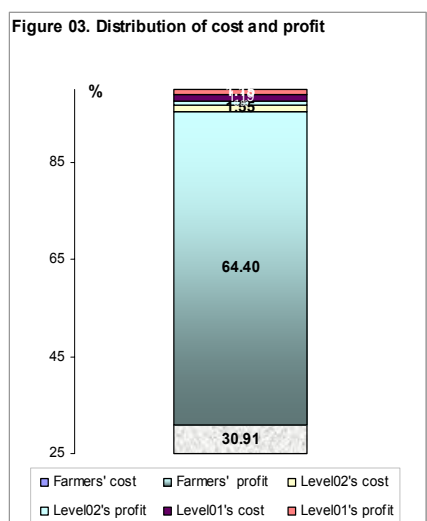
Note: Margin is the different between selling price and purchasing price.

We calculate the value added during the first supply chain (see also relevant calculation of farmers' production cost in Appendix 3.1, cost and profit of purchasing station level 01 in Appendix 3.2, cost and profit of purchasing station level 02 in Appendix 3.3 and cost and profit of dealers in Appendix 3.4). Appendix 3.1 indicates that farmers' production cost per kg cashew nut is from 1,037 VND to 4,560 VND depending on their initial investment cost, annual cost, the farmgate price and the yield. Accordingly, farmers have obtained a profit level on 01 hectare during 12-month period of the cashew nut annual crop, ranging from 1,916,754 VND to 10,251,667 VND. While the calculation in Appendix 3.1 is separated in two cases of Kinh and ethnic minority farmers in the three districts, the calculation on cost and profit distribution in Table 4.1 is the chosen case in Phuoc Long, Kinh farmer with the production cost per kg of 2,637.31 VND using the average cashew nut farmgate price in the survey of 8,132 VND/kg. Operation costs of purchasing station level 01 and level 02 is obtained from Appendix 3.2 and 3.3, getting the average result in Binh Phuoc province. The percentage of profit, cost and margin has been indicated in Table 4.2, Figure 3, Figure 4 and Figure 5.

Table 4.2 Distribution of costs and profits in cashew nut value chains (%)

Figure for graphs (in %)	100	100	100		
Farmers' cost	30.91	Farmers' margin	95.31	Farmers' profit of VC	97.06
Farmers' profit	64.40	Level02's margin	2.34	Level02's profit of VC	1.20
Level02's cost	1.55	Level01's margin	2.34	Level01's profit of VC	1.74
Level02's profit	0.80				
Level01's cost	1.19				
Level01's profit	1.15				

Source: Survey data, 2006





Cashew nut transaction at purchasing station level 02

Though the farmer's profit in each kg has highly been achieved, their monthly earnings are not corresponding high for the two reasons. First, the calculation does not take into account the economic of scale effect (or operational capacity of each stakeholder). While the middle men like collectors and purchasing station easily operate at several hundred tons in 3-4 months, farmers has only attained moderate output depending on their planted areas and yields. Second, farmers have cultivated in the year all whereas traders have performed their business only in the 4-month harvesting period of time. Thus, the estimation of monthly earnings of each stakeholder in the cashew nut supply chain is additionally presented in Table 05.



Purchasing station level 01



Cashew nut storage at purchasing station level 01

Table 05. Estimation of participants' monthly earnings in distribution chains

	Profit (d/kg)	Capacity (kg)	Time (month)	Earnings (d/month)
• Farmers				
+ Farmer 1	5,494.69	6,000	12	2,747,347
+ Farmer 2	6,623.00	2,000	12	1,103,833
• Collector				
+ Collector 1	147.95	55,000	1.1	7,397,475
+ Collector 2	150.10	42,500	1	6,379,167

• Purchasing station (level02)				
+ Binh Phuoc	68	730,833	3	16,565,556
+ Dak Nong	172	257,333	3	14,753,778
• Purchasing station (level 01)				
+ Binh Phuoc	98.28	1,275,000	4	31,326,750
+ Dak Nong	99.60	1,500,000	3	49,800,000

Source: Survey data, 2006

Table 05 shows that the monthly farmers' earnings are lowest among stakeholders in the chain. A high vulnerability in cultivation has however obtained a moderately low gain compared to other stakeholders in the supply chain. The remaining stakeholders' monthly income is found higher according to their trading capacity. To attain such a high trading capacity, traders have to put in their business capital both for purchasing cashew nut, not being taken into account in the calculation and for previous funding to farmers which has considered as a cost of capital in the calculation.

4.2 POST-HARVEST PROCESSING AT HOUSEHOLD SCALE

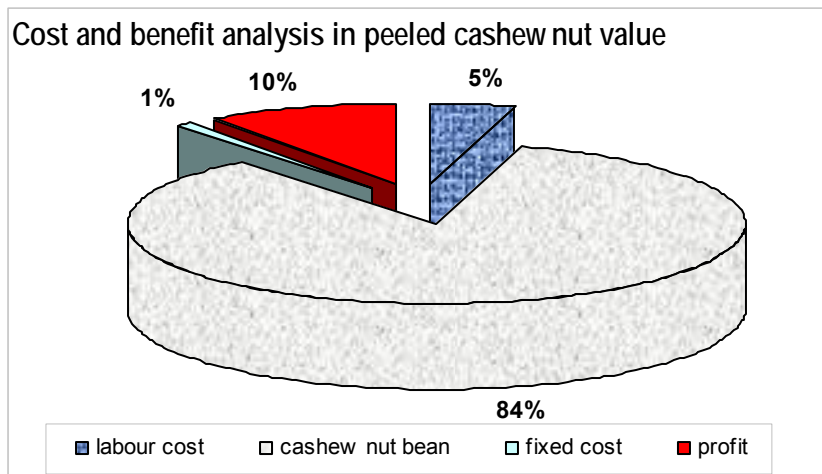
As presented, some households have started certain post-harvest activities in Binh Phuoc province. Within the four main steps in processing, namely drying, steaming, peeling and kernel processing, they can perform the first three steps either for their own investment or for a based-product wage as processing labor cost. Cost and benefit analyses are then conducted in these two situations (see Table 06 and Table 07).

Table 06. Analysis of cost and benefit of peeling - Farmer's own establishment

Cost/Income items	Unit	Value	
Kernel selling price	d/kg	40,000.00	
Output (kernel/1000 kg cashew nut bean)	kg	240.00	
Income on kernel sale	VND	9,600,000.00	
<i>Direct cost</i>			
Cashew nut bean as raw material	kg	1000.00	
Opportunity cost of cashew nut bean	VND/1000 kg	8,132,000.00	84.71
Labour cost	VND/1000 kg	435,000.00	4.53
<i>Indirect cost (cost in a month)</i>			
Depreciation	VND/01month	8,333.33	
Rental of premise	VND/01month	100,000.00	
Knife sharpening	VND/01month	25000.00	
Fixed cost in a month	VND/01month	133,333.33	
Capacity	kg/01 month	1,724.14	
<i>Fixed cost per 1000 kg cashew nut bean</i>		77,333.33	0.81
Total cost		8,644,333.33	
Profit per 1000 kg cashew nut bean		955,666.67	9.95
Profit on peeling in a month		1,647,701.15	

Source: Survey data, 2006

As doing their own processing business, farmers can additionally obtain 956 VND/01 kg cashew nut bean or equivalently 10% in selling price of cashew nut kernel. Farmers can gain monthly earnings for their post-harvest peeling of 1,647,701 VND with a normal processing capacity of 1000 kg cashew nut bean. This income is relatively high and stable in comparison with their farming. More importantly, farmers can make the best use of their working time after harvesting cashew nut.



The requirements for such post-harvest activities are the two things: (1) initial investment in equipment, premise and labor skill after a week-practice; (2) a contract with processing companies to collect their by-product. An affordable equipment investment includes an iron barrel and a peeling machine at a total cost of 1,000,000 VND (see Photo in Part 3.3.2). To obtain a contract with processing companies, the household has to obtain a rather high processing capacity. For this reason, some small – scale farmers have been discouraged to conduct post-harvest activities. And thus, this processing situation is normally performed by collectors, purchasing station, or large-scale production farmers.

Table 07. Analysis of cost and benefit of peeling - Farmer working in a peeling establishment

Cost/Income items	Unit	Value
<i>Seasonal income on peeling</i>		
Income per kg of kernel	VND/01 kg	1,800
Capacity in a month	kg of cashew kernel	600
Earnings in a month	VND	1,080,000

Source: Survey data, 2006

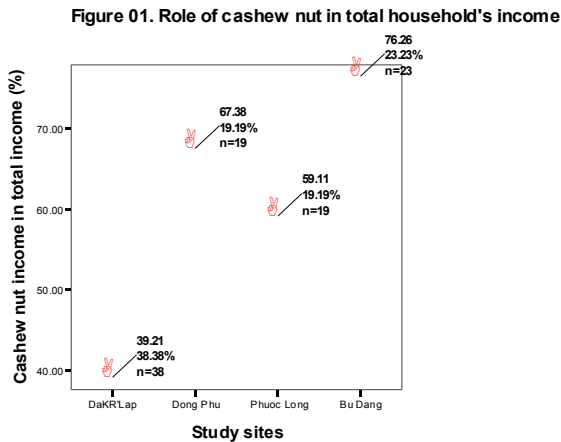
Being a hired labor in these processing premises for a based-product wage; a farmer can obtain a seasonal monthly income on peeling of 1,080,000 VND. This income is also acceptable and nearly equals their farming income.

In summary, the post-harvest activities to cashew nut has been found not only feasible and profitable in case of either doing their own business or hired labor. Such activities should be handed over farming households so that they can increase value added in their cashew nut bean, and thus increase their earnings. As performing such post-harvest activities, farmers more or less perceive the quality requirement in their cashew nut bean and will improve their farming as a result. As most of farmers have gradually invested in large – scale production, these post-harvest activities seem to be achievable and progressive in the coming years.

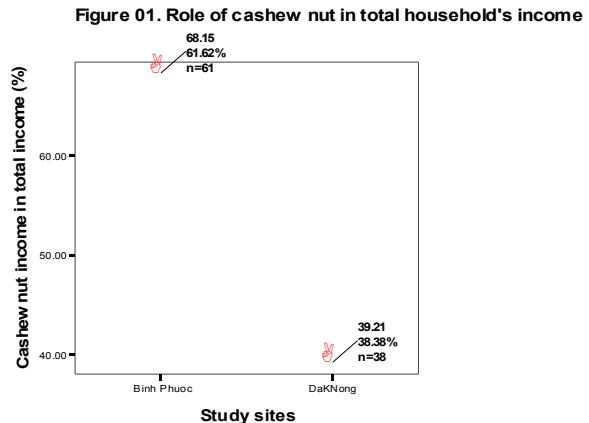
4.3 DESCRIPTIVE ANALYSIS ON HOUSEHOLD SURVEY

4.3.1 The role of cashew nut in household's income

The survey indicates 57% of farmer's income comes from cashew plantation on average; 68% in Binh Phuoc and 39% in DaK Nong. 22% of surveyed households have 90% of income from cashew. This proves a crucial role of cashew in household's living condition (see Figure 01).

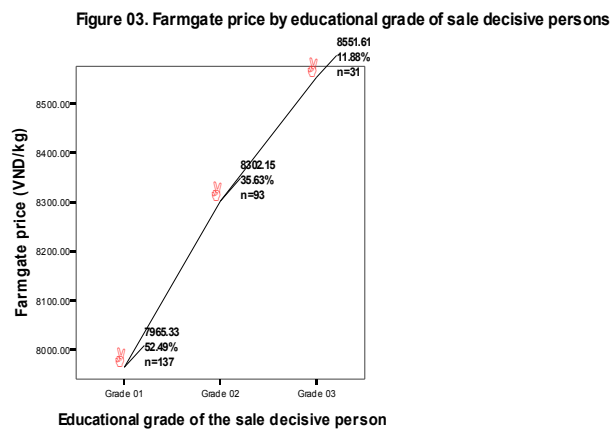


Source: Survey data in 2006

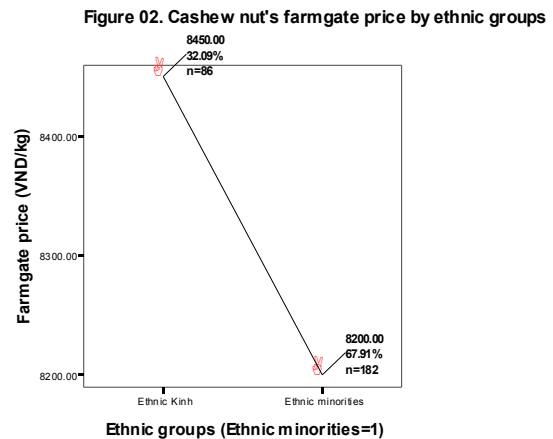


Source: Survey data in 2006

4.3.2 Characteristics of households and cashew nut sale-decisive person



Source: Survey data in 2006



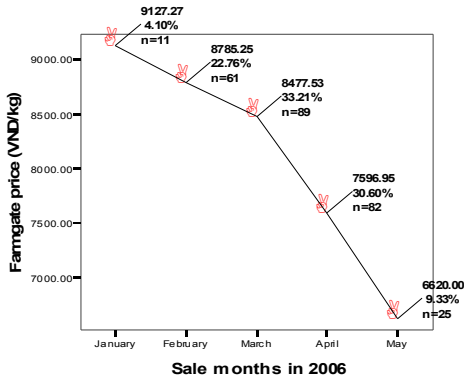
Source: Survey data in 2006

The sample includes both Kinh and ethnic minorities that are mostly Stieng and M'Nong. Half of them have over 12-year in cashew cultivation (Appendix 4.2 and 4.3). Sale-decisive persons are commonly males at portion of 75.76. They have not obtained high education levels indicated mostly at the first and second grade. Their jobs are all under farm occupation, posting rate of 96.97%. Thus, job concerning is totally similar in the sample. Educational grade of the sale-decisive person positively relates to his/her cashew nut's farmgate price (see Figure 03). Considering ethnicity, the average cashew nut's farmgate price is found discriminatory between Kinh and minorities. While Kinh households has reached higher price, ethnic minority ones have experienced at 250 VND per kg lower (Figure 02).

4.3.3 Seasonal impacts on cashew nut's farmgate price

Cashew is annually harvested in January to May. Accordingly, cashew nut transactions start in January, lightly decrease in February and March, and then drop in April and May. During harvest, cashew nut is all in fresh. After May, dried cashew nut possibly appears for trading in market. The survey appears only one household having transaction after May. The number of this variable is too small and thus is omitted in the sample. The farmgate prices are all at-harvest prices in this study. Their temporal variation is observed under inter-seasonal impact in Jan. to May. Cashew nut transaction has mostly been taken place in Feb. to May, amounting to 89% of total transactions (see Figure 04). Cashew nut's farmgate prices obviously find great temporal variation though it is only affected by inter-seasonal impacts. Its highest is in January, and then gradually reduces during remaining period.

Figure 04. Cashew nut's farmgate price by sale months



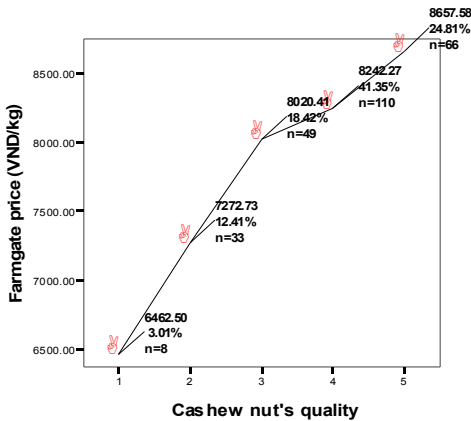
Source: Survey data in 2006



Households' harvesting cashew nut

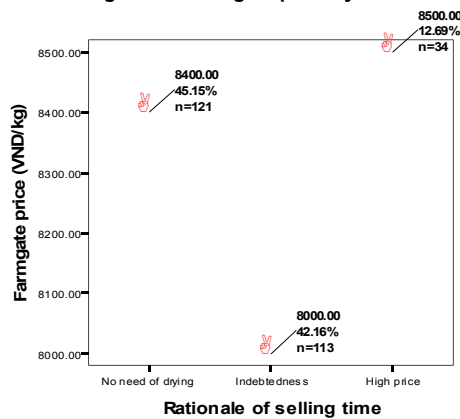
4.3.4 Product

Figure 05. Cashew nut's farmgate price by quality



Source: Survey data in 2006

Figure 07. Farmgate price by rationale of selling time



Source: Survey data in 2006

As mentioned, there has been too few dried cashew nut transactions, ranking observations so as to separately observe in the sample. None of package deal and selling short⁸ has appeared in the

⁸ Package deal is the case that farmer sells their cashew nut farm as a whole without any measurement; selling short is the case of package deal before the harvest point of time.

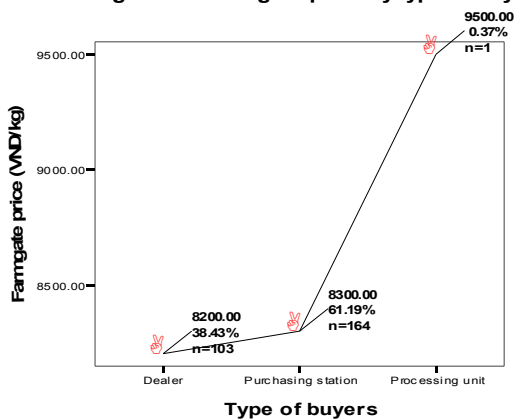
survey. All transactions have conducted under careful measurement and qualitative evaluation. As a result, the impacts on farmgate price induced by type of product and ranking have been omitted under empirical consideration.

Cashew nut quality evaluation is practically conducted through its color, size and solid. To observe its impact on price, questionnaire is designed to mark quality from 5 at the best quality to 1 at the worst. Cashew nut quality obviously induced a positive impact on farmgate price as indicated in Figure 05. None of farmers stated that they have sold their cashew nut short. However, there have appeared circumstances of non-competitive relations owing to buyer's previous financial support, which is described in the next debate on household's bargaining position.

4.3.5 Household's bargaining position

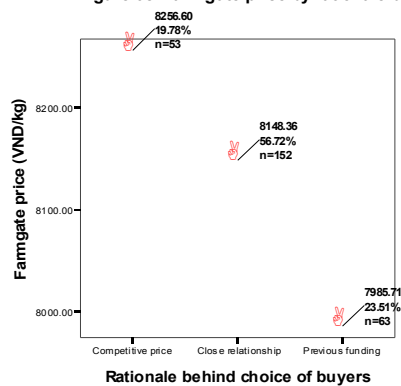
A practical research of household's bargaining position is viewed from 03 aspects namely, rationale of selling time; type of buyers, rationale of choosing buyer. Concerning rationale of selling time, the fact that farmers decide when to sell their cashew nut indicates their temporary inducements and thus reveals their bargaining position. The survey indicated that over 45% of transactions have taken place at harvest because households have been unavailable to fulfill storage and drying cashew nut. 42% of transactions have occurred since farmers are in debt/or in need of money for their production, consumption and investment. Only 13% of transactions have been operated at favorable selling time of high price. Figure 07 demonstrates that farmers receive the lowest farmgate price due to their indebtedness circumstance. As for transactions occurring under high price condition, mean statistic of farmgate price demonstrates the highest. Under reluctance of storage and drying of cashew nut, farmgate price on average is between the former worst and the later highest.

Figure 06. Farmgate price by type of buyers



Source: Survey data in 2006

Figure 08. Farmgate price by rationale behind choice of buyers



Source: Survey data in 2006

Cashew nut traders are classified into 3 types namely, dealer (collector), purchasing station and processing factory. The farmer's buyer seeking also reflects their bargaining position. In search of the rationale of choosing buyer, the survey has empirically found 3 main groups of reasons including close relationship, buyer's previous funding and competitive price. Farmers have popularly made transactions with dealers and purchasing station, posting 38% and 61% of transactions (see Figure 06). Farmgate price has in reality changed according to whom farmers have dealt with. Only one case has directly taken place between farmer and processing manufactory at the highest price among three types of buyers. Because dealers have collected cashew nut from farmers to resell to purchasing station, their price has been the lowest. This margin between two price levels is attributed to dealer's collection, transportation and his earnings.

In search of rationale behind farmer's choice of buyer, the empirical study has pointed that 23.5% of farmers seem to have no or little choice of buyer under their indebtedness for their buyers' previous funding and 56.7% for close relationship (see Figure 08). These high portions demonstrate that there have still remained so many transactions under non-competitive relationship. Thus, competitive price has obviously become unattainable in those transactions. While transactions derived from close relationship have reached little lower farmgate prices than price in those dealt in competitive way, those occurring as settlement of previous funding have experienced 2 and 3 percent lower than two other cases, respectively. Some obscure expressions have empirically revealed. Farmers themselves feel compelled to deal with the buyers who have previously funded their necessities or working capital in production such as fertilizer, pesticide and gasoline. In contrast, to the buyers who have maintained close relationship and acceptable price, farmers willingly sell their cashew nut without strong enforcement.

4.3.6 Market price information

As for market price information, frequencies of each source that farmers have accessed to obtain information and farmer's assessment on each information source are investigated. The survey shows the most popular sources of price information have currently been informal namely, dealers, farmer's relatives and neighbors with the highest mean values. There has somewhat appeared a bias unfavorable to households, higher power of buyer and disadvantage to farmers as price information has only derived from buyers. Some officially formal sources like television, radio, and newspapers are effective, cheap and more importantly fair to both buyer and seller in transactions. Unfortunately, farmer's access to these sources is limited at low mean value and so many farmers marking 1 and 2.

Table 08. Market price information source

Information source	Mean of hhlds' assessment on quality	Mean of access frequency
Television	3.259542	2.6824
Radio	2.94.860	2.3041
Newspapers	2.361702	1.3614
Agricultural extension staff	2.433962	1.3865
Farming association	2.758621	1.5404
Price at purchasing station	2.783784	2.6747
Dealer	2.902778	3.4012
Relatives, neighbor	3.903226	3.8363

Source: Survey data in 2004

As for purchasing station, staff at purchasing station has practically provided cashew nut price to farmer by face to face or telephone without any official price list. Complained by farmers and extension staffs, prices from purchasing station have even been changeable within a day. Such a source of price information thus turns unreliable and risky to farmers' production and investment. A great lack of price information from local agricultural extension staff and farming association proves the shortage of price information of local officers, their incompetence to perform market consultation and the government's in-coincidence in supportive policies regarding both technical and marketable consultation.

In summary, the above descriptive analysis has provided some features of some affecting factors on farmgate price. The next presentation will focus the proposed hedonic regression.

4.4 MODEL RESULT

4.4.1 Analytical framework and model specification

Under hedonic pricing approach, the literature has put forward six groups of explanatory variables namely, infrastructure, buyer, product, household characteristics, seasonal effects and information. These are each conformed to practical transaction condition in Binh Phuoc and Dak Nong provinces so as to reveal the most significant set of variables for estimation model (see Appendix 4.1 for detail description). Using the hedonic pricing model, a linear regression is applied in this study. Dependent variable is cashew nut's farmgate price received by household during the studied year 2006. In short, explanatory variables utilized in hedonic pricing regression are summarized in Table 09.

Table 09. Explanatory variables and expected signs in estimation model

Variable	Expected sign	Variable	Expected sign
Dependent Variable: farmgate price (VND/kg)			
Independent Variable			
<i>Seasonal effects</i>		<i>Distance</i>	
February	(+)	Distance to nearest purchasing station	(-)
April	(-)	<i>Bargaining position</i>	
May	(-)	Market accessibility	(+)
<i>Household's characteristics</i>		Bargaining position (Indebtedness=1)	
Minority Ethnic (Yes=1)	(-)	<i>Product</i>	
Year of cashew cultivation	(+)	Cashew nut 's quality	(+)
<i>Sale decisive person</i>		Production scale (ha)	
Year of education	(+)	<i>Information</i>	
Sex (Male=1)	(-)	Follow-up market price before transaction	(+)

Note: A positive sign (+) indicates an expected positive impact while a negative sign (-) does an expected negative one.

4.4.2 Regression result of cashew nut's farmgate price in Binh Phuoc and DakNong provinces in 2006

The regression is overallly significant with the very small probability of F statistic (0.000) and acceptable R-squared at 0.599 (see Table 10). The farmgate price variation is well explained by explanatory variables through the hedonic model. Except for sex and production scale variables, either t-ratio statistic or probability value proves that the remaining explanatory variables are all significant at 1% to 10% level. The remaining variables have expected coefficient's sign.

Table 10. Regression result

Variable	Coefficients	t-ratio ^(**)	Prob. ^(*)
Dependent Variable: farmgate price (VND/kg)			
Independent Variable			
(Constant)	6,917.1146	26.0701	0.0000
<i>Seasonal effects</i>			
February	269.3355	2.1381	0.0335
April	(833.9544)	(7.0587)	0.0000
May	(1,724.9809)	(9.3554)	0.0000
<i>Household's characteristics</i>			
Minority Ethnic (Yes=1)	(506.9322)	4.5690	0.0000

Year of cashew cultivation	21.6536	2.1522	0.0324
<i>Sale decisive person</i>			
Year of education	30.3671	1.9485	0.0525
Sex (Male=1)	(34.1752)	(0.3007)	0.7639
<i>Distance</i>			
Distance to nearest purchasing station	(0.0553)	(1.8916)	0.0598
<i>Bargaining position</i>			
Market accessibility	414.3041	3.0537	0.0025
Household's bargaining position (Indebtedness=1)	(605.2493)	(5.6515)	0.0000
<i>Product</i>			
Cashew nut 's quality	173.9165	3.4127	0.0008
Production scale (ha)	(11.0701)	(0.8747)	0.3826
<i>Information</i>			
Follow-up cashew nut market price before transaction	380.3205	3.3134	0.0011
Number of observations: 252		F-statistic F (13, 251): 27.355	
R-squared: 0.599		Prob. (F-statistic): 0.0000	
Adjusted R-squared: 0.577			
Dw-statistic: 1.914			

Note: (*) Probability (p value) of obtaining t-ratio indicates the exact level of significance

(**): t-ratio in comparison with the critical value in t-distribution statistic also provides the level of significance

4.4.3 Diagnostic tests

The significance test through either t-ratio or p.value and diagnostic tests are well performed in the linear hedonic regression. Diagnostic tests are presented in Appendix 4.4. As these estimation results are proved valid and reliable, they will be interpreted the economic meanings in view of practical economic conditions in Binh Phuoc and Dak Nong provinces.

4.4.4 Economic meanings of the estimation result

A hedonic regression is conducted under 252 observations and six groups of explanatory variables namely seasonal effects, characteristics of households, product, infrastructure, bargaining position and information. All explanatory variables are statistically significant except for sex and production scale variables. Each is respectively interpreted the insight into the relevant economic performance in Binh Phuoc and Dak Nong provinces.

For household's characteristics, Kinh farmers have reached 507 VND per kg higher than minority ones, indicating that ethnic minority farmers have been less adaptable in the market. They are mostly located in remote areas, somewhat limited sphere of economic activities. Ethnic minority households operate cashew production with low investment and thus make transaction in lack of their best effort for appropriate price. The survey indicates how long households take part in cashew plantation have significantly affected farmgate price.



Dealer's transportation of cashew nut



Cashew nut plantation without any investment in a Stieng household

Concerning sale decisive person, as for more educated farmers, they have highly recognized their investment in cashew nut plantation. Highly educated farmers are more adaptable to high technical method and available purchasing system. They are conscious in each step of investment from yield, technique, farming care during the crop and more effort to reach high price in selling their performance.

Regarding seasonal effects, we choose March as a base for seasonal dummy variable. Regression result shows that while February has positive coefficients, the following two months have negative ones. Accordingly, transactions in February reach 269 VND higher, respectively compared to March. At the beginning of annual harvest, both local factories and outside trading companies start to purchase at high capacity to meet their high demand of processing and trading. These purchasing units often preferred to collect cashew nut in first months to avoid possibly bad weather in later months. As it rains, cashew nut's quality will be deteriorated. As a result, high demand leads to high purchasing capacity and thus induces high price.

Distance from selling place to the nearest purchasing station has negatively affected farmgate price. This can be easily accounted for the transportation cost, availability purchasing system, purchasing capacity and infrastructure in general.

Market accessibility variable is the ratio of the number of traders to whom farmers possibly sell products to the numbers of traders demand and ask for buying cashew nut. This variable reflects their market accessibility and their ability in choosing buyers and thus has a positive impact on farm-gate price, concerning buying competitiveness. When practically dealing with many purchasers, households obtained more opportunities to reach competitive prices. There rarely appear non-competitive relationships in such a deal. On the contrary, with a few buyers or only one buyer household deals; there somewhat exists non-competitive relationship in transaction such as buyer's previous financial support, indebtedness, relatives or other close relationships. Under these circumstances, competitive prices are obviously unable to be obtained since purchasers apparently take advantage of their superior bargaining position to cut off farmgate price.

Dummy variable of household's indebtedness creates a negative impact on farmgate price. This variable focuses more on hidden compulsory obligation in choosing buyer. As expectation, estimation result proves that farmers lose about 605 VND per kg under their limited choice of cashew nut's buyer. The statistical significance of two above variables addresses the insight of cashew nut transaction in Binh Phuoc and DakNong provinces. There has currently remained farmers' inadequate bargaining position in cashew nut selling. Unless this circumstance is improved, it is hardly to induce an efficient market performance in a competitive way.

Relating to product, higher quality of cashew nut farmers dealt, higher prices they can reach. Unexpectedly, production scale has an insignificant impact on farmgate price. In reality, an equal price treatment is applied regardless of quantity. The explanation is as followings. There have many bags in large transaction while the quality evaluation is performed once with a certain bag. Thus, buyers are unable to well monitor their quality control and normal loss in such transactions. This practice discourages purchasers conduct large-size transaction in price favorable treatment. Instead, buyers often give more support on transportation or advance payment.

Considering information factor, as following up market price before transaction, farmer has obtained higher price. Clearly, the more updated price information farmers attain before transaction, the more confident they are in negotiating to reach high price. Then, they can make decision of where and whom to sell cashew nut in a more profitable manner

To sum up, cashew nut's farmgate price variation is justified through the impact of households' characteristics, seasonal factor, product, infrastructure, information and farmer's bargaining position. Educated farmers, farmers' price information attainments, highly qualified product and better infrastructure have expectedly induced a higher farmgate price. Farmers' inadequate bargaining position significantly induced an unfavorable farmgate price in transaction.

4.5 RECOMMENDATION

Change in the role of cashew plantation

Cashew nut has more and more played an important role in Binh Phuoc and DakNong 's economic development. In the past, cashew plantation has been considered as an option simply to cover forestland. Such a status has not been changed over time. Cashew nut is now the most second important product as it provides core input for processing industry; enhances export performance and highly contributes to households' income, more importantly to the ethnic minorities. This essential role of cashew in local economic development are calling for a truly investment of both household and many official institutions under the government's supportive policies in the coming years. As a result, this strategic appreciation and essential role in local economic development of cashew production are calling for a truly appraised investment of both household and many official institutions under the government's supportive policies in the coming years.

Long cashew plantation under lack of investment

In pursuit of covering forestland for a long time, the study demonstrates that there has still remained a portion of household in lack of investment and adequate bargaining position in launching their produce. Binh Phuoc has started to import cashew nut since 2003, revealing its insufficient supply capacity both quality and quantity. In Binh Phuoc province, a large cultivation area has utilized in an unproductive way (DoTT, 2001, p.141; VET, No 40, 10 March 2003). Without any choice of varieties and plantation technique, the local cashew nut production has not attained its potential capacity in providing cashew nut raw material and required quality for exportation.

Relating to the study from household's perspective, the following policy recommendations put more focuses on issues directly involving farmers' kick-off transaction. As for an improvement of cashew nut's farmgate price, there obviously requires the cooperation of government strategic policies, supportive operations from the official institutions, farmers' participation as well as purchase underwriting from processing enterprises directly to farmers.

More favor to ethnic minorities in conducting supportive policies

Ethnic minorities have somehow been less adaptable to market access than Kinh people. Thus, there should be more favor to ethnic minorities in performing supportive policies. Educational support is necessary as a base for cooperation. Technical supports should be spread through ethnic minority households to better their current plantation without investment.

Substance for an improvement of farmgate price

- **Support on high-yield varieties and techniques for improving cashew nut quality**

In pursuit of stabilizing purchasing capacity, exportation enhancement and domestic demand more and more require high quality of cashew nut as the first decisive input. However, most of farmers have been cultivated cashew without care of variety and technical application. Instead of higher attainment in production, large planted areas have still been under poor yield and low quality. Such a practice has called for more support on high-yield varieties and techniques for improving cashew nut quality (VET, No 40, 10 March 2003).

The survey demonstrates that majority of farmers currently demand high-yield varieties and more technical support for improving of cashew nut quality. In 5-point scale of marking (5 being the most urgent necessity), it is the first rank at the highest mark of 4.29 among various options. More than 50% of households are willing to renew their sown cashew garden for the application of advanced technique and high-yield varieties.

In recent years, there has an effort of the GoV for application of grafted cashew plantation under the seed supporting program and technical support from the extension officials. Though the government program has paid more attention to and favor the ethnic minority's farming, the better-off have mostly been the Kinh farmers. The reason is that such grafted cashew plantation has required not only seed but also such other more important and decisive factors as farming technique, fertilizer and pesticide and the taking care of growers. Ethnic minority has for a long time had a habit of normal cashew plantation with fewer requirements of both capital and their taking care.⁹ As for ethnic minority farmers, the program success requires the recommendation and practical support in capital investment and farming technique necessary to grafted cashew such as pruning and maintaining.

⁹ For this reason, farmers have chosen cashew nut plantation for its "idle – plant".

- **Support for efficient storage to lower seasonal variation**

Storage will reduce seasonal variation unfavorable to households. In reality, household's unavailability of storage results from certain constraints including finance for working capital during their storage, lack of facilities. Support credit for storage is ranked number three among eight needs for government support. This seems to be the most crucial as all farmers look for turnover right after harvest for their consumption, production investment and so on. The remaining requirements are not much challenge including facilities or space, redundant labor after harvest. Besides, for efficient storage, there also requires a need for technical method though it is not so complicated. Instead of being unnecessarily allocated in processing enterprise, margin in storage somewhat transfers to farmers in return of their additional work after harvest. This cognition is essential and crucial for farmgate price improvement.

- **Manipulating market price information**

Informal sources of price information are more common than officially formal ones. Unfortunately, the former more or less brings a bias unfavorable to farmers; more advantage to traders from whom price information is derived. Secondly, price information from purchasing station is changeable even within a day. This source turns more risky and unfavorable to farmers in arranging and executing their cashew nut's sale. Thirdly, the lack of price information from local agricultural extension staff and farming association revealed considerable incompetence to perform market consultation. Last but not least, the government's policy has not effectively coincided both technical support and market consultation to farmers.

In the survey, an information assessment of accuracy, timing and usefulness indicated that most of farmers have not highly appreciated current price information of cashew nut. This practical analysis has apparently exposed a warning signal for a more efficient cashew nut market and incentive favorable to farmers. Therefore, cashew nut's price information calls for the government's direction in fair to both farmers and traders. The effective formal source should be utilized to update price information day by day at least in the trading period from January to May. Market consultation should be designed in the activities of agricultural extension institutions and farming association.

- **Expanding purchasing service, upgrading road infrastructure**

Infrastructure has mentioned in this study such aspects as current road status, the availability of purchasing service and distance from selling place to nearest purchasing station. Though these illustrations do not totally reflect the broad term of infrastructure, they reveal inadequate infrastructure so as to enable a more market accessibility and farmgate price improvement.

The survey shows that expanding purchasing stations and improving roads for reduction in transportation cost are highly appreciated by farmers. As cashew nut purchasing services are expanded and road infrastructure is highly upgraded, farmers will more easily access to purchasing system at low transportation cost in order to reach higher price in transaction. Rural traders play a certain role in market system. In 2004, Binh Phuoc has started their permission of establishment of purchasing stations from other provinces. This more or less induces more efficiency in cashew nut market and thus should be encouraged in the coming years.

More efficient location and operation of processing units

In Vietnam, most of processing manufactories have currently been placed in big cities and/or so far from areas supplying raw material of cashew nut. There has remained the lack of linkage between processing enterprises and cashew producers or local supplying areas as a whole. Under this practice, these processing enterprises have in reality cut off budget of raw material by lowering

purchasing price of cashew nut since the lowdown export price has gone down in the international market. Furthermore, these have obviously led to inefficiency in processing industry and detriments to farmers as a result.

Vietnam is now the second highest of cashew nut exportation and the third greatest of cashew nut output in the world. Binh Phuoc has contributed more than a quarter of total output (GSO, 2006). Removal of these restrictions will invariably benefit current local purchasing capacity and push up farmgate price from other operating cost reductions. More importantly, this will generate crucial factors conducive to efficiency in cashew nut market and rural development as a whole.

Farming contract to purchase cashew nut from farmers

Direct farming contract to farmers is found an effective link between processing enterprise and farmers so as to make sure the required quality and quantity. In return, farmers get benefit from payment in advance as a credit for their production investment.

Last but not least, the government should take measures to reduce risk in market price. In addition to processing units, the government or one official institution can conduct this underwriting or forward operation to cashew nut, and then these organizations make a deal with purchasing units or processing enterprise as farmers' representative.

Encouragement of post-harvest activities

The movement of post-harvest activities from processing companies to households' premise has actually been under market mechanism. The companies have more capacity to focus on further processing and farmers better utilize their working time after harvesting cashew nut. The analysis of cost and benefit of these post-harvest activities at household level shows that farmers have earned a profit of 10% on the selling price of cashew kernel, in addition to their labor cost of 5%. With a low initial investment, such an income is relatively high compared to their farming earnings. Farmers more importantly recognize the quality requirement through their post-harvest performance and thus improve their farming accordingly. Therefore, post-harvest activities should be encouraged to be carried out at household level to create the better linkage between farmer and processing companies in the supply chain.

Other related policies

Though these last recommendations are not directly derived from the whole study, they are better taken into consideration in a strategic package of supportive policies. The mentions possibly reveal a starting issue for further research of the whole market system. As for farmgate price improvement, they should be placed in a few words.

In summary, as cashew nut has more and more been crucial for local households' income and Binh Phuoc economic development, there should be more strategic and supportive operations from government conducive to farmers' participation and their benefit as a result. Support on high-yield varieties and techniques, credit for efficient storage, and manipulation of market price information are the most households' necessities. To improve farmgate price and enhance market efficiency, underwriting to purchase cashew nut is found efficient link between the government's support, processing enterprises' guarantee and farmers' production investment.

5. CONCLUSION

The analysis of value added in the supply chain of cashew nut bean has proved that the monthly farmers' earnings are lowest among stakeholders. There has a concern that a high vulnerability in cultivation has however obtained a moderately low gain compared to other stakeholders in the supply chain. However, by performing post-harvest activities for their own processing business, farmers can gain a profit of 10% in selling price of cashew nut kernel in addition to 5% of labor cost arriving either to their own pocket or to hired labor.

The estimation model indicates that increase in quality or price information attainment helps to improve farmgate price. Farmers in indebtedness circumstance and/or under a few choices of buyers receive lower farmgate price than those without any obligation or enforcement. Infrastructure creates a positive impact on farmgate price. More educated farmers receive higher price for their more adaptable to market and advanced technique in production.

The descriptive analysis of empirical data set reveals that there has remained lack of formal sources of market information under the government's manipulation. The current market price information sources are informal, risky and unfavorable to farmers as totally derived from traders. There has remained a large portion of transactions under non-competitive relationship. Somehow, farmers stand at inadequate bargaining position in their cashew nut transaction. In spite of within harvest period, there also exists a strong seasonal effect on farmgate price due to a change in purchasing capacity and product quality.

These above-mentioned existing detriments in cashew nut transaction should be removed in seeking for an improvement of farmgate price and efficiency in agricultural market as a whole. Market price information should be placed under the government's manipulation through formal and more effectively accessible sources in fair of both farmers and traders. Improvement of infrastructure and available purchasing service will apparently induce a more efficient market operation. In seeking for more production investment from smallholders, the government's technical support should coincide with marketing consultation and marketable guarantee of farmers' crop produce. Accordingly, underwriting to purchase of cashew nut should be taken into account in both processing enterprises and related institutions under a package of the government's strategic policies.

APPENDIX

APPENDIX 01. QUESTIONNAIRES

Appendix 1.1 Interview of farmer

No: Interview date:/07/ 2006
 Hamlet:..... Commune:..... District:
 Interviewer:

INTRODUCTION

Good morning... we are doing a research on cashew production and sales in order to improve selling prices of cashew nut that farmers receive. Can we speak to household head or person who decides cashew sales in your family?

QUESTIONS

1. Would you please provide us some general information about your family?
 - Name of household head:.....The number of members in the family: (Persons)
 - Ethnicity:(1: Kinh, 2: Tay, 3: Nung, 4: Stieng, 5: Others)
 - Interviewee:Relation with household head:.....
2. Would you please provide us information on cashew nut sale decisive member?
 - Relation with household head (Code 1).....His/her job (Code 2).....
 - Gender (1 = Male, 0 = Female)AgeYear of education.....
3. Distance from your selling place to the nearest buying station:m

Code ❶	Code ❷	
Relation with household head	Job	
1=Household head	1=Self farmer	7= Services
2=Wife/husband	2=Employee in agriculture	8=Transportation
3=Father/mother	3=Livestock breeding	9 =Building workers
4=Brother/sister	4=Fishing	10=Officer
5=Son/daughter	5=Business	11=Teacher
6=Others (specify)	6=Employee	12=Student

4. Would you please tell us some information about your annual income?

Income sources	Amount (000VND)	Note
Other agricultural product 1.....		
Other agricultural product 2.....		
Business, service, worker		
Officer		
Employee in agriculture		
Others:.....		
Total		

5. How long have you occupied in cashew production? (year)

6. Would you please give us information on area, age and output of your cashew farm?

No	Cashew age (year)	Area (ha)	Expected output (kg)	Actual output (kg)	Cost (000 VND)
1					
2					
3					

Total

7. Information on harvested and sold cashew area in last crop 2006.
 At the beginning of the crop, how much did you spend on planting, harvesting and selling cashew nut?

No	Cost items	Amount (000VND) (a)
1	Fertilizer/Pesticide	
2	Weeding	
3	Harvest	
4	Preservation, storage	
5	Drying	
6	Others (specify)	
	Total	

8. Cost in farming construction period:

- a. What kind of land for growing at the beginning?
 (1) forest land (2) cultivated land (3) hired land
- b. If it's hired land, how much does this cost?.....
- c. Does your land have tractor plough before cashew nut growing? If yes, how much does this cost?.....
- d. Do you hire labor for hole digging? If yes, how much does this cost?.....
- e. Do you create the nurse ling by yourself or buy up. How much does this cost if you buy them?.....
- f. Do you have put down basic fertilizer or not? Available or must buy? how much does this cost?.....
- g. Do you hire labor for planting? If yes, how much does this cost?.....
- h. What is added cost from tree planting to harvesting?.....

Items	Unit	Total
Plough against fire		
Weed		
Watering		
Fertilizer		
- NPK		
- Urea		
- Nitrogenous fertilizer		
- Phosphate		
- Kali fertilizer		
- Muck		
- Others cost		
Herbicide, insecticide		
Labor cost		
Total		

9. On harvested cashew nut area in this season (2006); Since this early season how much do you spend cost for planting, maintenance, harvest and cashew nut selling?

No.	Type of cost	Total (1000 VND)
1	Fertilizer	
2	Spray chemicals	
3	Weed	
4	Harvest	
5	Store	
6	Air dry	
7	Others cost	
	Sum	

- 10. Have you classified cashew nut based on different quality levels before sales? (1: Yes, 0: No)
- 11. At the beginning of the crop, which price of cashew nut have you expected to get after harvest?
 No expectation Expected price: VND/kg

Note (for interviewer) when asking question no. 10

- Way of asking about months
- In case of selling before harvest or selling on average, ask estimated output and the selling price of the whole farm

12. Harvesting and selling cashew nut:

Code ③ Product types	Code ④ Quality	Code ⑤ Types of buyers	Code ⑥ Reasons of choosing selling time
1: Fresh	5: Very good	1: Dealer both local and outside	1: Not have to dry and store (sell immediately harvest)
2: Dry	4: Good	2: Purchasing station	2: Need money for paying debt or production, consumption
3: Sales on average	3: Average	3: Processing units	3: High price
4: Sales before harvest time	2: Bad	4: Others (Specify)	4: Others (Specify)
5: Others (Specify)	1: Very bad		

Would you please provide us some information on cashew harvest and sales in the year 2006?

Month	Output (kg)	Amount sold (kg)	Selling price (VND/kg)	Product Types (Code 3)	Product quality (Code 4)	Types of buyers (Code5)	Rationale of selling time (Code 6)
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
Total							

13. Cashew nut buyer

13a. In cashew nut transaction, do you make a choice of buyers? (1: Yes; 0: No).....

Code ⑦ Reasons of choosing buyers

- | | |
|---|--|
| 1: Their high buying prices | 3: Previous funding (being in debt, being provided working capital in advance) |
| 2: Close relation ship (Acquaintance, relatives, neighbors) | 4: Others (Specify) |

13b. Information on buyers

No.	Types of buyers	Who demand your cashew nut?	Whom do you actually sell to?	Reasons of selling to those people (Code 7)
1	Dealer			
3	Purchasing station			
5	Processing factories			
6	Others (Specify)			
Total				

13c. Which reasons buyers often based on to negotiate? (Multiple choices)

Please list in order the degree of using reasons of buyers.

(5: Always; 4: Often; 3: Have used; 2: Seldom; 1: Never)

No	Reasons	Frequency (Marking)
----	---------	---------------------

(5: Always; 1: Never)

- 1 Market demand is low
- 2 This is the current market price
- 3 Resell price
- 4 The average price in the market is low
- 5 Transport cost
- 6 High distance
- 7 Other marketing costs (as storage...)
- 8 Farmers do not evaluate exactly their cashew nut quality
- 9 Types of cashew nut (fresh, dry)
- 10 Selling time
- 11 Others:

13d. When negotiating selling prices, do you think you are in a superior position?
(Marking)..... 1: Be inferior and not satisfied;
2: Be satisfied;
3: Be superior.

13e. In negotiating, which do you think you need to have in order to get higher selling prices?
.....

14a. Which factors do you think your selling prices depend on? (Multiple choices)

No	Factors	Evaluation (1: Dependent, 0: Not dependent)
1	The world price	
2	The cashew nut supply and demand in Binh Phuoc (Many or few people want to buy cashew?)	
3	The quality of cashew nut	
4	Types of products (Fresh, dry, sell on average, sell before harvest)	
6	Selling time	
7	The ability of negotiation	
8	Buyers (whom)	
9	Others:.....	

14b. Interviewer: If interviewee chooses "the quality of cashew nut" (number 3),
Ask: If there is another high-yield cashew variety, do you accept to remove the current farm to grow the
new one? (1: Yes; 0: No)

14c. Do you belong to any co-operative or agricultural extension station? (1: Yes; 0: No)

15. What do you think the government should do to improve cashew nut selling prices of households?

No	Contents	Degree of necessity (Marking) (5: Very necessary; 1: Totally unnecessary)
1	Improve roads	
2	Intensify transport services	
3	Support on transport means	
4	Widen buying stations	
5	Support credit for storage	
6	Support on varieties and techniques for improving cashew nut quality	
7	No cashew nut import	
8	Support on cashew price information	
9	Others:.....	

16a. Before selling cashew nut, do you pay attention to cashew nut price in the market?

(1: Yes; 0: No)

16b. Through which source do you get information on cashew nut price and how often?

No	Information sources	Frequency (Marking) (5: Always; 1: Never)
1	Television	
2	Radio	
3	Newspapers	
4	Extension staff	
5	Farmer association	
6	Price list at buying station	
7	Local buying station	
8	Traders	
9	Relatives, neighbour	
10	Others.....	

16c. Interviewer: If in 16b, the choice is television, radio, newspapers, ask:

Please tell us: The television channel you watch:

The radio programme you listen to:propagated at what time ...

Newspapers you read

16d. Would you evaluate the cashew nut price information system of the following sources?

No	Contents	Degree of satisfaction (Marking) (5: Very satisfied, 1: Completely unsatisfied)
1	The selling prices you receive	
2	Price information on television	
3	Price information on radio	
4	Price information on newspapers	
5	Extension staff	
6	Farmer association	
7	Price list at buying station	
8	Local buying station	
9	Traders	
10	Relatives, neighbour	
11	Others	

Suggestions for information improvement?

.....
.....
.....

17. How do you evaluate the market or cashew sales in Binh Phuoc?

Contents	Degree of satisfaction (Marking) (5: Very satisfied; 1: Completely unsatisfied)
Intermediary buyers	
Payment of buyers	
Prices	
Transport system	
Government policies	

Other ideas about cashew nut prices and cashew market system:

.....
.....

Thank you very much for your help in doing our research.

Appendix 1.2 Interview of traders (dealer, purchasing station)

Number:.....Date of interview:

1. Interviewee:.....

2. Address: Village:.....Commune:.....District:.....Province:.....

A. THE GENERAL INFORMATION

3. Full name:..... 4. Sex: Male Female 5. Ethnicity.....

6. How long have you been engaged in trading cashew nuts?.....(year)

7. How much is the income by trading cashew nuts in a month? (VND/month).....

8. How much is the total income of your family (VND/month):.....

B. THE GENERAL INFORMATION ON CASHEW NUT TRADING

09. In usually, how many categories of cashew nuts do you grade in trading?

10. Which criteria is your grading based on? colors size other (specify?)

11. From whom do you buy cashew nut? (% in total cashew nuts collected)

Middle man/Dealer (.....%) Farmers (.....%) Others (..... %)

b. Do you prefer to buy cashew nuts directly at the farms? Yes No

c. If yes, what are requirements that farmers need to fulfill?

Quality Price Prestige sstability in supply Quantity Others

d. If no, why?

e. Do you pay higher price if buying from middle men in comparison with buying from farmers? Yes No

f. If yes, how much is the difference per kg?VND/kg

12. a. Do you have closed traders? Yes No

b. If yes, who they are? Farmers Middle men others

c. How long have you established the relationship with them?.....year

d. Why do you prefer to do business with them?

Quality of cashew nuts Quantity Price Stability Close relationship Others.....

13. What is your solution to deal with the temporary shortage of cashew nuts?

.....

14. How do you decide the daily quantify of cashew nuts selling and buying?

The change of price

Other from other traders

Weather

Others (specify):

15. What information/or source of information that help you to determine/bargain the price of cashew nuts?

Price (from what sources):

Quality of cashew nuts

Selling and buying relationship (specify):

Others (specify)

.....

16. a. Do you store the cashew nuts? Yes No

b. Usually, how long do you store cashew nuts?: Lost rate:%

c. Usually, when you do you store cashew nuts? Why do you store cashew nuts? (note priority)

.....

17. The quantity of cashew nuts in this crop compared to the previous crop? More less Same

More than/less than:.....%

18. The quality of cashew nuts in this crop compared to previous crop? Better Worse Same

19. The price of cashew nuts in this crop compared to previous crop? Higher Lower Same
Higher/Lower:.....%

20. a. Do you receive any previous funding for you business? If yes, from whom? And how does it operate?

.....
.....

b. Do you pay in advance to your customers? If yes, who is that? And how does it operate?

.....
.....

C. CASHEW NUT PURCHASING

21. Please provide the information regarding to the price, quantity and source of cashew nuts?

Item a: Cashew nuts sellers	Item b: Grading	Item c: Cashew nuts buyers
1. Farmers in your commune	1. Very good	1. Purchasing station (Level 01)
2. Farmers outside the commune	2. Good	2. Processing factory
3. Middle man	3. Ordinary	3. Others (specific)
4. Purchasing station (level 02)	4. Bad	
5. Others (specify)	5. Very bad	

Month	Sellers (see item a)	Quantity (kg)	Categories (see item b)	price (VNĐ/kg)

22. How much is the total purchasing per day?

	Maximum	Minimum	Average
Quantity (kg/day)			
No of days (kg/day)			

D. CASHEW NUT SELLING

Month	Buyers (see item c)	Quantity (kg)	Grade (see item b)	price (VNĐ/kg)

E. 23. Difference between buying and selling price:VNĐ/kg

F. 24a. On average, the profit that you get per 01 kg cashew nuts by is: VNĐ/kg

24b. Do you include the costs?

- Transportation cost? Not included Included

How much is the transportation cost? (Specify):.....

- Packing cost? Not included Included

How much is the packing cost? (specify).....

- Communication cost: Not included Included

Communication/telephone cost? VNĐ/ 01 month

- Labor cost Not included Included

Labor cost:VNĐ/01 month

F. EXPENSE INFORMATION

- 25 a. What kind of transportation means do you use?
 Motorbike Truck others (specify):
- b. How much is the transportation cost? (Specify the unit):VND/kg (ton).....
- c. Who pays the transportation cost? Farmers Dealers purchasing station

Other notes about transportation cost:

.....

.....

LABOR COST FOR DRYING AND COLLECTING

- 26. a. How many labors are there in your business?:people
- b. How much is their monthly salary? VND/01month/01 labor.
- 27. a. Do you hire the porters? Yes No
- b. If yes, how much do you pay for them? (VND/ porter):.....
- 28. a. Do you sell all the cashew nuts in the same buying day or store them for some days?
 Sell them in the same day store them for (days)
- b. If store them for some day, do you dry them (sun-drying).....
- c. Do you hire labor to sun dry the cashew nuts?.....
- d. If yes, how many people do you hire?:.....
- e. Cost for these labors? (VND/labor/day).....
- 29. a. Do you hire labor to collect cashew nuts? Yes No
- b. If yes, how much do you pay? (VND/labor):.....

CONTAINER

- 30. a. What is the container to store the cashew nuts? What is the capacity of these containers?
Nylon pack (.....kg/01 pack) Bamboo basket (.....kg/01basket) Others (specify):..... (....kg/.....)
- b. Cost of these containers:
Pack:đ/01 pack Bamboo basket: đ/01 others (specify).....
- 31. Other cost: Weight scale:....., How long is its useful life?year

COMMUNICATION

- 32. a. How do you contact/communicate with the farmers/middle man?
Face to face contact telephone mobile phone 4. Others
- b. On average, how much is the cost of telephone per month:.....VND

CASHEW NUT STORAGE

- 33. Do you have to hire premise for storage? Yes No
 If yes, area?:.....m² Cost:VND/m²
- 34. a. Do you store cashew nuts? Yes No
- b. Normally, how long do you store?: lost rate:.....%
- c. When do you decide to store cashew nuts? Why do you store cashew nuts?
 Selling in big amounts waiting for higher price others

.....

.....

d. What is the cost when you store cashew nut?

.....

.....

G. YOUR DIFFICULTIES AND SUGGESTION

.....

.....

Thank you very much!

Appendix 1.3 Interview of cashew nut processing company

Number:.....Date of interview:

1. Interviewee:.....

2. Name of the processing company:Address: District:.....Province:.....

A. THE GENERAL INFORMATION ON CASHEW NUT TRADING

03. In usually, how many categories of cashew nuts do you grade in trading?

04. Which criteria is your grading based on? colors size other (specify?)

05. From whom do you buy cashew nut? (% in total cashew nuts collected)

Middle man/Dealer (.....%) Farmers (.....%) Others (..... %)

b. Do you prefer to buy cashew nuts directly at the farms? Yes No

c. If yes, what are requirements that farmers need to fulfill?

Quality Price Prestige sstability in supply Quantity Others

d. If no, why?

e. Do you pay higher price if buying from middle men in comparison with buying from farmers? Yes No

f. If yes, how much is the difference per kg?VND/kg

06. a. Do you have closed traders? Yes No

b. If yes, who they are? Farmers Middle men others

c. How long have you established the relationship with them?.....year

d. Why do you prefer to do business with them?

Quality of cashew nuts Quantity Price Stability Close relationship Others.....

07. What is your solution to deal with the temporary shortage of cashew nuts?

.....

08. **Importation:** Have you imported cashew nut to deal with the temporary shortage? Give your idea on the price of cashew nut imported, and any legal requirement?

.....

09. How do you decide the daily quantify of cashew nuts selling and buying?

The change of price

Other from other traders

Weather

Others (specify):

10. What information/or source of information that help you to determine/bargain the price of cashew nuts?

Price (from what sources):

Quality of cashew nuts

Selling and buying relationship (specify):

Others (specify)

.....

11. a. Do you store the cashew nuts? Yes No

b. Usually, how long do you store cashew nuts?: Lost rate:%

c. Usually, when you do you store cashew nuts? Why do you store cashew nuts? (note priority)

.....

12. The quantity of cashew nuts in this crop compared to the previous crop? More less Same
More than/less than:.....%

13. The quality of cashew nuts in this crop compared to previous crop? Better Worse Same

14. The price of cashew nuts in this crop compared to previous crop? Higher Lower Same
Higher/Lower:.....%

15. a. Do you receive any previous funding for you business? If yes, from whom? And how does it operate?

.....
.....

b. Do you pay in advance to your customers? If yes, who is that? And how does it operate?

.....
.....

C. CASHEW NUT PURCHASING

16. Please provide the information regarding to the price, quantity and source of cashew nuts?

Item a: Cashew nuts sellers	Item b: Grading	Item c: Cashew nuts buyers
1. Farmers in your commune	1. Very good	1. Purchasing station (Level 01)
2. Farmers outside the commune	2. Good	2. Processing factory
3. Middle man	3. Ordinary	3. Others (specific)
4. Purchasing station (level 02)	4. Bad	
5. Others (specify)	5. Very bad	

Month	Sellers (see item a)	Quantity (kg)	Categories (see item b)	price (VNĐ/kg)

17. How much is the total purchasing per day?

	Maximum	Minimum	Average
Quantity (kg/day)			
No of days (kg/day)			

D. CASHEW NUT SELLING

Month	Buyers (see item c)	Quantity (kg)	Grade (see item b)	price (VNĐ/kg)

E. 18. Difference between buying and selling price:VNĐ/kg

F. 19a. On average, the profit that you get per 01 kg cashew nuts by is: VNĐ/kg

19b. Do you include the costs?

- Transportation cost? Not included Included

How much is the transportation cost? (Specify):.....

- Packing cost? Not included Included

How much is the packing cost? (specify):.....

- Communication cost: Not included Included

Communication/telephone cost? VNĐ/ 01 month

- Labor cost Not included Included

Labor cost:VNĐ/01 month

F. EXPENSE INFORMATION

20 a. What kind of transportation means do you use?

Motorbike Truck others (specify):

b. How much is the transportation cost? (Specify the unit):VNĐ/kg (ton).....

c. Who pays the transportation cost? Farmers Dealers purchasing station

Other notes about transportation cost:

.....
.....

LABOR COST FOR DRYING AND COLLECTING

21. a. How many labors are there in your business?:people
b. How much is their monthly salary? VNĐ/01month/01 labor.

22. a. Do you hire the porters? Yes No
b. If yes, how much do you pay for them? (VNĐ/ porter):.....

23. a. Do you sell all the cashew nuts in the same buying day or store them for some days?
 Sell them in the same day store them for (days)
b. If store them for some day, do you dry them (sun-drying).....
c. Do you hire labor to sun dry the cashew nuts?.....
d. If yes, how many people do you hire?:.....
e. Cost for these labors? (VNĐ/labor/day).....

24. a. Do you hire labor to collect cashew nuts? Yes No
b. If yes, how much do you pay? (VNĐ/labor):.....

CONTAINER

25. a. What is the container to store the cashew nuts? What is the capacity of these containers?
Nylon pack (.....kg/01 pack) Bamboo basket (.....kg/01basket) Others (specify):..... (....kg/.....)
b. Cost of these containers:
Pack:đ/01 pack Bamboo basket: đ/01 others (specify).....

26. Other cost: Weight scale:....., How long is its useful life?year

COMMUNICATION

27. a. How do you contact/communicate with the farmers/middle man?
Face to face contact telephone mobile phone 4. Others
b. On average, how much is the cost of telephone per month:.....VNĐ

CASHEW NUT STORAGE

28. Do you have to hire premise for storage? Yes No
If yes, area?:.....m² Cost:VNĐ/m²

29. a. Do you store cashew nuts? Yes No
b. Normally, how long do you store?: lost rate:.....%
c. When do you decide to store cashew nuts? Why do you store cashew nuts?
 Selling in big amounts waiting for higher price others

.....
.....

d. What is the cost when you store cashew nut?

.....
.....

G. OPERATION SIZE OF THE COMPANY

Employment: How many employees are there in your company? in purchasing cashew nut? in processing?

.....
.....
.....

How many percentage have you exported the processed cashew nut?

.....
.....

H. YOUR DIFFICULTIES AND SUGGESTION IN PURCHASING CASHEW NUT,

Difficulties in purchasing cashew nut bean for processing, including importation?

.....
.....
.....

Difficulties in processing and selling processed product in the output market?

.....
.....
.....

Your suggestion for improvement?

.....
.....
.....

Thank you very much!

APPENDIX 02. STUDY SITE SELECTION

Appendix 2.1 Cashew nut plantation by district in 2003

No	District	No of households	No of households under cashew plantation	Households under cashew plantation (%)
1	Dong Xoai	11763	1334	11.34
2	Dong Phu	14506	4801	33.10
3	Phuoc Long	34368	14040	40.85
4	Loc Ninh	29447	1750	5.94
5	Bu Dang	20829	8926	42.85
6	Binh Long	38409	3472	9.04
Binh Phuoc		149322	34323	22.99

Source: Agricultural Extension in Binh Phuoc Province (2004)

Appendix 2.2 Cashew production sown area and output by district in Binh Phuoc

	Production sown area (ha)			Output (tons)		
	2003	2004	2005	2003	2004	2005
Dong Xoai	3,457	3,594	4,234	2,489	2,599	3,259
Dong Phu	10,642	12,145	10,844	9,897	11,000	10,762
Phuoc Long	31,608	35,333	39,096	29,617	44,770	48,892
Loc Ninh	2,541	2,416	2,644	918	2,080	3,570
Bu Dop	902	962	1,258	655	728	952
Bu Dang	19,801	24,579	27,858	18,217	30,180	38,269
Binh Long	5,271	5,297	5,430	5,245	4,982	7,489
Chon Thanh	2,215	1,989	1,707	1,994	1,791	1,792
Binh Phuoc	76,437	86,315	93,071	69,032	98,130	114,985

Source: GSO 2005, Statistical Yearbook 2005 (2006, p. 85)

Appendix 2.3a Administrative unit, area and population and motor way status

No.	District	Administrative unit, area and population					Motor way status			
		No. of communes	No. of downtown	Area (Km ²)	Aver. Population	Population density (person/km ²)	urban population (% of total)	Total	Asphalted road	Gravel & earth road
1	Dong Xoai	3	4	168.48	65,878	391	61.6	7	7	
2	Dong Phu	10	1	929.06	79,894	86	8.8	11	9	2
3	Phuoc Long	16	2	1,858.94	184,483	99	11.3	18	18	
4	Loc Ninh	14	1	862.97	113,219	131	9.0	15	15	
5	Bu Dop	6	1	377.51	50,135	133	14.8	7	6	1
6	Bu Dang	12	1	1,488.33	115,616	78	6.0	13	12	1
7	Binh Long	13	1	757.73	142,776	188	12.1	14	14	
8	Chon Thanh	8	1	414.58	62,329	150	21.3	9	9	
	Binh Phuoc	82	12	6857.35	814,330	119	15.2	94	90	4

Source: GSO 2005, Statistical Yearbook 2005 (2006, p35, p.40, p.149)

Appendix 2.3b The availability of purchasing services in Binh Phuoc province in 2003

Districts	No. of purchasing station	
	Level 1	Level 2
Dong Xoai	4	18
Dong Phu	2	70
Phuoc Long	6	100
Loc Ninh	1	3
Bu Dang	3	50
Binh Long	2	4
Binh Phuoc	18	245

Source: DoTT (2004), DARD (2004)

Appendix 2.4 Cashew production sown area and output by district, in Dak Nong in 2003-05

District	Planted area (ha)			Output (tons)		
	2003	2004	2005	2003	2004	2005
Cu Jut	373	846	1458	86	230	525
DaK Mil	87	165	2550	43	69	308
Krong No	na.	923	3526	na.	416	482
Dak Song	na.	6	320	na.	10	15
<i>Dak R'lap</i>	<i>1700</i>	<i>3711</i>	<i>10510</i>	<i>1761</i>	<i>2937</i>	<i>4561</i>
Dak Glong	116	391	1241	na.	16	23
Gia Nghia	231	623	1334	50	50	784
Dak Nong	2507	6665	20939	1940	3728	6698

Source: DaK Nong GSO 2006, Statistical Yearbook 2006 (2006, p. 57); na: Not available

Appendix 2.5 Number of household in Dak R'lap district and cashew planted area in 2004

	Population	Cashew nut planted area		Cashew nut yield
	(Persons)	ha	%	(ton)
Kien Duc Town	6872	18,0	0.49	10,0
Quang Truc	1876	20,0	0.54	1,5
Dak Buk So	5031	18,0	0.49	-
Dak R'Tih	5430	209,0	5.63	49,0
Quang Tan	7165	185,0	4.99	120,0
Quang Tin	8808	1347,0	36.30	1500,0
Dak Sin	9144	180,0	4.85	204,0
Dao Nghia	10601	132,5	3.57	102,1
Nhan Dao	3178	60,0	1.62	25,5
Nhan Co	12100	302,6	8.15	108,9
Kien Thanh	7483	206,1	5.55	146,4
Dak Ru	8887	640,0	17.25	591,0
Others		392.5	10.58	79.0
Total	86575	3710,7	100	2937,4

Source: Statistical yearbook of Dak R'Lap District, 2005

Appendix 2.6 Ethnic minority population in Dak R'lap district in 2002

	Number of households	Ethnic minority (%)	
Quang Truc	555	518	93
Dak Buk So	1044	229	22
Dak R'tih	962	798	83

Quang Tan	1374	439	32
Quang Tin	3772	1018	27
Dak R' lap	7707	3002	38.96

Source: Data provided by the officials in Dak R'Lap District

APPENDIX 03. EXPLANATORY CALCULATION OF VALUE ADDED IN THE DISTRIBUTION CHAINS

APPENDIX 3.1 Explanatory calculation of value added in the distribution chains – Farmers

Cost items in the value chain	Dak Rlap			Dong Phu		Phuoc Long		Bu Dang
	Kinh		Ethnic minority	Kinh	Ethnic minority	Kinh*	Ethnic minority	Ethnic minority
Area (ha)	2	3	2	2	3	3	30	2
Initial investment cost (d/ha)	62,667	147,333	9,000	26,889	70,513	324,611	157,667	260,925
Land								
Seed	4,000	20,000	5,000	2,000	2,000	1,500	1,000	2,000
Plough							133,333	
Digging	2,667	20,000	4,000	2,667	8,000	6,000	23,333	26,667
Labor		4,000				6,000		
Fertilizer		50,000		11,111		111,111		
Pesticide		13,333		11,111		166,667		
Weeding	56,000	40,000			60,513	33,333		232,258
Annual cost (d/ha)	2,066,667	2,600,000	1,500,000	1,893,667	961,538	4,950,000	3,500,000	2,419,354
Fertilizer	733,333	750,000	500,000	733,333		1,666,667	500,000	
Pesticide	333,333	200,000		733,333		833,333	1,500,000	
Weeding		600,000				450,000		1,741,935
Harvesting	1,000,000	1,050,000	1,000,000	427,000	961,538	2,000,000	1,500,000	677,419
Total cost (d/ha)	2,129,334	2,747,333	1,509,000	1,920,556	1,032,051	5,274,611	3,657,667	2,680,279
Yeild (kg/ha)	467	1,500	1,000	560	962	2,000	1,500	968
Price (d/kg)	8,664	8,666	7,500	8,664	8,840	7,417	8,244	9,266
Value (d/ha)	4,046,088	12,999,000	7,500,000	4,851,840	8,504,080	14,834,000	12,366,000	8,969,488
Profit (d/ha)	1,916,754	10,251,667	5,991,000	2,931,284	7,472,029	9,559,389	8,708,333	6,289,209
Cost per kg (d/kg)	4,560	1,832	1,509**	3,430	1,073	2,637	2,438	2,769

Source: Survey data, 2006

Note: *: This sample is used in calculation in Table 4.1.

** : This sample is used in calculation in Table 5

Appendix 3.2 Explanatory calculation of value added in the distribution chains – Purchasing station level 01

Cost items in the value chain	Unit	Binh Phuoc	DaKNong	Binh Phuoc	Binh Phuoc	DaKNong
					Average calculation*	
Earnings (calculated)	d/month		49,800,000	37,519,233		
Margin	d/kg	200	200	200	200.00	200.00
Trading time		120	90	90	105.00	90.00
average	days	90	40	65	77.50	40.00
max	days	15	20	10	12.50	20.00
min	days	15	30	15	15.00	30.00
Trade volume		1,275,000	1,500,000	1,057,500	1,166,250	1,500,000.00
average	kg/day	10000	15,000	10,000	10,000.00	15,000.00
max	kg/day	20000	30,000	40,000	30,000.00	30,000.00
min	kg/day	5000	10,000	500	2,750.00	10,000.00
Cost					-	-
Cost of capital	d/kg	19.2	28.8	26.4	22.82	28.80
Tax			1.00	1.42	0.71	1.00
Normal loss	d/kg				-	-
packing	d/kg	33.33	42	32	32.67	42.00
weighing machine	d/kg	0.6	0.6	1.13	0.88	0.60
	d/year	800,000	900,000	1,200,000	1,000,000.0	900,000.00
	units/year	2	2	3	2.50	2.00
transport cost	d/kg	37.5			18.75	-
communication	d/kg	3.53	3.00	1.89	2.71	3.00
Telephone	d/month	3000000	1500000	2,000,000	2,500,000.0	1,500,000.00
labour cost	d/kg	15.69	25.00	30.67	23.18	25.00
labour cost for drying						0
Total cost	d/kg	109.88	100.40	93.56	101.72	100.4
Profit	d/kg	90.12	99.60	106.44	98.28	99.6

Source: Survey data, 2006

Note: *: The average calculation in Binh Phuoc is used in calculation in Table 4.1.

Appendix 3.3 Explanatory calculation of value added in the distribution chains – Purchasing station level 02

Cost items in the value chain	Unit	Dong Phu		Phuoc Long		DaKNong		Binh Phuoc DaKNong		
		4	1	6	14	9	12	Average calculation*		
Earnings (calculated)	d/month	8,210,000	9,153,333	30,668,519	19,471,579	18,935,000	1,477,500			
Margin	d/kg	200	200	200	200	300	400	200	300	
Trading time		90	90	90	95	60	120	90	92	
average	days	60	40	50	45	20	60	50	42	
max	days	15	30	20	30	10	30	22	23	
min	days	15	20	20	20	30	30	18	27	
Trade volume		367,500	375,000	1,450,000	539,000	206,000	27,000	730,833	257,333	
average	kg/day	4,000	4,000	15,000	5,000	5,000	200	7,667	3,400	
max	kg/day	8,000	6,500	30,000	10,000	10,000	400	14,833	6,800	
min	kg/day	500	1,000	5,000	700	200	100	2,167	333	
Cost		14.69	2.88	2.48	3.01	13.11	40.00	7	19	
Cost of capital		5,400,000	1080000	3,600,000	1,620,000	2,700,000	1,080,000	3,360,000	1,800,000	
packing	d/kg			44.44				15	0	
Normal loss	d/kg	80	80	80	80	80	80	80	80	
weighing machine	d/kg	4.00	2.29	0.62	0.74	2.18	16.67	2	7	
	d/year	400,000	860,000	900,000	400,000	450,000	450,000	720,000	433,333	
	units/year	1	2	2	1	1	1	1.67	1	
transport cost								0	0	
communication	d/kg	12.24	3.20	0.72	1.86	3.40	44.44	5	17	
Telephone	d/month	1,500,000	400,000	350,000	500,000	350,000	300,000	750,000	383,333	
labour cost	d/kg	22.04	38.40	8.28		17.48		23	6	
Labor cost per day	d/day	90,000	160,000	4,000,000				1,416,667	0	
No. of labour	persons	3	4	5				4	0	
wage	d/day	30,000	40,000	800,000				290,000	0	
Total cost	d/kg	132.98	-	126.77	136.55	85.60	116.17	181.11	132	128
Profit	d/kg	67.02		73.23	63.45	114.40	183.83	218.89	68	172

Source: Survey data, 2006

Note: *: The average calculation in Binh Phuoc is used in calculation in Table 4.1.

Appendix 3.4a. Explanatory calculation of value added in the distribution chains– Collectors
(Not including collector’s labor cost in the calculated operational cost)

Cost items in the value chain	Unit	Case 01	Case 02	Average
Earnings (calculated)	d/month	2,179,074	1,726,389	
Margin	d/kg	200	200	200
Trading time		40	30	35
average	days	20	15	18
max	days	10	10	10
min	days	10	5	8
Trade volume		55,000	42,500	48,750
average	kg/day	1,000	1,200	1,100
max	kg/day	3,000	2,100	2,550
min	kg/day	500	700	600
Cost				
packing	d/kg	17	15	16
weighing machine	d/kg	6.36	8.24	7
	d/year	350,000	350,000	350,000
	units/year	1	1	1
	d/unit	350,000	350,000	350,000
transport cost		23.84	23.14	23
gasoline	d/day	30000	30000	30,000
transportation means	d/month	83,333	83,333	83,333
communication	d/kg	4.85	3.53	4
Telephone	d/month	200,000	150,000	175,000
Total cost	d/kg	52.05	49.90	50.98
Profit	d/kg	147.95	150.10	149.02

Source: Survey data, 2006

Appendix 3.4b. Explanatory calculation of value added in the distribution chains– Collectors
(Including collector’s labor cost in the calculated operational cost)

Cost items in the value chain	Unit	Case 01	Case 02	Average
Earnings (calculated)	d/month	2179074	1726388	
Margin	d/kg	200	200	200
Trading time		40	30	35
average	days	20	15	18
max	days	10	10	10
min	days	10	5	8
Trade volume		55000	42500	48,750
average	kg/day	1000	1200	1,100
max	kg/day	3000	2100	2,550
min	kg/day	500	700	600
Cost				
packing	d/kg	17.00	15.00	16
weighing machine	d/kg	6.36	8.24	7
	d/year	350,000	350,000	350,000
	units/year	1.00	1.00	1
transport cost		23.84	23.14	23
gasoline	d/day	30,000	30,000	30,000
transportation means	d/month	83,333.33	83,333.33	83,333

communication	d/kg	4.85	3.53	4
Telephone	d/month	200,000	150,000	175,000
labour cost	d/kg	29.09	28.24	29
	d/day	40,000.00	40,000.00	40,000
No. of labour	persons	1.00	1.00	1
wage	d/day	40,000	40,000	40,000
Total cost	d/kg	81.14	78.14	80
Profit	d/kg	118.86	121.86	120

Source: Survey data, 2006

Appendix 3.5.1 Distribution of costs and profits in cashew nut value chains

Actors/cost items in the value chain	Unit	Value	%
• Farmer			
Total cost	d/kg	2,637.31	30.91
- Initial investment cost	d/kg	162.31	
- Annual cost	d/kg	2,475.00	
Farmers' net profit margin	d/kg	5,494.69	64.40
Farmgate price	d/kg	8,132.00	
• Collector			
Margin	d/kg	200.00	
Total cost	d/kg	50.98	0.60
Cost of capital			
Normal loss	d/kg		
packing	d/kg	16.00	
weighing machine	d/kg	7.30	
labour cost	d/kg		
transport cost and communication	d/kg	27.68	
Profit	d/kg	149.02	1.75
Purchasing price of Level02	d/kg	8,332.00	
• Purchasing station level 01			
Margin	d/kg	200.00	
Total cost	d/kg	101.72	1.19
Cost of capital		22.82	
Normal loss	d/kg	0.00	
packing	d/kg	32.67	
weighing machine	d/kg	0.88	
labour cost	d/kg	23.18	
transport cost and communication	d/kg	22.00	
Profit	d/kg	98.28	1.15
Purchasing price of market	d/kg	8,532.00	
Total profit	d/kg	5,742.00	100.00

Source: Survey data, 2006

Appendix 3.5.2 Distribution of costs and profits in cashew nut value chains (%)

Figure for graphs (in%)	100		100		100
Farmers' cost	30.91	Farmers' margin	95.31	Farmers' profit of VC	95.69
Farmers' profit	64.40	Collector's margin	2.34	Collector's profit of VC	2.60
Collector's cost	0.60	Level01's margin	2.34	Level01's profit of VC	1.71

Collector's profit	1.75
Level01's cost	1.19
Level01's profit	1.15

Source: Survey data, 2006

APPENDIX 04. REGRESSION MODEL AND DIAGNOSTIC TESTS

Appendix 4.1 Analytical framework and model specification

Under hedonic pricing approach, the literature has put forward six groups of explanatory variables namely, infrastructure, buyer, product, household characteristics, seasonal effects and information. These are each conformed to practical transaction condition in Binh Phuoc and DaKNong provinces so as to reveal the most significant set of variables for estimation model. Some issues of sample selection and data collection will then be introduced.

Using the hedonic pricing model, a linear regression is applied in this study. Dependent variable is cashew nut's farmgate price received by households during the studied year 2006. Each explanatory variable group is in turn conformed to local condition for a set of specific variables in estimation.

Household characteristics

As debated in literature, household's characteristics namely, ethnicity, year of cashew cultivating and trading experience and the sale-decisive person's characteristics including educational level and sex are brought in the estimation. As most of sale decisive persons are farming occupation (97%), job variable is omitted in the estimation.

Dummy variables including minority ethnicity (yes=1) and sex (male=1) are utilized in estimation. Minority ethnicity is less favorable to market access and other transaction conditions. Bargaining ability of male is often lower than female in dealing. Thus, both variables expectedly create negative coefficients. Quantity variables namely, year of education of sale decisive person and year in cashew production do expectedly induce a positive impact on farmgate price because they more effectively bargain and better establish trading relationship.

Seasonal effects

The seasonal effects are evidently placed in estimation under dummy sale month variables. The sampled transactions are all carried out in the first five calendar months in the survey. Accordingly, sales in March are assigned a zero value as a base or comparison for its middle point of time in the studied selling period. While the first two months expectedly have positive coefficients due to high purchasing capacity at the beginning of harvest, the later two months are expected to create negative ones after the peak period of harvest season.

Product

Relating to product factor, we has employed in the survey four proxies, namely transaction size, quality marked from 5 at the best to 1 at the worst, dummy ranking variable (yes=1) and types of product including fresh, dried, selling short and in package selling.

However, there is no deal in package, selling short and too few transactions of dried and grading their cashew nut in the empirical survey to employ in estimation. Remaining two variables of quality and quantity are placed in regression involving cashew nut product. The higher quality of cashew nut farmers sell, the higher farmgate price they receive due to higher bargaining position. Thus, two variables are expected to induce a positive impact on farmgate price.

Infrastructure

Most of local farmers sell cashew nut to dealer without any evidence of transportation time. Besides, time variable is expectedly correlated to distance, as transportation mean popularly is motorbike. Infrastructure factor is thus measured by the distance from selling point to the nearest purchasing station. This measure is found suitable proxy of opportunity cost in transportation and the availability of purchasing system in each studied area. Accordingly, this variable is expected to create a negative impact on farmgate price.

Buyer and bargaining position

The choice, number and type of buyer are debated surrounding buyer factor in previous studies such as Ramatu (1999, p.14), Minten (1999, p.17), Vakis et al (2003, p.15) and Escobal (2001, p.11). The ratio of the number of traders to whom farmers possibly sell products to the numbers of traders demand and ask for buying cashew nut reflects their market accessibility and their ability in choosing buyers. The higher this number is, the more competitively farmers sell products and improve their selling prices concerning bargaining power. This implies better position in conducting transaction, negotiating with buyers to raise selling prices without any obligatory or enforcement. As a result, this variable expectedly induces a positive impact on farmgate price.

The rationales of selling time are extracted in estimation under dummy indebtedness variable (yes=1) concerning farmers' bargaining position. As under indebtedness, they have to sell their produce as soon as possible and commonly to buyers who previously provide financial support as an obscured buying obligation.

Information

In this study, a dummy variable of whether farmers follow up cashew nut market price before transaction (yes=1) is employed to capture the impact of information on farmgate price. Theoretically, this variable creates a positive coefficient in regression.

Appendix 4.2 Variable descriptive statistics

Descriptive statistics	N	Minimum	Maximum	Mean	Std. Deviation
Farmgate price (VND/kg)	268	4000	11000	8,131.53	1,144.53
<i>Seasonal effects</i>					
January	11			9127	
February	61			8785	0.40
March	89			8478	
April	82			7597	0.40
May	25			6620	0.40
<i>Household's characteristics</i>					
Minority Ethnic (Yes=1)	500	0	1	0.71	0.45
Year of cashew cultivation	500	1	24	10.68	4.84
<i>Sale decisive person</i>					
Year of education	485	1	12	5.20	3.22
Sex (Male=1)	500	0	1	0.75	0.43
<i>Distance</i>					
Distance to nearest purchasing station	500	0	6000	1,756.69	1,795.98
<i>Bargaining position</i>					
Market accessibility	485	0.2	2.5	0.87	0.39
Bargaining position (Indebtedness=1)	268	0	1	0.44	0.50
<i>Product</i>					
Cashew nut 's quality	266	1	5	3.73	1.06
Production scale (ha)	500	0.5	30	3.61	3.94
<i>Information</i>					
Follow-up market price before transaction	499	0	1	0.71	0.46

Appendix 4.3 Characteristics of household and sale decisive person

Items	BinhPhuoc						DaKNong		Total	
	Bu Dang		Phuoc Long		Dong Phu		DaKRLap		No	%
	No	%	No	%	No	%	No	%		
Size sample	23		19		19		38		99	
Ethnic										
Ethnic Kinh	2	8.70	9	47.37	14	73.68	4	89.47	29	29.29

Ethnic minorities	21	91.30	10	52.63	5	26.32	34	10.53	70	70.71
Year of cultivation										
- < 7 years	2	8.70	0	-	3	15.79	8	21.05	13	13.13
- 8-12 years	5	21.74	3	15.79	12	63.16	18	47.37	38	38.38
- >12 years	16	69.57	16	84.21	4	21.05	12	31.58	48	48.48
Decisive person										
Sex (Male=1)	18	78.26	12	63.16	12	63.16	33	86.84	75	75.76
Farm occupation	23	100	18	94.74	18	94.74	37	97.37	96	96.97
Years of education										
- Grade 1 (1-5 years)	13	56.52	7	36.84	11	57.89	25	65.79	56	56.57
- Grade 2 (6-9 years)	6	26.09	8	42.11	6	31.58	11	28.95	31	31.31
- Grade 3 (10-12 years)	4	17.39	4	21.05	2	10.53	2	5.26	12	12.12

Appendix 4.4 Diagnostic test illustration

a. Normality test

A first look at the normal P-P Plot of regression residual in Appendix 4.5 provides evidence of the normal distribution of regression residuals. The normality test for residuals is performed through the Jarque-Bera (JB) test. As Gujarati (1995, p. 143) shows, the JB-statistic calculated from number of observations (n), skewness (S) and kurtosis (K) statistic follows the chi-squared (χ^2) distribution with 2 degree of freedom (df) (see Formula 01). If the probability of JB computed value is higher than 5%, we do not reject the normality conclusion. As probability is greater than 5% (10.097%), we can obtain the normality conclusion of residual in regression.

Jarque-Bera test of normality of residuals

No of obs. (n)	(S)	(K-3)	JB-statistic	CHSQ (2)
252	0.2247	0.2194	4.5859	0.10097

$$JB = n \left[\frac{S^2}{6} + \frac{(K-3)^2}{24} \right] \quad (1)$$

b. Specification model test

Specification error test carried out in this study is Ramsey's RESET test. Following this test, we utilize the squared fitted value as an additional regressor in the auxiliary regression in F-version.

$$F_{computed} = \frac{R_{new}^2 - R_{old}^2 / \text{No.of.new.regressor}}{(1 - R_{new}^2) / (\text{No.of.obs.}(n) - \text{No.of.parameters}(k))} \quad (2)$$

For Ramsey's RESET test guided by Gujarati (1995, p. 464), we calculate the F computed value indicated in formula 02. The terms R_{new}^2 and R_{old}^2 are respectively R-squared in the tested regression and auxiliary regression. The F-computed value possesses F-distribution with s and (n-k) df that are 1 and 254 respectively in this study.

Appendix 4.6 presents the auxiliary regression results. The summary of the crucial results of specification error test is in the following table. The F computed value is lower than F critical value or the probability is greater than 5%, we therefore conclude the goodness of model specification.

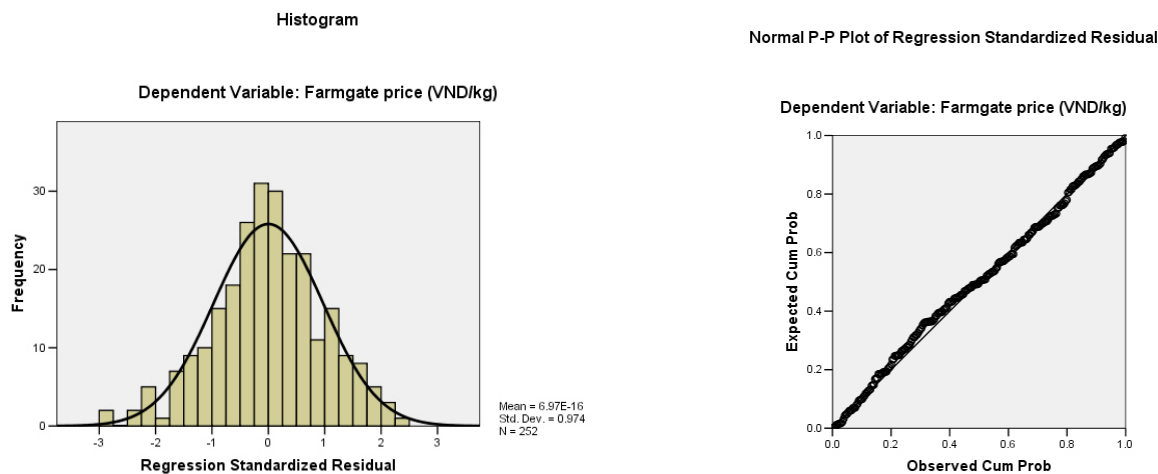
Ramsey's RESET test of Specification error

R^2_{old}	R^2_{new}	$F_{computed}$	Critical	Prob.
0.6091	0.611135479	2.19437	3.84	0.1393

c. Heteroscedasticity test

Heteroscedasticity test is conducted on the basis of auxiliary regression of the squared residual on the squared fitted value. F computed is derived from F-statistic in auxiliary regression and follows F distribution. If the probability to obtain F computed value is greater than 5%, we can confirm that the regression does not possess heteroscedasticity. The auxiliary regression result is placed in Appendix 4.7 F-statistic (6.773) is then put into FDIST function in excel software to obtain the relevant probabilities. The probability is higher than 5% (17.8054%). As a result, the conclusion is that heteroscedasticity does not exist in regression.

Appendix 4.5 Normal P-P plot of regression residual



Appendix 4.6 Auxiliary regression for Ramsey's Reset test

Variable	Coefficients	t-ratio ^(**)	Prob. ^(*)
Dependent Variable: farmgate price (VND/kg)			
Independent Variable			
(Constant)	13,598.2489	5.4472	0.0000
<i>Seasonal effects</i>			
February	908.3841	3.3889	0.0008
April	(2,727.4785)	(3.8243)	0.0002
May	(5,385.9994)	(3.9243)	0.0001
<i>Household's characteristics</i>			
Minority Ethnic (Yes=1)	(1,679.4401)	3.7384	0.0002
Year of cashew cultivation	68.3570	3.4187	0.0007
<i>Sale decisive person</i>			
Year of education	101.0026	3.3199	0.0010
Sex (Male=1)	(123.6053)	(1.0563)	0.2919
<i>Distance</i>			
Distance to nearest purchasing station	(0.1775)	(3.2992)	0.0011
<i>Bargaining position</i>			
Number of purchasers (m13bb/m13ba)	1,414.9062	3.5803	0.0004
Household's bargaining position (Indebtedness=1)	(1,996.3577)	(3.7838)	0.0002

Product

Cashew nut 's quality	549.1365	3.7048	0.0003
Production scale (ha)	(34.3014)	(2.2589)	0.0248

Information

Follow-up cashew nut market price before transaction	1,215.2235	3.6794	0.0003
PRE_1_SQ (farmgate price fitted _squared)	(0.0001)	(2.6912)	0.0076

Number of observations:	F-statistic F (14, 251): 26.585
R-squared: 0.610958366	Prob. (F-statistic): 0.000
Adjusted R-squared: 0.587977003	
Dw-statistic: 1.884964161	

Note: (*): Probability (p value) of obtaining t-ratio indicates the exact level of significance

(**): t-ratio in comparison with the critical value in t-distribution statistic also provides the level of significance

Appendix 4.7 AUXILIARY REGRESSION FOR HETEROSCEDASTICITY TEST

Variable	Coefficients	t-ratio	Prob.
Dependent Variable: Residual -squared RES_1_sq			
Independent Variable			
(Constant)	1,124,101.62	4.8364	0.0000
Farmgate price fitted -squared PRE_1_sq	(0.0088)	(2.6025)	0.0098
Number of observation: 253			
R-squared: 0.026376468	F-statistic F (1, 251): 6.773		
Adjusted R-squared: 0.022481974	Prob. (F-statistic): 0.0098		
Dw-statistic: 1.9325			

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