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Market Integration for Local Farmers

Case Study of Vegetable Trade in Sourt Nikom District, Siem Reap Province, Cambodia

Chou Phanith, Phnom Penh, Cambodia

Department of Urban and Rural Development
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SLU

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ABSTRACT

This study analyses farmers' adjustments of vegetable production and trading decisions in relation to a number of market- as well as non-market related factors. Fluctuations in the price of vegetables, degree of specialization in vegetable production and the choice of vegetable crop portfolio, as well as the impact of external actors such as GOs and NGOs are examples of factors influencing farmers' decisions and actions.

Empirical data for the discussion on the issues above were collected using qualitative and quantitative approaches during fieldwork in Sam Raong and Dan Run communes in Sourt Nikom district, Siem Reap province, Cambodia. Seasonal calendar, ranking, venn diagram, problem tree, and feedback information were used in qualitative methodology. In the quantitative approach, 60 households were interviewed in a questionnaire survey.

The result shows that, farmers actively integrate their vegetable production to the markets but not in an optimal way, why the profitability is lower than what could be expected. Some farmers expand vegetable production in large scale in order to satisfy the high demand of traders. Unfortunately they supply only seasonally, something which dynamic traders do not prefer. Other farmers grow all year around but it is at very small scale. This reduces the benefits in comparison with the large scale and seasonal growers. Vegetable growers also assess the quality and prices of inputs but they lack understanding about the importance of checking expiry date, usage instruction, and bargaining the prices. Also, they try to engage with relevant stakeholders like government authorities or non-government organizations in order to improve their vegetables production. However, the level of acceptance and adoption of new techniques is still limited. Finally, while farmers strive to create more options for selling their vegetables to reduce the effects of price shocks, they are still not successful in meeting the requirements of traders who are able to offer the higher price levels typical for the city markets.

The outcomes from vegetables production are clearly positive but farmers are not reaching the marginal profit. Cash income from vegetable sales constitutes nearly 70% of total net cash income among the sampled farm households. Differences in the ways farmers integrate in the markets result in different incomes from vegetable sales. While Sam Raong commune's farmers earned profits from vegetable sales at the level of an average of 2,497 000 Riel, Dan Run farmers only made a profit of 1,302 000 Riel per annum.

The study discusses the ways in which farmers' assets endowment, government and NGOs involvement, social relationship, price fluctuation, food security considerations, commodity, and natural conditions affect farmers' decision in both vegetables production and trading process.

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Chou Phanith

CONTENTS

ACRONYMS

CENTDOR	Center for Development Oriented Research in Agriculture and Livelihood Systems
CUTS	Centre for International Trade, Economics & Environment
ECOSORN	Economic and Social Relaunch of Northwest Province in Cambodia
GOs	Government Organizations/Projects
GTZ	German Technical Cooperation
Ha	Hectare
IPM	Integrated Pest Management
Km	Kilometer
MAFF	Ministry of Agriculture, Forestry, and Fishery (Cambodia)
MOT	Ministry of Tourism (Cambodia)
NGOs	Non Government Organizations
P	People/Persons
R	Riel (Cambodian Currency)
T	Ton
USD	US Dollars

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1 INTRODUCTION

1.1 Justification

Market integration is important for people's livelihood as it carries potential benefits for actors involved. Unfortunately, the benefits are rarely equally distributed. Some stakeholders can gain while others lose. Therefore, a central issue in agricultural development is whether local farmers, who are key actors in this system, become winners or losers in the process. And, how do local farmers make decisions to engage with other actors to generate high profits? These are the entry questions which should be answered, in order to better understand the conditions for successful market integration benefiting all.

Ideally, farmers should have certain well developed relationships with dynamic market agents. In this way they can access agricultural inputs easily and sell their products for a suitable price while other stakeholders can also get benefits from their service providing or trading process. Also, this interaction can be a bridge which connects from domestic agricultural products to industrial products for supplying the world's demand (Ahmed, 2006; Berdegué et al., 2008; Estelle et al., 2004; Haggblade et al., 2007; Sorensen, 2001).

But, in many countries, especially in developing countries, the farmers harvest agricultural products only for their own consumption. They do not get high income from their agricultural products because they do not access the markets or their access to markets is weak. There are many problems that make the farmers fail in the marketing systems. The lack of roads, transportation, agro-processing, market actors, price control, quality control, and long distance from the city, etc. are found to be core causes leading to failure in agricultural marketing (Estelle et al., 2004; World Bank, 2007).

Cambodia shares several of the mentioned problems of weak marketing systems with other developing countries. Agriculture is an engine of growth, but the rate of poverty is still high. It needs trading process to generate households' income, which is a main source of national economic growth. Wherever producers have close interactions with market actors to sell their products at suitable prices, with stability, they earn more income for their families. There are some efficiency interactions that bring smallholder producers high benefits in Cambodia including a contract between market actors (supermarket, hotel, restaurant, and agro-industry, etc.) with farmers and a farmer community for selling products directly to the market. And, in several cases, the big or medium industries collect agricultural products from the farmers for processing, so they do not only provide income through buying products but also give employment opportunity to local people (GTZ, 2006; Royal Government of Cambodia, 2004).

In contrast, the link between farming and the private sector as mentioned above is still very weak in many places in Cambodia. Agricultural smallholder producers find it difficult to access both the input market and the output market and this makes them fail in marketing systems. They are the worst off group because they have to buy inputs at high prices and sell to middleman at low prices. That is a serious problem behind unequal benefits and conflicts in society (CUTS, 2005; GTZ, 2006).

Vegetables are regarded as important crops for generating income in rural Cambodia. As short duration crops, vegetables are also the source of much needed cash for farmers. Moreover, the high demand for vegetable production at world tourist hub zones like in Phnom Penh capital city and Siem Reap province are the main market opportunity, for all local farmers can increase their productivity by selling to the markets. But the farmers often suffer due to unstable prices. The price of vegetables varies from one season to another, and it is also different from one location to another. This is the main problem causing high risk for growing and selling their vegetable

products. Market integration is found important to solve this problem because it provides multiple benefits. However, the integration between vegetable productions and other sectors is still weak, which is a very common problem in many places of Cambodia.

Many research studies have focused on farmer's production in Cambodia. They are interested mostly in how to make farmers increase their productivity and what strategies should be used to intervene in market integration, but they seem to give less attention to how farmers make decisions in market integration for generating income. In many cases farmers still live in poverty even though they have surplus agricultural products, good market actors, and market opportunity, so what exactly happened and why is it so? Is the marketing problem caused by farmers' awareness to engage in market integration?

From this context, this research will explore the different characteristics of farmers in market integration by focusing on vegetable production as the case study. It is designed to reach a goal that could bring smallholder farmers to the markets aiming to success for all in an equitable way. It will be a new and hot study, for the attention of Government, Donors, NGOs, and other stakeholders. I expect that this research could contribute in helping small farmers generate more income in their production "in the short term", and it could be a concept that brings Cambodia to become an industry country through efficient marketing systems "in the long term"

1.2 Research Questions

This thesis attempts to answer one main research question:

To what extent and in what ways does local farmers' behavior affect the process of market integration?

To find the answers to the main question, I have three specific research questions:

1. How do farmers growing vegetables adjust, in terms of production and marketing decisions, to fluctuations in the price of vegetables?
2. To what extent do different farmers' characteristics in vegetables management affect the outcomes in terms of costs and margins?
3. What are the determining factors affecting local farmers' behaviors in vegetable market engagement

1.3 Limitation of the Study

Our focus on market integration and farmers' behavior does not mean that all the various characteristics and components will be shown in this study. Even though this study broadly looks at all stakeholders operating in the vegetable value chain, including farmers, traders, government, GOs, NGOs, and local authorities, it is farmers' situation at the local level that has been chosen as the focus for the analysis presented. Another limitation is regarding the level of detail of farms' input costs. Each operation has costs in terms of seeds, varieties, manure fertilizer, chemical fertilizer, pesticide, and depreciation, etc. which are not enclosed accurately even though we used them for calculating the total production costs for each farm different alternatives. This case study does not focus much on those detailed operation costs because the main purpose is to study the farmer's characteristic in vegetables' market integration and how that engagement effects to costs and margins. So, only summary costs of all different farm activities will be presented. Also, given the fact that the study draws on data collected in only two communes in one district, it should be viewed as an exploratory case study. The absence of detailed data from local authority offices and relevant NGOs offices about number of beneficiaries and success indicators of their projects is also another limitation, for this study hardly support lacking information from the farmers.

1.4 Research Structure

This thesis is organized in five chapters. Chapter 1 introduces the motives behind the selection of study topic, the relevance of the study topic, and the specific research questions. Chapter 2 offers a theoretical background to market integration as well as a background on vegetable production in Cambodia. In a final section of the chapter a conceptual framework is presented. Chapter 3 describes the methodology and approach used for collection and analysis of data. Chapter 4 presents the findings and discussions around farmers' perception in vegetable market integration in the field. Finally, chapter 5 provides conclusions for the study and raises some key questions for further research.

2 LITERATURE REVIEW

2.1 Market Integration Characteristics

2.1.1 Market Integration Concepts

The movement of market liberalization and globalization has stimulated economic growth in both developed and developing countries. This movement is also the catalyst to increase agricultural production (Estelle et al., 2004; World Bank, 2007). The growth of agricultural production has been integrated more with farmers. This integration does, however, not always provide equal benefits among stakeholders. Farmers seem to be the less beneficiary group if we compare with another groups of non-farm sectors (Barrett et al., 2005; Estelle et al., 2004). Groups of farmers themselves also experience different economic benefits. Some farmers can be more successful than others even when they are in the same systems (Wolz et al., 2008). So, what exactly is meant by "Market Integration"? And why does it provide unequal benefits among stakeholders?

Different authors provide similar definitions on market integration. McNew (1996) gave the definition of market integration as the trading process where one location has close relationship with the marketing system in order to receive product prices with efficiency and to reduce price shocks. Another author mentioned that market integration is the alternative choices in the trading process to stabilize the price (Mushtaq et al., 2008). Others, Barrett (2005) and Jacks (2000) give a very simple definition on market integration that it is the opening and development of tradability, the flow of commodities from one to different market actors in the systems. Thus, we can see that different authors provide different definitions but in similar way. We can interpret that market integration is the trading process involving different actors for selling and buying with negotiation of prices.

2.1.2 Market Integration Operations

High production is regarded as the core effect, leading to integration in commerce. Whenever people can get high productivity in their production, they start to learn the new norms for exchanging their products for maximum profits. To achieve this, people have to integrate their products with other stakeholders in trading fairness thinking (CHARTRES, 1994; Ensminger, 2004; Maltsoglou & Tanyeri-Abur, 2005). Private sector improvement is very high effective in linking farmers to the dynamic trading process, but farmers themselves also must prepare to act proactively in selling their output (Berdegué et al., 2008). However, we can simply say that market integration is bringing two or more market actors together into one system. Three main kinds of market integration are very common in the world including Vertical Integration, Horizontal Integration, and Circular Integration (Rehber, 1998).

2.1.2.1 Vertical Integration

Vertical integration is the style of management in both production and trading. A firm can manage their own suppliers and buyers. It means that one actor in the market chain has to control other members for getting high benefits (Le Thi Cam Van, 2008; Wikipedia). Rehber (1998) also gave a similar concept that vertical integration is the combination of activities when a firm tries to engage in all activities in their production and trading. For illustration, a meatpacker decides to buy the meat from farmers and operate it for selling to consumers in the countryside. Generally, vertical integration is classified into three varieties. Firstly, "Backward Vertical Integration" means a firm tries to produce some inputs or bargain with other input suppliers to get a suitable price to use in their whole production process. Secondly, "Forward Vertical Integration" happens when the firm tries to control their product distribution to wholesalers, retailers, or consumers. Thirdly, "Balanced Vertical Integration" will have happened whenever

the firm tries to control both input supplies and output distribution by their own operation (Le Thi Cam Van, 2008; Rehber, 1998).
One example related to agriculture is "Farmers may concern themselves only with production: they prepare the land, plant the seeds, apply fertilizer, control pests and weeds, and harvest the crop when it is mature. But they may also be involved in other activities including procuring inputs, drying their crop, sorting and grading, processing, transporting and trading" (KIT et al., 2006).

2.1.2.2 Horizontal Integration

Horizontal integration is in contrast with vertical integration. It is the way that a firm or farmers decide to sell their product to various and numerous markets. It occurs when farmers decide to produce similar products in different areas and sell to different market actors or different areas in order to get high prices for their products (Le Thi Cam Van, 2008; Wikipedia). For example, "farmers improve their access to information and technology, their power to control over contract or their cooperation with other members in the chain". Another example from Wikipedia is "a car manufacturer merging with another car manufacturer. In this case both companies are in the same stage of production and also in the same industry". We can understand that those car companies are like two communities of local farmers, and they integrate to become a union for selling their products to other market actors whom they wish. Rehber (1998) also gives a similar definition of the horizontal integration concept, that it is the way that a firm tries to control over other firms with similar activities at the same level of production and market sequence. This integration is the consolidation of holdings across multiple firms or industries that merge together because they have the same stage of production and trading target. For illustration, local diary cooperatives are brought under the regional union, so the union has rights to sell farmers' products to other market actors who provide them a suitable price.

2.1.2.3 Circular Integration

Circular integration is the combination of vertical and horizontal integration. Some firms try to expand their integration in both vertical and horizontal ways to reach a higher goal in their business. When farmers try to cooperate in the process of their production and trading, a vertical integration appears; at the same time if their cooperative or communities merge together under a regional cooperative union, a horizontal integration has been established. So, it means that a farmer has to cooperate with other farmers in creating a community or cooperative; their cooperative has to continue integrate with another cooperative for establishing a broad cooperative union. According to Rehber, this is an important and positive way to reach such good and big integration for reaching a goal or vision in their business.

When vertical integration has improved, farmers need closely good partners for delivering their products with reasonable prices. So, horizontal integration is also needed to reach the marginal profits. Contract farming is a kind of that combination within vertical and horizontal integration that can bring farmers to a dynamic market and stimulate the agricultural products to globalization. It has been promoted in the recent four decades in developing countries because many GOs, NGOs, and other international organization believe that farming contracts can be the engine to reduce poverty by providing market opportunities for farmers (Coulter et al., 1999; NEPAD et al., Rehber, 1998). Contract farming is defined as the agreement between farmers and a processing, export, or purchasing unit for supplying products with standard quantity, quality, and price through using a contract. We can simply say that the farming contract always includes how much products that the contractor will buy and what price they will pay for it. Sometimes contractor also provide credit, inputs, and technical service for farmers. So, farmers can have enough capability to intensify their agriculture activities in good quality (Baumann, 2000; Coulter et al., 1999). However, contract farming requires farmers to produce and supply

their specific commodity to the entrepreneur at agreed quantity, quality, and prices. This system can bring some threats for farmers. Sometimes the entrepreneur breaks the contract with farmers. For example, they refuse farmers' product by referring to the market's high product quality requirements or to fluctuating market prices. And, in some cases farmers themselves cannot supply products to the contractor on time and in enough quantity, so it can make their contractor fail in their forward business. However, these two common issues can be overcome if farmers and contractor have a very strong relationship. Farmers must do what a contractor requests. And, the contractor must provide techniques, credit, and other services that farmers need; also they should try to monitor the production process of farmers (Coulter et al., 1999; NEPAD et al.).

Cooperative production and trading is also a kind of circular integration. When farmers have improved the vertical integration, the challenge of liberalization also comes at the same times. So, farmers need cooperative to build a strong commercial for reducing the risk and getting high profits. Each part tries to connect with others to get benefits from their integration. Farmers' communities or organizations can also be important in linking farmers to dynamic markets. Small scale and not-standard products are challenges for farmers in the integration with other entrepreneurs. So, farmers themselves must organize a community or cooperatives within their location to produce homogenous or heterogeneous products required to meet the needs of a specific entrepreneur such as agro-processing, hotels or restaurants (Hopkins et al., 2005; Kaganzi et al., 2008; Moustier et al., 2007). Kaganzi and his group (2008) and Masuku & Kirsten (2003) add that to establish a strong farmers' community for selling their product to the markets, they need to trust each other within their own colleagues, to strengthen internal and external relations with group members, service providers and with market chain actors. Farmers should trust each other in their association to help each other in sharing knowledge, skills, and market information. Moreover, they also need to build trust with their contractor or traders, so they can know how much product they should supply, in which quality it will be accepted, and what price can be offered. So, this trust can benefit all stakeholders involved.

2.2 Farmers Characteristic in Market Integration

Different farmers have different perspective in market integration. This perspective has brought farmers to have different decisions in production and trading management. This section illustrates the theoretical of farmers characteristic in market integration and some experiences of farmers in different countries.

2.2.1 Farmers with food security objective

Focusing on food security as the main objective is the kind of farmers' characteristic. Farmers develop various strategies to secure the food and to reduce the marketing risk. They rely on diversification of agricultural production and/or diversification of income through off-farm activities. Farmers with this characteristic mainly produce stable food crop for self consumption while commercializing is only a part of their surplus. Farmers' endowment in such land, labor, and capital determines strongly the capacity to produce, to earn income, and to cope with risk (Estelle et al., 2004).

An experience that is in line with what Estelle and his group mentioned in World Bank report 2004 is the case of Nanggung farmers in West Java, Indonesia. Tukan and his colleagues of World Agroforestry Centre in Indonesia argue in their report that farmers in Nanggung are not sure where to focus their efforts. And, in spite of a promising market potential, farmers are reluctant due to risks (Tukan et al., 2006). Good natural condition for fruit and vegetable crops especially banana is strong potential of that location. The demand of those products from the market is high, and the road from that location to Jakarta is also good something which facilitates transportation. But the farmers still cannot supply to those markets as the farmers' production

management is not intensive. They do not use agricultural inputs including fertilizer, pesticide and modern seed technology. The effort in banana specialization for supplying to the market is also very low due to the high risk reason. If their banana get pests or cannot sell to their markets, farmers will lose income. They may not have enough cash for buying food; also, they can fall in debt. So, this risk can make farmers fall in poverty easily (Tukan et al., 2006).

2.2.2 Farmers with production and trading management to influence the price

These farmers offer a reasonable attractive product to the market for getting the reasonable price from traders. They try to develop their own ability such as developing techniques, setting quality standards, delivering products in time, and negotiating prices, etc. This kind of farmers have a good business concepts because they try to make their product attractive to the business partners so that the buyers can be willing to pay on their product on the better prices, listen to their demand, and invest in them (KIT et al., 2006).

The research of Alam & Verma, 2007 conducted in Uttarakhand, India, where smallholder farmers try to connect with several traders and to control their production costs is the evidence to support the statement above. Their research shows that, farmers in Uttarakhand used to sell their tomatoes to private dealers at very low price, and they also spent much money on transportation and commission. But, later on, Mother Dairy Company offered them a better price and additionally they did no longer need to pay any commission. So, all the farmers prefer to sell their tomatoes to Mother Dairy Company. Currently, the market chain has changed because private dealers try to compete with Mother Dairy Company. Private dealers now offer a much higher price. Thus, farmers now have started to make decisions whether they should sell to Mother Dairy Company or to a private dealer. Both entrepreneurs provide high profit to farmers if they calculate the costs of inputs, transportation, and commission. So, some farmers decide to sell to Mother Dairy Company while others sell to private dealers according to their location and their convenience (Alam & Verma, 2007).

Another interesting case is when small scale farmers combine their products with other farmers when selling to the entrepreneurs (Kaganzi et al., 2008). One farmers' group in south-western Uganda has successfully sustained sales of potatoes to a fast-food outlet in Kampala because they had learned new techniques for their potato production. They also have tried to build the strong relationship and leadership in their community through sharing techniques, skill, and market information. Market innovation and dynamic market actors connecting are also done in their community. They also tried to work together in making decisions in the trading process with restaurant and supermarket in Kampala. This characteristic made them very successful in their production and trading (Kaganzi et al., 2008).

2.2.3 Farmers with production and processing management to influence the markets

Selling raw material or product to the traders is not the objective of farmers in this group. These farmers integrated many activities in their specific product such as improvement production, processing product, and trading product. They try to influence to the market through their processing product. They believe that their product will be attracted by many buyers, so they can get high profits from this process (KIT et al., 2006).

The book of KIT et al., 2006 also gives an example to support the statement above. Pius, a farmer in western Kenya integrated many activities in his farm. After harvesting the grain, he dries and processes it into flour for selling to the traders. He has moved farming into another activity to attract the buyers in his village.

2.2.4 Farmers with multiple functions (production, processing, and trading management) to influence the markets

Farmers with this characteristic are willing to take risk for getting high profit. They know their multiple functions may meet the risk during the process, but they are aware of coping with it. These farmers organize themselves as the producers, processors, traders, and distributors to reach the end of consumers. Generally, they always work as community or cooperation to innovate and to develop new product base on consumer demand. This process is empowered to negotiate the price and earn the fair share for each member (KIT et al., 2006).

To know the clear example of farmer characteristic with multiple functions, the story of Kaffa forest coffee union is shown in book of KIT et al., 2006. Ato Imito who works in that union enters multiple functions in the production, processing, and trading process. He harvests coffee, removes the pulp, dries the beans and then delivers them to the Union to be graded and packaged by them for export from Ethiopia to Germany. The Union has negotiated to supply several importers with high-quality beans, and has created its own brand that fetches premium prices on the German market. This cooperation chain is called "Chain Co-Owner", because that farmer integrated his activities in coffee production upstream to a cooperative. Both farmers' activities and influence to the cooperative engage with another cooperative to develop new products and reach the end consumer.

Samaratunga (2006) raises another example of farmers in Sri Lanka. Ma's Foods Company sets its own private standards to facilitate standardization of the products procured from different suppliers and differentiates the company's products from competitors. They tried to encourage farmers to supply products to them on time with enough quantity and standard. Farmers were trained by the company and were subsequently getting certificates in post harvest, organic planting, and credit management. Holding a certificate, they can supply their products to the company at a very good price. They also participate with company to process, to package, to label, and to trade, etc. This process has made the company more competitive in the local and international markets enable its product to satisfy consumer preferences. Farmers also have gotten the reasonable profits for what they have entered in production, processing, and trading operation.

2.3 Is Market Integration a Good Thing for Farmers?

Whoever involves in market integration can get more or less benefits according to their involvement. Those gaining the most benefit from market integration include farmers, private sectors, and the state (Berdegué et al., 2008). Farmers are often regarded as the group that benefits most from market integration, but this group may also experience negative consequences of market integration (Malsogou & Tanyeri-Abur, 2005).

2.3.1 The benefits of Farmers in Market Integration

Farmers are a heterogeneous group and obviously, farmers can get benefits from market integration in several ways. Alam & Verna (2007), also mention that different profitability is due to differences in flexibility and involvement in markets by farmers. Farmers still can get profit from market integration through reducing the production costs and price isolation. Other authors and institutions also agree with what Alam and Verna raised this kind of good thing from market integration to farmers, according to the discussion in section above.

Farmers also can get job opportunities from industries, supermarkets and other entrepreneurships. When market integration results in transferring and processing products, the demand for employment will also increase. So, farmers can reduce labor or time in their farms and work for those entrepreneurships to get more income. This system also leads to urbanization

that attracts many migrants from rural areas. This could be beneficial in terms of employment accessing, so farmers can bring back remittance to their families in rural areas (Dhital, 2004; Samaratunga, 2006; Söderbom & Rijkers, 2009).

Farmers also benefit by developing their production skills. The integration of markets is a challenge for farmers, so some farmers try to learn new techniques in their production in order to integrate well in their cooperative. They will strive for higher benefits through quality control, quantity control, inputs control, and customer control. It means that their mind will be broader when they start integrating their own production, community, and markets (Berdegué et al., 2008; Kaganzi et al., 2008). Furthermore, in some cases farmers can get new techniques, production management, organization and financial management skills through training from an industry or other market agents. This is also another opportunity that can build capacity empowerment of farmers effectively (Samaratunga, 2006; Warning & Hoo, 2000).

Social networks are also strengthened in their communities. To reach success in market integration, not only do farmers integrate their individual activities but also those carried out together with other members in their community and market actors. Such a chain can bring all members a very good relationship (Coulter et al., 1999; Moustier et al., 2007). This good relationship provides multiple benefits to all farmers. They can learn the new techniques and experiences in production from each other. Also, they can access market information easily though chatting. Sometimes, when farmers have problems in production or trading, they can help each other to solve those problems. For example, a farmer cannot supply enough quantity products to the entrepreneur through contract, so other farmers who have surplus products can help him or her by lending some of their product to that farmer who is facing such a problem (Wolz et al., 2008).

2.3.2 The constraints causing farmers' losses in market integration

Market integration is regarded as the engine of growth at household level, private sector level, and regional level, but it is unfortunately an uneven process. Some groups may win in this system while others lose. This is a severe weakness of market integration. In some cases, the private sector creates problems for farmers. The private sector is driven by profit motives, so they may seek ways to control the farmers. Some private sectors never accept farmer's product of low quality or below standard. Or, they can accept, but at very low price. This is the problem that forces farmers to sell their product at a very low profit or even at a loss. Furthermore, the private sector changes the price of product whenever they want if there is lacking competition in a location. In such situation farmers will have no choice for their trading. Later on farmers may stop producing that kind of product and change to only crops that secure the food. So, the problem is not only for the farmers anymore but also to the firm because they cannot receive sufficient product for operation anymore (Coulter et al., 1999; Estelle et al., 2004).

Instable product demand and prices from customers is another challenge for members in market integration (Coulter et al., 1999). Farmers, communities, and firms work together in supplying and processing products, but what happens if the customers do not accept the final products due to financial crisis or other reasons? As a consequence, all members in the system will suffer severely. When firms lose their profit, they reduce the purchasing from farmers' cooperative. They compensate with an amount of money for what they break the contract. Cooperatives or communities will be stuck in the system because they do not know where to sell their products, or they find themselves forced to sell products to other firms at a low price. Farmers are often the most severely affected group in the system. They cultivate their product already, so what can they do with those products? Surely, this system will push them to sell their products at a very low price. This causes problems for future production plans. Consequently, problems of poverty will appear in rural areas (Coulter et al., 1999; Estelle et al., 2004).

2.4 Factors affecting to Farmers Characteristics in Market Integration

Farmer's characteristics are not always fixed. Their perceptions are always affected by many factors. What they think today maybe different from yesterday, and may change tomorrow depending on factors affecting them. Some farmers are still depending on traditional markets due to norms or traditions. Other farmers are affected by market information or market actors, so they can participate more in market integration and earn profit more from their production. Below the main factors that affect farmers' decision making in market integration are discussed.

2.4.1 Initial Assets Endowment

Asset endowment has a significant influence to household's livelihood decision making (Perz, 2005). Asset endowment refers to households' assets including land, labor, knowledge and capital etc. Households always use those assets to invest in their production or business to achieve welfare benefits. It is a very important factor that plays a role in farmers' decision making. When farmers have enough capital, they can change their seasonal cropping patterns to be more modernized. Also, farmers can think of new markets for their production and trading. Moreover, it would be difficult for a household that have very few laborers to diversify activities or intensive crops to generate high income. But, for households that have many labors they can do those activities easily. In addition, education is also another main asset for households. Educated families tend to think carefully before deciding to do something in their production and trading. However, assets endowments are usually unequally distributed among households. This inequality then influence decision making in agricultural production and marketing. Rich households access or do their income activities differently from the poor. Drawing on a survey made in Uruara, Northern region of Brazil, Perz (2005) argues that variation in households' asset endowments are leading to more diverse livelihood strategies. The rich households, having many adult laborers, hiring more labor, access to credit, and social network are generally more flexible in their income generation.

2.4.2 Infrastructure

Infrastructure forms part of the physical capital that may affect farmers' decision marking. If situated in irrigation systems, farmers can harvest crops two or three times per year. They tend to abandon the traditional cultivation that depended on the season or rainfall. They will use the benefits from the irrigation systems to produce for own consumption but also for commercialization. Moreover, farmers will intensify their crop production because they have enough water, so they can get higher productivity to meet the dynamic market actors (Chiza, 2005). In addition, infrastructure of transportation including roads, canals, bridges, railways, ports, and airports are not only for development of physical flow but also for information flow. Farmers can decide to use this capital for delivering their products to a number of traders. It means that they may change their perception from selling only to middlemen who control the price, to selling to other market actors providing higher profits to them (Estelle et al., 2004).

2.4.3 Private Sectors involvement

Wherever private sectors including traders or agro-industry are located, they persuade farmers to supply products to them with some requirements. Thus farmers will start to think whether they should sell to those private sectors or not; whether they can supply to them or not. In the case they really want to supply those private sectors because of high price, they will try to adapt their crop portfolio and to intensify by using new techniques, skills, and inputs. Thus, farmers may try to change both inputs and outputs to supply products that meet the requirements of the private sector (Berdegué et al., 2008; Kaganzi et al., 2008).

2.4.4 GO, NGOs, and International Organization involvement

Governments and Non-Governmental Organizations may be involved in providing training course about applying new techniques, practices for intensive cultivation or organic cultivation, soil preparation, or approaching the market. Sometimes they are not only providing the techniques but also offering credit, which farmers can use to invest more in their production. Farmers may find it difficult to change their traditional production pattern if they do not have enough capital. So, credit is also a kind of source that can induce farmers to change their old agriculture patterns to modern patterns. Moreover, the mentioned types of organizations can use field demonstrations to show farmers exact outputs, so farmers can assess those techniques. In addition, some GO and NGOs also try to help farmers regularly in their fields, as they want farmers to have more confidence in their cultivation. Such interventions will affect farmer's decision making. Farmers thinking will be broader in terms of generating more income from their production (Kristjansona et al., 2005).

2.4.5 Policy intervention

Policy intervention is a powerful tool, affecting farmers´ decision making in market integration. There are many policies to increase the agricultural production and to link farmers' products to the market. Infrastructure construction policy may have multiple utility for all the farmers (Dorward et al., 2004; Haggblade et al., 2007). Farmers can not cultivate crops without water, and irrigation may facilitate a change in cropping pattern from traditional to intensive cultivation. Roads can be used to transport any agricultural inputs for the farm and outputs for the market at low costs. Telecommunication and electricity are other examples of infrastructure facilitating efficient information flows and agricultural mechanization respectively. Agricultural knowledge or techniques spread through extension services is another policy area assisting farmers adopting and applying new technologies to increase their agricultural productivities at low risk (Berdegué & Escobar, 2002). Agricultural price policy may also be necessary for improving the agricultural products. Government should control the price inflation of both agricultural inputs and outputs, so that farmers can set their own strategies to reduces the inputs costs and increase their productivity (Binswanger, 1989). Other policies include subsidies, land reform, credit and taxes reduction, which are also very important in agricultural development for rural areas (Dorward et al., 2004; Farugee & Carey, 1996). Governments can also create market policies that link households with dynamic traders and processors, etc. It means government can encourage those private sectors to invest more in a location near the farmers, so farmers are encouraged to engage in the new market. If they change their production strategies they may benefit from dynamic markets near their farms. However, the efficiency policy from government not only affects, but also pushes farmers to change their previous decision in market integration (Wandscheider & Junior R. Davis, 2003).

2.5 Market Integration in Cambodia

2.5.1 General information of Cambodia

Cambodia is kingdom country located in South East Asia. Cambodia covers a geographic area of 181,035sq.km. It borders in the northwest to Thailand, the north to Laos, the east to Vietnam and the south is inseparable to the Gulf of Thailand. The distance from North to South is about 440 km and from East to West 560 km, with a perimeter of 2,600 km land and about 1/6 is the seacoast. The country had a total population of 13,388,910 in 2008. Around 80% of the population lives in rural areas. Around 90% of the populations are ethnic Khmer, five percent are Vietnamese, one percent is Chinese and four percent belong to other ethnic groups. The official language in Cambodia is Khmer. Cambodia has a large area of cultivated land that is suitable for diverse production of commercial crops, given the agro-climate and topographical conditions. The total area of cultivated land is estimated at 4 million hectares; this area is about 22% of the land area of Cambodia. The main crops are rice, maize, rubber, soybean, vegetables, mungbeans,

sesame, cassava, and ground nuts. Around 80% of the population is living in the rural area and depend on agriculture, husbandry, fishing, and bi-forestry products. The agricultural productivity is still very low. This is a reason why around 36% of the population still lives in poverty (NIS, 2009).

Agriculture is crucial to improving incomes, particularly for the poor in rural areas. Total production in crops, particularly rice, has grown steadily resulting in exportable surpluses in recent years. Average paddy yield per hectare has grown (from 1.31t/ha in 1993 to 1.97t/ha in 2005), but is still below that in neighboring countries (Royal Government of Cambodia, 2006). Even though Cambodia still has large areas of arable land, the country is still not benefiting optimally from agriculture. Soils are generally poor, often becoming waterlogged during the wet season, and three-quarter of agriculture land is rainfed. Poor structure of soils and infertile soils are among the main reason why farmers in Cambodia experience low productivity (ACIAR, 2009). Water management is also another main challenge for both dry land and irrigated cropping. Lack of irrigation systems and drainage systems are the cause of low crops productivity. That is very difficult to cope with flood because dikes construction system is still very poor. To impound water for irrigation using water reservoirs, dams, and wells is also another issue in Cambodia. Hence, poor soil and water management lead farmers to have difficulties to intensify their crops for getting higher productivity. This also constrains them in linking with dynamic markets (ACIAR, 2009). However, even though Cambodia faces many problems in agricultural cultivation, the country still has surplus production for export. For example, in 2004-2005, Cambodia produced 416,118 tons of milled rice with average productivity around 2t/ha. So, if the country could intensify the crops with soil, water, and technical management, Cambodia could get double or triple surplus rice product.

2.5.2 Agricultural Market Situations in Cambodia

Market oriented agricultural development is regarded as the best way out of poverty for Cambodia. Since the late 1980s, Cambodia's economy has gradually expanded since it began to open up and take steps toward a market economy. It has become more and more integrated with the world economy including becoming a member at the Association of Southeast Asian Nations (ASEAN) and the World Trade Organization (WTO). However, the country remains one of the poorest countries in the world (CUTS, 2005).

Although agriculture is very important for Cambodia's economy and society, its share of the country's total trade is low. The agricultural marketing system in Cambodia is not very developed. Marketing is the common problem for all farmers in Cambodia because farmers find it difficult to access dynamic markets (World Bank, 2005). Since 1970's most market facilities were destroyed by political instability and civil war. Until now, those market operations are still not operating in a modern way. Currently, there are very few modern marketing systems such as storage facilities with cold and cooling systems for fresh produce in urban and rural areas. Formal agricultural markets can be found at the district level, but none exist at the commune or village level yet. Generally, farmers do not have any storage or processing facility for keeping their agricultural products for a long time. Infrastructure including irrigation systems, roads, and telecommunication are insufficiently developed, making input costs very high. Price information in Phnom Penh city is not delivered to farmers in rural areas. This limits farmers' chances of selling their products. The only accessible output market for them is through middlemen in rural areas. Generally, when farmers sell their product to a middleman at the farm gate, the price is very low because farmers do not have any power for bargaining the price with those collectors (Ho-Seop, 2004).

The market intervention from the government of Cambodia is also not efficient. It does not intend to control the fluctuation of price in the market. Actually, the government does not have

enough capacity to stock farmer's products in order to be able to stabilize the price or to release stocks for emergency use. The price is always different from one season to another season. For example, the rice price tends to decrease during the main harvest season (November to January) and increase during the flood season. This fluctuation in price makes farmers reluctant to expand the cultivation area or the use of inputs to improve the productivity because they do not trust the market price (Ho-Seop, 2004).

2.6 Conceptual Framework for Analysis

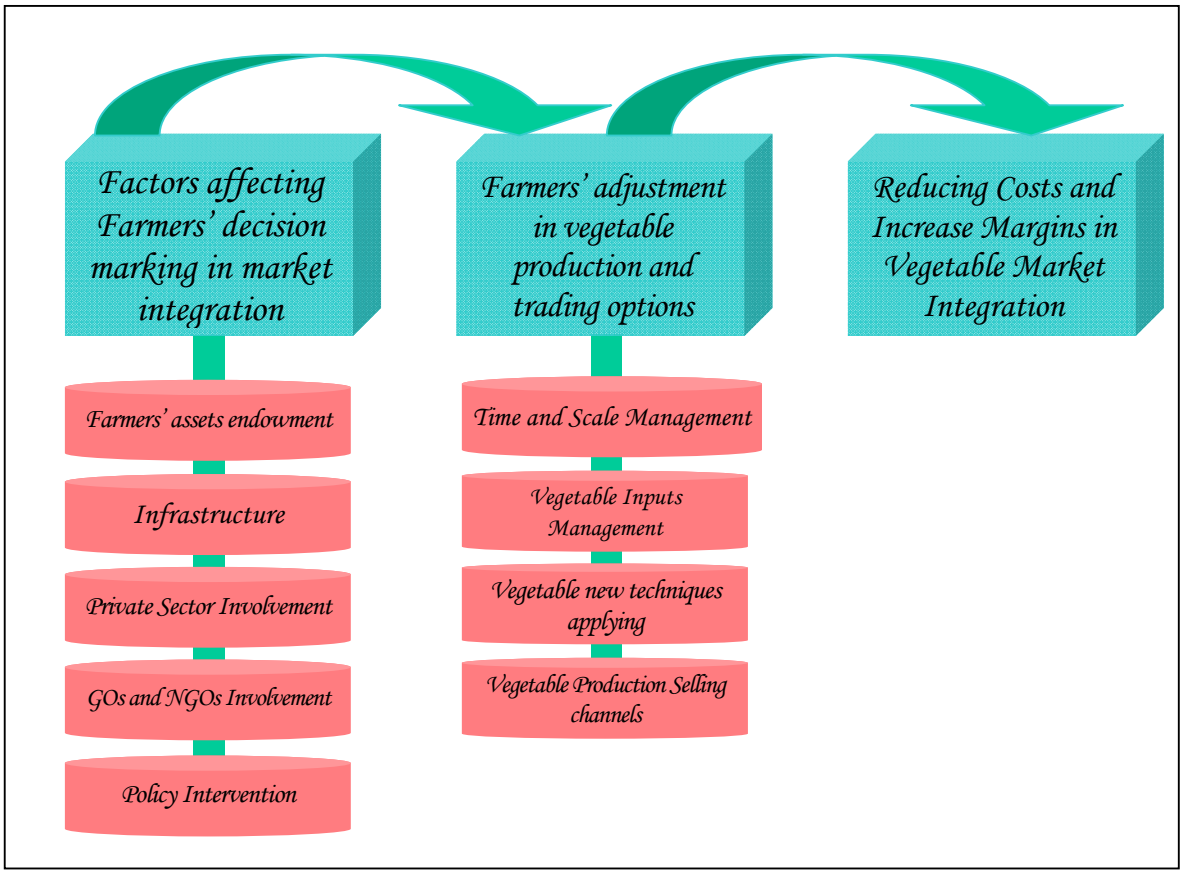

Figure 2.1: The conceptual framework for analysis on farmers' adjustments in vegetable production and trading options to reduce the costs and to increase margins

From the theoretical and empirical review above, this study hypothesizes that farmers need to adjust themselves in vegetable production and trading to reduce the costs and to get high margins. They would benefit from expanding the scale of their vegetable production instead of growing only in the garden. Also, they must prepare vegetable inputs carefully and efficiently to reduce the production costs together with accepting the new techniques which can bring higher productivity. Moreover, farmers should not depend on only unique trading. They should have several options for trading their products, so they can compare and choose the most profitable price for their vegetable commodities. However, different farmers' adjustment in both vegetable production and trading options would bring different benefits from their production. In addition, farmers' characteristic in market integration is determined by many factors including farmers' asset endowment, infrastructure, private sectors involvement, GOs and NGos involvement, and policy intervention. However, this theoretical framework is used as the roadmap to construct the research methodology and to argue in finding and discussing chapter.

3 VEGETABLE PRODUCTION AND TRADE IN CAMBODIA

This chapter explores the context of vegetable production situation in Cambodia. The supply and demand chains in Siem Reap province, which is the study case, is also described in this chapter. It shows the background of this thesis research.

3.1 Vegetable Production in Cambodia

Vegetables are, second to rice, the main crops of Cambodia. They are short duration crops that can provide important income to farmers. Cambodian farmers grow all kinds of vegetable commodities including pod-, leafy-, fruit- and root crops. The main irrigation sources for vegetable production are rivers, creeks, lakes, ponds and open wells. The major vegetable commodities that farmers grow are cabbage, Chinese cabbage, cauliflower, broccoli, pekoe, mustard green, bean, wing bean, Chinese kale, tomato, egg plant, bell pepper, onion, leaf lettuce, yard long bean, French black bean, cow pea, papaya, cucumber, sponge gourd, shallot, wax gourds, and chili (Sarith & Kea, 2003).

Most farmers grow vegetable as a traditional practice. Some farmers prefer to keep the seed for growing from year to year. They think that by doing so they can reduce the cost of inputs while benefiting from good varieties that can provide high productivity. The vegetables for which farmers keep the seed are papaya, bitter gourd, gourd, cucumber, wing bean, lettuce, pekoe, mustard green, French bean, shallot, tomato, egg plant, chili, cow pea, and wax gourd. But, for some kinds of vegetables farmers have to buy fresh seed from the market. Those kinds are Chinese kale, onion, sweet pepper, broccoli, cauliflower, and Chinese cabbage. Farmers are using unclear techniques for pest and fertilizer management. Most often more than one pesticide is mixed together and sprayed on their vegetable without proper use of protection (for example, masks or clothes). It is often harmful to the farmers' health. The pesticide is mostly imported from Vietnam and Thailand with label instructions in Vietnamese or Thai language which Cambodian people cannot read and thus can not understand how to use those types of pesticides correctly. In the case of fertilizers, farmers tend to apply it according to their own thinking. They are not sure of what type of fertilizer suits their vegetables or what quantity to apply. The decision is often coming from the old generation, gossip from their neighbors, or their own judgment (Sarith & Kea, 2003).

Cambodia is a tropical country, so the conditions are good for insect pests, natural enemy and crop diseases. The common insects pest in vegetable cultivation are armyworm, bug, diamond back moth, aphid, stem bore, pod borer, white fly, etc. Most types of disease are caused by fungus, bacteria, nematode and virus. The most common diseases encountered vegetable cultivation are leaf curl, yellow leaf curl, leaf miner, yellow mosaic virus, bacteria wilt, damping off, cap rot, root rot. Those common diseases represent the highest risk for vegetable farmers. Farmers find it hard to control all those kinds of pests and diseases and some farmers are feeling helpless in their vegetable production (Sarith & Kea, 2003).

The yield of vegetable production is still very low. The lack of technologies and suitable varieties are the most common causes of low yield levels. Generally, yield differences between farmers and provinces are pronounced, depending among other things on differences in techniques and inputs applied. Currently, the demand for safe vegetable from hotels, restaurant, and supermarket is very high. The number of tourists in Cambodia is also rapidly growing, and those tourists require clean and safe vegetable. Consequently, farmers are starting to change their vegetable pattern to organic cultivation step by step. However, the change is not easy. Farmers are still facing many problems of supplying safe vegetable to those dynamic traders. To help farmers to solve those problems, National Integrated Pest Management (NIPM) have tried very

hard to train farmers about agro-ecosystems and crop management in order to reduce the use of chemical fertilizers or pesticides that may have a bad effect on farmers' vegetable production. This knowledge will help farmers to increase yields using organic manure (Sarith & Kea, 2003).

Currently, many governmental organizations (such as the Department of Agriculture and Kbal Koh Research Station) and non-governmental organizations (NGOs) are already working to promote vegetable production and home gardening in some parts of the country. Around 40 organizations are presently involved in some way in vegetable production or home gardening activities with limited target groups. Ten of these organizations are working on different aspects of home gardening management. Some of them provide training in home gardening and nutrition/health education, and promote organic practices. However, the promotion does not cover all locations in the country, so there are still many places are facing the problems in vegetable production (Talukder et al., 2003).

Through data from ministry of agriculture of Cambodia, vegetable production reached a very high level in 1980 with a total annual of 366,920 tons, but by 1995 it had significantly decreased reaching only 193,010 tons. It started to recover again during 1996 and 1997 with around 250,000 tons per year. That recovery lasted only two years, and production again started to stagnate until 2005 when it was 172,399 tons (Figure 2.3). Recently, vegetable production has climbed again with a stable growing rate. As of 2006, the total vegetable production had increased to 222,893 tons (MAFF, 2009). And, according to a recent report Cambodia's vegetable harvest rose to 259,610 tons in 2008, up from 226,486 tones in 2007 (NIS, 2009). However, we can see that vegetable production in Cambodia was very unstable growth and periods of stagnation over time. However, there has been growth stability more recently, even the rate of growth is still very low.

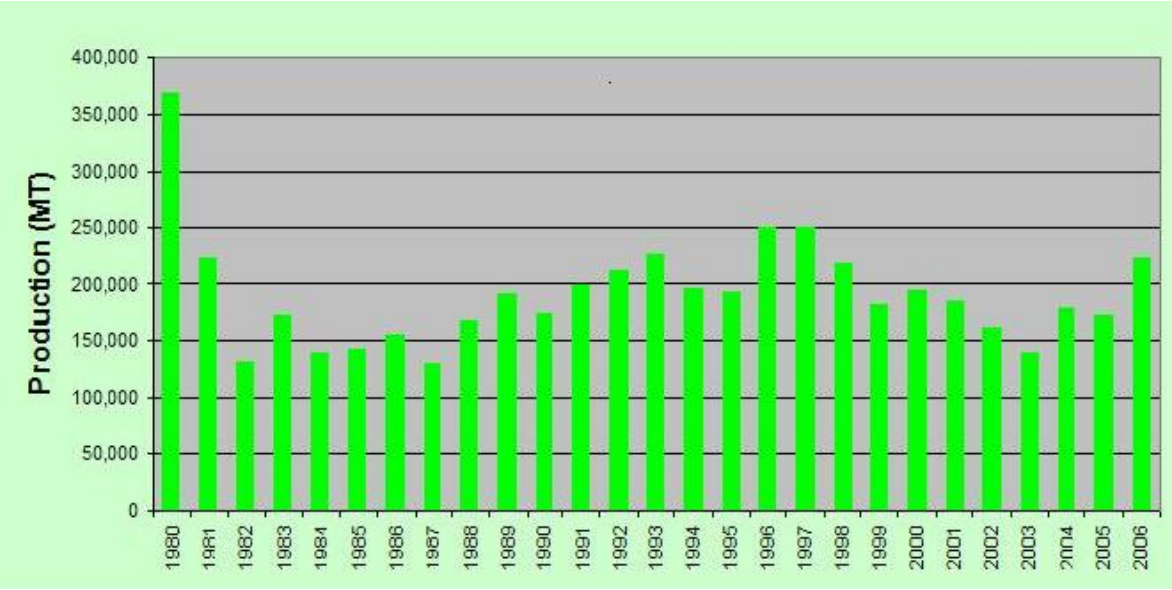

Figure 3.1: Vegetable Production of Cambodia from 1980-2006
Source: (MAFF, 2009)

3.2 Vegetable Supply and Demand in Siem Reap Province, Cambodia

Vegetables production is the largest product supplied to Siem Reap city, while supplies of rice, maize, fish, and livestock products is more limited. The farmers who can grow much vegetable production can also get high profits from their selling to middleman, restaurants, hotels, and markets (AD_SR, 2009).

CENTDOR center reported in 2008 that the 16 vegetable commodities that are needed the most from from Siem Reap customers include Cauliflower**,** Chinese cabbage, Chinese kale, Cabbage, Swatow mustard, Local Lettuce, Tomato, Eggplant, Chili, Sweet Pepper, Long Bean, Spring Onion, Bitter Gourd, Cucumber, Green Papaya and Lime. Additionally, other kinds of commodities are also needed according to the demand of consumers. There are four flows of commodities for supplying vegetables including local products (Produced in Siem Reap Province), other provinces products (Produced in other provinces in Cambodia), other sources (Supplied from Phnom Penh), and imported Products (Imported from Vietnam and Thailand). As be shown in table 3.1, we see that the highest proportion share in total volume of supplying vegetable to Siem Reap province is Phnom Penh source (63.10%). Phnom Penh is not the origin location for producing vegetables, but it is the trading center which collects vegetable from many sources of other provinces and Vietnam. It is noticed that the total local product make up a very small proportion of the market shares in total volume traded. It distributed only 8.59% in total volume of supply structure.

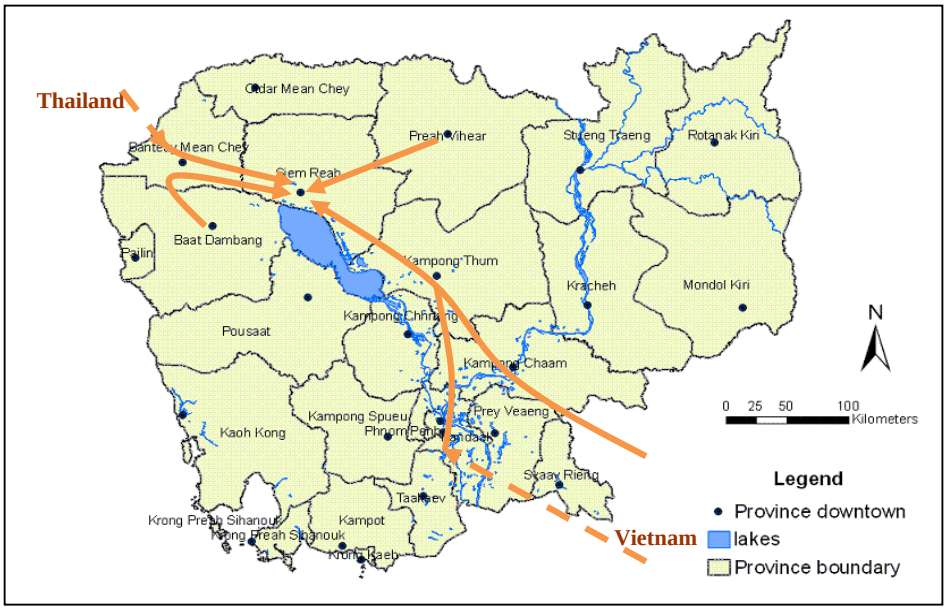

Figure 3.2: Flows of vegetable commodities from outside sources
Source: CENTDOR, 2008

Table 3.1: Supply structure of vegetable commodities flow to Siem Reap city (in volume: Kg/Year)

Local producer	***Other provinces***				Other Sources*	Other countries	
	Battambang	Kangpong Cham	Preah Vihear	Kompong Thom		Vietnam	Thailand
1,811,934 (8.59%)	372,133	1,342,106	248,400	124,500	**13,313,604** (63.10%)	3,668,285	218,315
	2,087,139 (9.89%)					**3,886,600 (18.42%)**	

Source: CENTDOR, 2008
*Remark: * Other sources: It means the source of supply comes from Phnom Penh. Phnom Penh can be supplied by other provinces of Cambodia or other countries (Vietnam).*

There are twelve big markets located in Siem Reap province that control the total vegetable trading volume in whole province. Those twelve markets play very important role as the distributors to household consumers, food vendors, hotels/restaurants, and retailers (CENTDOR, 2008). According to table 3.2 below, it is to estimate that the total demand for vegetables from customer groups in Siem Reap province is about 21,000 tons/year. Of the total demand around 12,000 tons are traded through retailers who sell to household consumers and food venders in

other districts, while about 6,000 tons are sold directly to household consumers in Siem Reap city. We learnt through this that, household consumers are the main buyers of vegetable commodities in provincial markets and district markets. Retailers are the second most important group for purchasing from those 12 big markets and resell to other district markets in Siem Reap province.

Table 3.2: Demand structure of vegetable commodities by consumer groups (in volume: Kg/Year)

N^0	Name of market	In volume: Kg/year				Total
		Household	Food vendor	Hotel/ Restaurant	Retailers in other markets	
1	Phsar Chas	668,202	203,298	0	0	**871,500**
2	Phsar Doem Kralanh	454,941	128,160	0	0	**583,101**
3	Phsar Kroam	380,356	313,404	0	0	**693,760**
4	Phsar Samaki	107,447	0	39,266	5,674,489	**5,821,202**
5	Phsar Leur	2,251,861	337,363	659,070	3,000,154	**6,248,448**
6	Phsar Puok	894,757	274,873	0	3,137,556	**4,307,186**
7	Phsar Char Chhouk	269,797	28,100	0	0	**297,897**
8	Phsar Kralanh	409,954	259,651	0	98,190	**767,795**
9	Phsar Banteay Srey	258,194	29349	0	0	**287,543**
10	Phsar Svay Leur	52,129	58,423	0	156,476	**267,028**
11	Phsar Dam Daek	192,507	46,323	0	568,717	**807,547**
12	Phsar Srae Noy	131,697	14,573	0	0	**146,270**
Total		**6,071,842**	**1,693,517**	**698,336**	**12,635,582**	**21,099,277**

Source: CENTDOR, 2008

According to the demand and supply chains above, we learnt that local vegetable products, which are produced by local farmers make up very small share in total volume traded. The capacity of producing in local areas is not high enough. Also, local producers supply vegetable commodities seasonally to the markets. This process is not good enough to attract all customer groups who have high demand. According to the CENTDOR report, the highest volume of supplying local vegetable products is just from November to April. Even consumers prefer local product because they believe that those products are less contaminated with chemicals, but other customer groups including retailers or food venders do not take interest in local products because of the low capacity to supply throughout the year.

4 RESEARCH METHODOLOGY

4.1 Research Phases

First Phase: Pre-Survey

The first phase was conducted for collecting the preliminary data. It was a necessary phase to inform and to discuss the detailed research plan with local authorities. Deeply discussion was held with commune leaders for choosing the villages that met the research' purpose. The discussion with village headmen to choose the targeted households for group discussion and the semi-structured interviews also was done. The detail regarding the criteria for households' selection is discussed in section 3.4.2. The contact address of key informants was also requested, for later contacting in the next step of research. This phase, the researcher also found out the suitable locations for the case study; two contrasting communes for making comparison. The secondary data also was collected during this phase as much as we could. In addition, we conducted semi-structured interviews with several farmers to find out whether our indicators were suitable or not; whether the questions were easy to answer by local people or not; how much time we spent for each questionnaire. Basically, the result from this pre-survey was used for basic understanding, developing the qualitative research tools and questionnaire.

Second Phase: Main-survey

Most of the research time was spent on this period. Qualitative and quantitative approaches were applied. Qualitative data was collected before interviewing households. Synthesis information had been completed after group discussions in sufficient time. When group discussion was in the morning, the synthesis was done in the afternoon. Quantitative data collecting was conducted immediately after the questionnaire was revised. Generally, all outputs from that main survey were used for evidence and discussion of the research.

Third Phase: Feedback and completing information - Workshop

The final phase was used to clarify whether the information was true in general or not. The feedback, debate, arguments and ideas from farmers, local authorities, and relevant NGOs were recorded. That was a very efficient way to share information and experiences among people themselves during feedback workshop. Also, the lacking information from the main survey period was filled by this feedback workshop. And, unexpected information occurred during discussion was also recorded when we found it related to this research issues.

4.2 Case Study Selection

This thesis builds on a case study on vegetables trade in two communes of one district of Siem Reap province. It should not be considered as representative of all farm activities and everywhere in Siem Reap province, but it is more exploratory on the study case only.

The case study was conducted in Sourt Nikom district, Siem Reap Province, Cambodia. This district has been encouraged as the green belt for supplying vegetables to hotel, markets, and super-markets to Angkor Tourism hub-site. Good natural conditions, infrastructure, and market opportunity in Soutr Nikom district are the strong potential which link farmers to the markets for getting high income from vegetable production. However, there are strong indications suggesting that farmers still cannot use that potential as efficiently as could be expected.

Two communes, in that district, named Dan Run and Sam Raong were chosen for the case study. Those two communes are very special cases because they have very similar natural conditions and policy, but they have experienced different benefits in terms of income generating from vegetable production. So, both case communes are the potential case, for understanding the

reasons why farmers have different benefits from vegetables even when they live in the same natural and policy conditions.

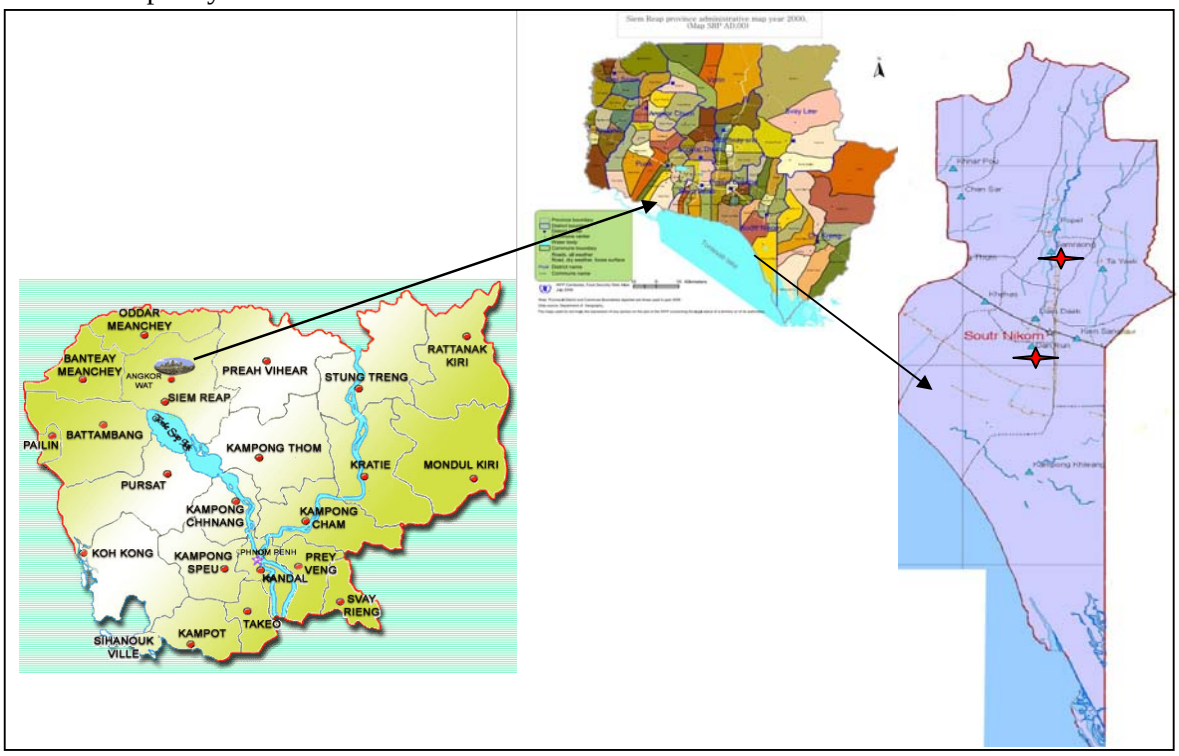

Figure 4.1: Map of Soutr Nikom District, Siem Reap Province, Cambodia
Noted: Red Points are the case communes

4.3 Literature Review

Literature review was done throughout the research process. It was also revised several times according to the change of the research concepts. Main ideas from different authors were presented regarding to the topic. According to that review, we tried to discuss, compare, and argue the main concepts and evidence, to understand how market integration works; how it is important to farmers; what efficiency characteristics of farmers performed in market engagements; what factors affecting to farmers' perceptions in market engagement. Moreover, this review also raised some historical study in agricultural transforming in Cambodia, for comparisons of the difference between what those authors say and what have been happening in Cambodia.

4.4 Data Collection

4.4.1 Secondary Data Collection

Secondary data were collected from as many sources as much as we can, so we have gotten overall information related to the resources, infrastructure, investment, marketing network, vegetable transforming situations, policy intervention, etc. The researcher collected all relevant reports and papers from Siem Reap provincial office, Sout Nikom district administrative office, Sam Raong and Dan Run communes' administrative offices, planning department of Siem Reap, agricultural department of Siem Reap.

4.4.2 Primary Data Collection

Primary data were needed from both qualitative and quantitative data. Group discussion, semi-structured interviews, deep interviews, and questionnaires interviews were applied in this research for collecting all relevant data to reply the three main research questions.

A. Group Discussion

Group discussions were carried out by selecting two villages in each commune for the case study. We applied the necessary and relevant PRA tools as following to reply the research questions.

Seasonal Calendar:

This tool helped to understand deeply about characteristics of farmers in their agricultural production, whether they depend on seasonal or intensive cultivation. The period and its reasons of crops cultivation also were known from this tool. Moreover, we have known for farmers how important vegetable is in term of food security and income generating. The specific vegetable commodities that are the most favorite in that location and its period of growing were also known. In addition, the scale which farmers grow vegetable has been also identified. This tool answered a part of the first research question, that is how farmers adjust in vegetable production in terms of time, intensive, and land scale.

We used this tool into two separate occasions. First it was conducted during pre-survey with 6 vegetable growers in each discussion group (one group per commune), so we have understood the overview information about which crops farmers have been doing, which period they always do those crop activities, what scale they have been applying, and why they decided so. We started to use this tool by listing all crop activities that farmers have been doing. Then we drew a row and identified 12 columns for stating 12 months. After that, we asked farmers deeply according to the key questions above.

Secondly the tool was conducted during the main survey in second phase of this research. The key question that we start to ask is when farmers always grow vegetable. After that, we asked specific which period they always grow a kind of vegetable commodity. We continued to ask the key question whether they changed time or kind of growing vegetable commodities or not; if they changed, why they decided so. Another key question, which scale they are growing a kind of vegetable and why they decided so.

Ranking:

Ranking tool was conducted by using two tables. Both tables in the first phase period were to know which farm activity among all activities that is more important to farmers in terms of food security and income generating. We drew a matrix table and list out all agricultural activities in that table. We also tried to facilitate by asking groups of farmers to compare one agricultural activity to another (Example: which crop is more important to you in term of food security, it choosing between rice and vegetables? Rice and sugarcane? Rice and fruits?, etc). And we continued to do that matching until we had compared all activities. Then, we got the final result for understanding which farm activity is the most important and why it is so; why others are not? This tool helped to answer a part of the first research question, that is how vegetables play a role in farmers' livelihood.

Problem trees:

This tool was applied in both communes, the more market oriented commune and the less market oriented commune, to know the different roots of problems in their production and trading; also, it was shown the factors that be improved in this system. We started this tool by letting the participants discuss what is the core problem in their vegetable production and trading process. We regarded the core problem as the trunk of the trees; causes as the roots; effects as the branch. So, we gave the color cards for them to write down the causes and effects of that problem and to stick them at position as we explained. After completing the problem trees, we brought their attention to think how to solve those causes of the core problem. This tool was very necessary to answer the third research question; What are the most important factors affecting to farmers' adjustment in vegetable production and trading?

Venn diagram:

This tool helped to know the role and link of different stakeholders of vegetable production and trading. The link between vegetable growers with another marketing agents and others institutions like NGOs, government officers, and private sectors has been shown. We have also known how and why farmers engage with vegetable input suppliers, vegetable new techniques providers, marketing information providers, and buyers in their location. It was very important tool to answer a part of the first research question, in terms of inputs management, techniques management, market channel accessing, and stakeholders' involvement.

We separated two different sheets A0 paper. The first sheet was used to know how farmers engage with other stakeholders in vegetable production including inputs supplier, techniques provider, and marketing information. The second sheet was used to know how farmers integrated with output stakeholders such as middlemen, wholesalers, restaurant, and others.

We started by drawing one circle on A0 Paper by regarding it as the vegetable growers. Then, we continued to give different color cards regarding different stakeholders, and we let them discuss and write down which stakeholders have strong relationship with (**far** means **less relations**; **near** means **strong relations**). After that, we gave cards of different size (**big** means **more important**; **small** means **less important**). And, we asked them to put on those previous color cards (Stakeholders) with the size which they think is more important and less important in their systems. We were also flexible to ask many key questions related to how farmers manage in their vegetable production and trading options; which option provided the highest price; what happened if they have several options to compare with unique option in selling vegetable; why they think this stakeholder is important while others not.

In dept-interview: 6 farmers from Sam Raong and Dan Run commune were chosen to conduct deep interview. We let them talk freely about their life story related to vegetable production and trading development in their households. The difficulties and suggestions were also encouraged to speak out.

Feedback Workshop: It was conducted during 3rd Phase to feedback preliminary result of research to six key vegetable growers in each communes and several people from the local authorities, so we have known if our information was true or not and what the feedback and argument were from stakeholders during that time. Missing information was also collected during that workshop. Some conflicting reactions from government authorities and local farmers were occurred. That was the challenges for us to find the common issues, but that was also unexpected and interesting data, because we got different views from different stakeholders.

Questionnaires Interviewing

The individual interviews mainly collected the quantitative data. We selected 60 interviewees from all vegetables growers in targeted villages. In order to select the sample, we used pioneering explorative studying to select communes and villages. We had discussed with both communes' council for choosing targeted households. In each commune we decided to choose three villages located in lower, upper, and middle of the commune map. 10 households were selected from each village by using the same location model as above (lower, upper, and middle of village map). Selecting different locations of households in the village was the good way for seeing the differences and common perspectives. Also, only households growing vegetables for trading were selected. Exploring the overall view and identifying the scale of vegetables growing were the two main purposes for this sample model selection.

The interview was based on main indicators including geography, agricultural production characteristic, vegetable production characteristic, accessing of farmers, vegetable trading

characteristic, vegetable production costs and incomes, number of options that farmers have in selling, and factors affecting the decision making or behaviors of farmers.

All the questions in the questionnaire were constructed through those main indicators by using hierarchy questions and cross margin. We also cross checked with other sources including local vegetable venders, middlemen, wholesalers, local authorities, and reports of the agricultural office of the district to find and compare with local information related to the prices and productivities of each vegetable commodity.

Table 4.1: Sample selection for questionnaire interview

Sam Raong Commune			*Dan Run Commune*			*Total Sample*
N^0	Village Names	N^0 of Sample	N^0	Village Names	N^0 of Sample	
1	*Ang Kunh*	*10*	*1*	*Kok Russey Chueng*	*10*	*20*
2	Bat Dongkor	0	2	Kok Russey Tbong	10	10
3	Svay Chrum	10	3	Trav Keat	0	10
4	Trang Kchay	0	4	Thnol Dach	0	0
5	Sam raong Tbong	10	5	Run Khang Chueng	0	10
6	Sam Raong Chueng	0	6	Run Khang Tbong	0	0
7	Bit Meas	0	7	Sra Mar Thum	10	10
8	Thnol Chek	0	8	Phum Veal	0	0
9	Stung	0	9	Ban Tat Bos	0	0
			10	Son Tey	0	0
			11	Thnung	0	0
			12	Kok Chan	0	0
			13	Beng	0	0
Total		$n_1 = 30$			n2= 30	n=60

Source: Commune council discussion and mapping, July 2009

4.4.3 Participants

We chose carefully the relevant key persons who could provide us with useful information.

A. <u>Farmers and traders</u>

Farmers for group discussion, questionnaire interview, semi-structure interview, and deep interview must be the vegetable growers who grow vegetables for trading. The old people who supplement the useful overall information were the persons who have been living in village more than 10 years. And only traders who have relationship with vegetable growers in communes were selected.

Households in Sam Raong Commune

- 30 vegetable growers for questionnaire interview
- 7 large scale vegetables growers for one group discussion
- 4 small scale and 3medium scale vegetable growers for one group discussion
- 2 old People and 2 vegetable growers for semi-structure interview
- 3 vegetable growers for deep interview

Households in Dan Run Commune

- 30 vegetable growers for interview
- 12 vegetable growers (all scale) for one group discussion
- 2 old People and 2 vegetable growers for semi-structure interview
- 3 vegetable growers for deep interview

***Identification:**

Smaller than 0.05ha is small scale

From 0.05 to 0.5 is medium scale
Higher than 0.5 is large scale

Traders
- 2 Input suppliers and 3 Collectors (Middlemen)
- 3 Traders in Sourt Nikom district (Wholesalers and Retailers)
- 2 Traders in markets at Siem Reap city (Distributors and retailers)

B. Key Informants
Key informants having special site knowledge on vegetable production and trading situation, general farm diversification characteristic of farmers, and overview natural, social, and economic information of the study site were chosen for discussion and interviewing.

Local Authorities
- 3 District staffs, 2 Commune Council Officers, and 6 Village Headmen

Government Department
- 3 Agriculture department staffs, 1 Planning department staff, and 1 IPM project staff

NGOs
- 1 Representative of GTZ organization

4.5 Data Analysis

4.5.1 Qualitative analysis

After collecting qualitative data, we synthesized information immediately after group discussion for checking and controlling the data. All results and synthesis paper were arranged in files carefully. After that, we listed all relevant data from each tool. Also, we interpreted all information regarding to our research questions. And we also drew preliminary conclusion from those PRA tools.

4.5.2 Quantitative analysis (SPSS and Excel)

All questionnaires were given a code number. All of them were punched into the files carefully after we interviewed already. After that, we input all variables into Spreadsheet table of SPSS for analyzing. We analyzed data by using frequency, and descriptive (means and Standardization etc.) tools for description of data. Moreover, compare means, regressions, and crosstabs were mainly used for discussing the correlations within dependent and independent variables. Some summary results from SPSS were exported to Excel for constructing the charts because Excel is more convenient. Tables and Charts from both SPSS and Excel were delivered to Win Word for reporting.

4.6 Development and refinement of research questions

The core research questions developed during the research period according to literature review, secondary data review, study site empirical context, and research process difficulties.

At the first preliminary draft of proposal, we developed a concept from the theoretical perspective only. We put the main research question that is “How market integration works for the poor?” We proposed to study all stakeholders in the value chains, and how much benefit farmers get in comparison with other stakeholders. It was too broad topic to understand all relevant stakeholders when we have only 3 months for research with limited budget.
When we conducted PRA tools, the context of vegetables production in the case study site has been known clearer. Different farmers have grown different vegetable commodities, so researcher found that it was very difficult to compare the prices of each commodity. We made up idea in proposal again. We selected more specific question that “How do farmers’ adjustment in

vegetable production and trading affect the costs and margins? How to compare between a specialization in vegetable production and more diversified farm alternatives; what factors affect farmers' adjustment".

Through the analyzing process, we have found that farmers have almost the same diversified farm alternatives, so we omitted the comparison between a specialization on vegetable production and more diversified farm activities. Finally, we have designed the research basing on three main research questions as following: *1). How do farmers growing vegetables adjust in terms of production and marketing decisions to fluctuations in the price of vegetables. 2). To what extent do different farmers' characteristics in vegetables management affect the outcomes in terms of costs and margins. 3).What are the determining factors affecting local farmers' behaviors in vegetable market engagement?*

4.7 Research Operational Process

Conceptual framework was used to build the content for reporting and discussing in the thesis, so we needed indicators to measure all those concepts in framework for securing the data collection and analysis model. From theoretical literature review and empirical fieldworks derived very important concepts for measure all the main points in research. Figure below is operational guideline used to explore the plan and process of the whole research study.

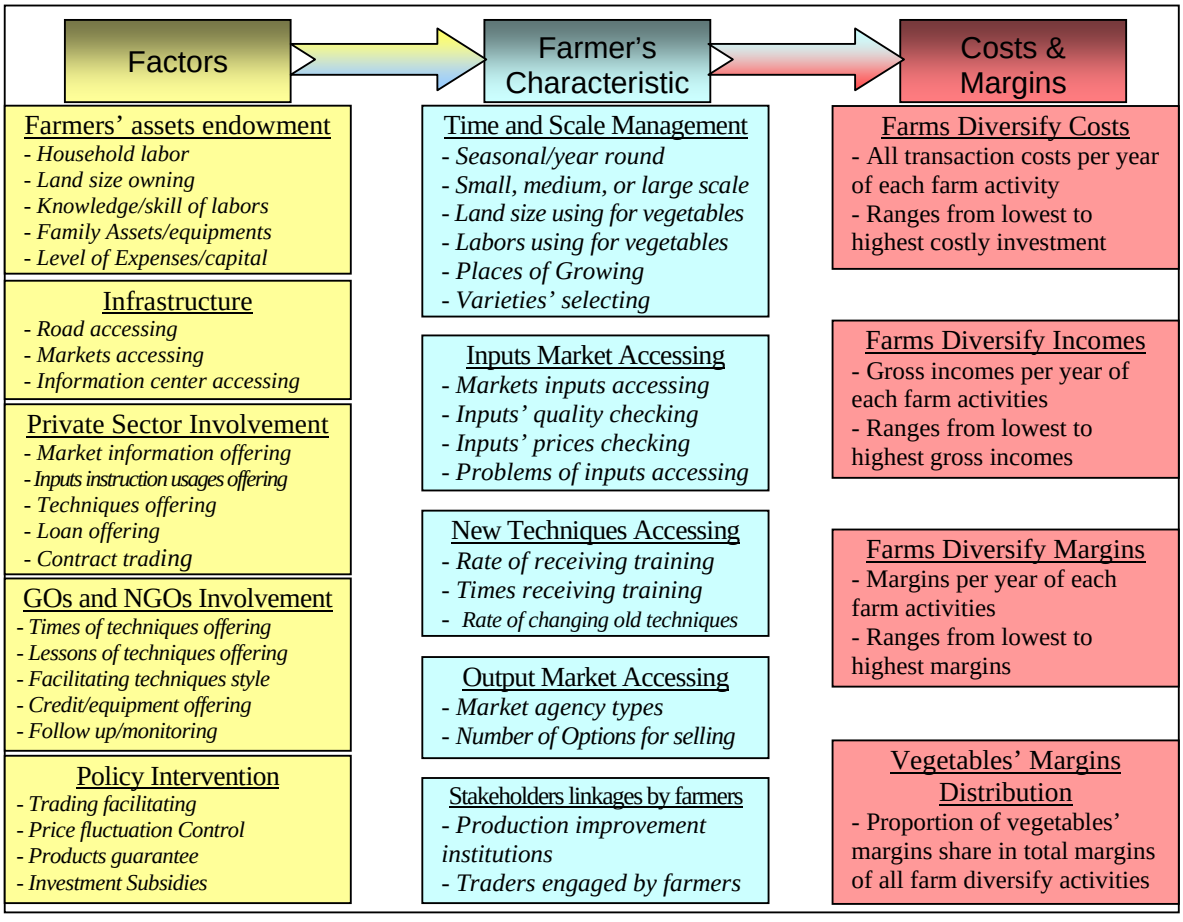

Figure 4.2: Research Operational Process

5 FINDING AND DISCUSSION

5.1 Background of Sourt Nikom District, Siem Reap, Cambodia

Agricultural marketing problem is the main concern for all farmers. It may be caused by the lack of infrastructure, lack of market agents, or lack of market opportunities, but Soutr Nikom District has good infrastructure, many market agents, and strong market opportunities from the World tourist hub-zone, but local farmers still cannot get high benefits as expected. It is necessary to find the reasons why. This section will describe the general background, general households' characteristic information, natural and social economic potential, and farm diversification characteristic of the study site to concentrate on market integration modes using vegetable commodities as the case.

5.1.1 Overview of Sourt Nikom District

According to social economic report of Sourt Nikom district, 2006 Sourt Nikom is one among 12 districts of Siem Reap Province. It is located at the East of Siem Reap City around 32 Km. The area occupies 984 sq km^2 including water surface. There are three types of land status in this area including up-land, flat, and low-land. The land tenure of this area is very suitable to agricultural production especially for rice crop, maize, and vegetables. The water sources for daily using and irrigation are coming from Tonle Sap lake, ponds, canals, and wells (DP_SR, 2006). The report added that, both poor and better-off households cultivate their crop seasonally, but it is significant difference in irrigation water between the poor and better-off households. The poor households mainly depend on rainfall and common ponds and wells for cultivating their crops while the better-off depend on both rainfalls and individual ponds and wells.

The same report also stated that, Sourt Nikom has ten communes including Chan Sar, Dam Daek, Dan Run, Kampong Kleang, Kien Sangkae, Kchas, Khna Pou, Popel, Samraong, and Ta yaek. Those have very similar natural conditions except for Dan Run and Kampong Kleang communes that have borders with Tonle Sap, great lake of Cambodia. Also, Khna Pou and Chan Sar are the suffering communes from minefield that make local people afraid to cultivate their agricultural products in some areas. This is also the problems that make some land be unused.

Table 5.1: Statistical of populations in Sourt Nikom district

Communes	*N^0 Villages*	*N^0 Group*	*N^0 of Households*	*Population (Persons)*
Chan Sar	19	63	1,609	8,308
Dam Daek	13	105	2,501	15,022
Dan Run	13	94	2,097	12,042
Kampong Kleang	10	105	1,907	9,956
Kien Sangae	12	102	1,727	10,499
Kchas	7	65	1,591	8,619
Khna Pou	8	30	929	5,375
Popel	13	59	1,781	10,164
Samraong	9	75	1,615	9,126
Ta Yaek	9	83	1,902	10,932
Total	113	781	17,659	100,043

Sources: SND_AO, 2008

According to the preliminary results of population statistical yearbook of Sourt Nikom district, the total households of Sourt Nikom district in 2008 was 17,659 households and the total population was 100,043 persons, of which 51.42 percent were females. The population density is 99.63 persons per square kilometer, and family size is 5.59 persons per household (see table 5.1).

Dam Daek commune has the highest population around 2,501 households (15,022 persons) because it is the district town which has markets, restaurants, government administrations, microfinance offices, shops, and others. And the smallest population in the district are Khna Pou(5375 perssons) and Chan Sor (8308 persons) communes. Mine field in those communes is the main reason making people do not want to live and cultivate their crops in those areas (SND_AO, 2008).

5.1.2 Households Characteristic Information

Most of households at Soutr Nikom district are farm households with 95% of total population, and others 5% are the small and medium traders, laborers, and government officers. Agricultural activities are regarded as the main source of food and income generating, but most of households still depend on rainfall for irrigation of their crops including rice, maize, vegetables, sugarcane, sweet potato, winged yam, peanut, corn, and watermelon. This condition shows that the people in this district mostly rely on weather or seasons for their agricultural production. It is also the main problem making high rate of poverty in this district (DP_SR, 2006). Around 36% are the poor households in total population, and most of them are the landless or holding little land. Fishing, off-farm activities, and migration are done insufficient way by the poor or landless households according to the report (DP_SR, 2006).

Many people in district can read and write, but around 15.1% of total populations in 2005 were still living in illiteracy. This proportion is still very high that need to find more solutions for eliminating this problem (DP_SR, 2006). The numbers of children ages from 6 to 14 who cannot go to school was 13.74% in 2005. The proportion of children who quit the school is still very high and needs reducing. However, the core problem making children unable to go to school are low living standard, low motivation, and lack of labor in agricultural production and housework. Long distance from school, lack of room, and lack of teacher are also the negative causes leading the fact that children cannot access to education (DP_SR, 2006).

5.1.3 Potential of Sourt Nikom

A. Natural Resource

Soutr Nikom is well known as the good place for agriculture activities. It has paddy rain-fed rice field 20,840 ha, paddy dry rice field 1860 ha, short term crops of (vegetable, peanut, sugarcane, sweet potato, etc) 4,642ha, forest land of 3,686 ha, Flooded forest of 11,892 ha, abandoned land 109ha. The forestry resource is available in three communes including Khna Pou, Chan Sar, and Popel, but it has been significantly affected by deforestation. Flooded forest which located along Tonle Sap lake in Dan Run, and Kampong Kleang communes has also been degraded every year by deforestation making fish lose their habitat. Soutr Nikom also has other natural resources such as clay, sand, and rock for construction (SRD_AO, 2008).

B. Infrastructure

National road number 6 (NR6) along with this district around 16.2 Km. The provincial road number 266B from Dom Dek commune to Trapang Prey village in Kien Sangkae commune across Somraong and Popel communes is around 21.46Km. The provincial road number 265D from Dom Dek commune to Srama Thum village in Dan Run commune is around 7.17 km. Another provincial road number 265e from Thnol Check, Dom Dek commune to Kompong Kleang commune is around 12.67 km. Those national and provincial roads are the concrete good ones making people convenient for traveling and transporting. Beside those good roads, the district also has many small roads in communes and villages built by red soil and white soil. However, the accessing to the roads is convenient for local people because they think that roads in their villages, communes, and district are good enough for them. But some problems occasionally arise during rainy season (DP_SR, 2006).

The literacy level in the district is around 85%. It is very high proportion in comparison with other districts and remote areas. There are around 349 rooms for primary level, and around 40 rooms for secondary (5schools) and high school (only one) (DP_SR, 2006).

This district also has many markets. It has one big market that local people call DOM DEK market. Beside that market, there are other four markets located in four communes including Kompong Kleang, Popel, Kien Songkae, and Somroang. This situation is very convenient for local people to exchange their products to traders or consumers. The agricultural business activities are also very busy. It is shown that all markets in Sourt Nikom play very important role for local farmers (DP_SR, 2006).

There are four radio stations for broadcasting information to whole district. Local people also can watch Television with four stations according to their preferences. Both radio and television are the main sources which provide the up-date information related to livelihood activities, entertainment, agricultural programs, and marketing information. Currently, local people seem to be interested in telephone for communication with each other. They also have been contacted, communicated, and negotiated for exchanging information about agricultural techniques, varieties, modern fertilizer, and prices through phone call (DP_SR, 2006).

Clean water system for supplying to local people is not established yet. All local people have to use the water from well, rain, and ponds for their cooking and drinking. Most of people cannot access electricity power or access at very high price. Generally, battery is well known as the main source of providing electricity power for lighting and watching television (DP_SR, 2006).

Industry is not developed yet in this district. There are only 33 small and medium factories for milling rice and mixing concrete (DP_SR, 2006).

C. Agricultural Marketing Opportunities from Angkor, World Wonder Tourist Hub Zone at Siem Reap City

Siem Reap is well known as the attractive tourist hub zone in the World. Magnificent temple of Angkor Wat is the World Wonder attracting million tourists from the rest of the World visiting every year. Bayond, Banteay Srey, Ta Prum, and other hundred temples surrounding are also very popular for national and international tourists. Cambodia received 2,125,000 foreign tourists to visit in 2008, and most tourists traveled to Siem Reap Angkor for visiting the World Wonder (MOT, 2010). According to annual report of agricultural ministry, 2009 the demand of any kinds of food especially rice, meat, and vegetables from consumers, food venders, retailers, hotels, and restaurants are very high. Therefore, this is the good opportunity of local people in Soutr Nikom to supply their agricultural products to Siem Reap city because the distance from Soutr Nikom district to Siem Reap city is only 32km. Agricultural domestic products cannot fulfill the demand from that tourist hub zone. Traders have to import more agricultural products from Thailand and Vietnam (AD_SR, 2009).

5.1.4 Farm Activities of Households in Soutr Nikom

A. Farm Diversification of Production Sources and Productivity

Soutr Nikom is the potential place for supplying agricultural commodities to Siem Reap city.The land tenure and climate condition are very suitable for agricultural production including rice, vegetable, livestock, fish, maize, corn, etc. Farmers used 20,840 ha for rice crop in wet season receiving 1.70t/ha on average and 1,860ha in dry season receiving 3.80t/ha on average. With this rice productivity, Soutr Nikom district got total paddy rice around 42,496tons (35,428 tons in Wet season; 7,068 tons in Dry season). It was not very high productivities, but farmers still have

surplus staple rice 6,951 tons equivalent to 10,861tons in paddy rice. Livestock and fishing production are not identified the quantity because the local people always raise livestock and catch the fish at small scale, and they sell it by themselves to whomever can afford the price (AD_SR, 2009). Beside the rice crops, other crops can be produced and sold to the market including vegetable production around 408 ton/year, maize 193ton/year, sweet potato 419ton/year, sugarcane 1,472 ton/year, and soybean 1,574ton/year. However, the quantities of those agricultural productions especially on rice and vegetable are still limited if we consider about the weather and natural resource opportunities. Also, the productivities and benefits are also not equal between farmers even when they live in similar natural conditions (AD_SR, 2009).

B. Farms Activities Seasonal Calendar

Estelle and his colleagues (2004) point out, that diversification into many activities is a strategy for farmers to secure the food consumption and to reduce the risk. The result of case study in Sam Raong and Dan Run communes shows that farmers have been applying this strategy. Farmers in both communes responded that rice, fishing, and fruit are mainly used for home consumption, and other activities such as vegetables and sugarcane are the sources of income generating. This process provides adequate food for household in the whole year. In addition, when the rice product is not enough for home consumption, farmers can use income from vegetables to buy more staple rice. Diversification of farm activities is a common strategy for food security and risk reducing, but is it the good marketing strategy or not? The answer of this key question will be discussed in section 5.2. Below figures identify the seasonal farm activities in both case communes.

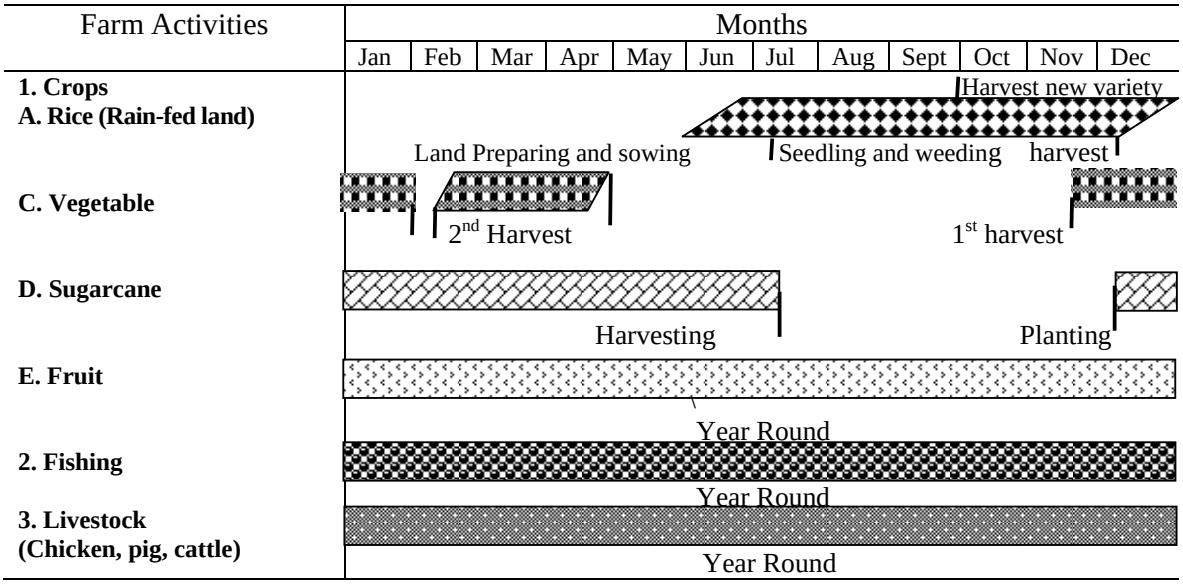

Figure 5.1: Seasonal farm activities at Sam Raong commune
Source: Households Group Discussion in Sam Raong Commune, 2009

Sam Raong Commune

As shown in figure 5.1, the diversified farm activities of local people in Sam Raong commune depend much on seasonal crop cultivation. The rainfall from May to September or October is the most important period for rice crops cultivation. Farmers start producing rice seedlings around the end of May; from June to October the local people do weeding and control the pest at least one time a day; November is the period of harvesting (Household group discussion in Sam Raong commune, 2009). Local people harvest only one crop per year with limited productivity, around 1.70ton/ha on average, according to report of agricultural ministry, 2009. The argument is made that the rice variety which local people have used is not good because it takes very long

time for harvesting with low productivity. Through group discussion of households in this commune, they agreed that their rice productivity was low, but it was enough for their own consumption in whole year. Generally, they use their local traditional variety called Reang Chey rice. Recently, some households in that commune have been starting to practice new variety called Rum Duol which has shorter duration and higher productivity. The seeds and techniques for the new variety had been transferred by agriculture department of Siem Reap province and some local NGOs. The taste of new variety is lower than the old, so local people have started to cultivate both varieties in their different land parcels. This progress enables households to have some surplus rice products to sell to the middleman or market in commune, according to households' group discussion. The profitability of rice productions is still low, but it is still very important for their livelihood in term of food security.

The second main farming activity is vegetable production. As shown in section 5.3.1 below, vegetable production is the most important for generating income for the families in this case. They can grow several times with different kinds of varieties. Usually, after harvesting the rice crop, they start to prepare the land for growing vegetable around the mid of November, and at the end of January they start the first period. At the mid of February they start to prepare the land and to grow vegetables for the second period. And the end of April they start to harvest, as shown in figure 5.1. There are many commodities of vegetable which local people grow according to their knowledge and market demand such as Cabbage, Chinese cabbage, Chinese kale, Swatow mustard, Cucumber, Tomato, and Eggplant. Those commodities have high demand on the market with high price making farmers easy to access with many market actors (Households group discussion in Sam Raong, 2009).

Other main activity for generating income is planting sugarcane. This kind of crop also takes long time for harvesting process. Local people can start to plant sugarcane at the mid of November and harvest it at middle of June. Sugarcane product is regarded as the cash crops which provide high profits for farmers, but it has costly investment in production that some farmers cannot afford (see figure 5.1).

Livestock, fruit, and fishing production occurs year round in very small scale (figure 5.1). Most of their products are consumed by farmers, and some surplus products are also sold at any time when farmers want to.

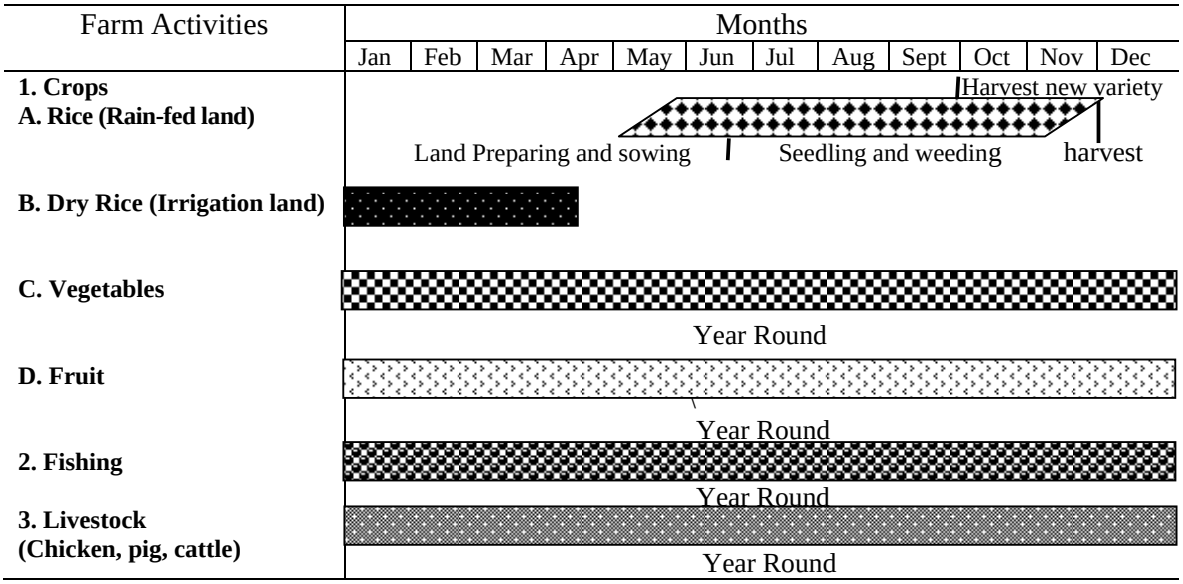

Figure 5.2: Seasonal farm activities at Dan Run commune
Source: Households Group Discussion in Dan Run Commune, 2009

Dan Run Commune

Farm seasonal activities are quite different between Dan Run and Sam Raong commune even though they are located in the same district with similar natural conditions (see figure 5.2). The period of rice cultivation on rainfed land is not different from that in Sam Raong commune. We can see that farmers in both communes still depend on rainfall and traditional long duration rice variety.

The significant difference is in dry season period. Farmers in Sam Raong commune use the same land plots for growing vegetables while Dan Run farmers use the land for dry rice cultivation, according to households' group discussions. The cause of this difference is water supply and land tenure. Sam Raong farmers only have ponds and wells for water to irrigate, so the amount of water can be used for vegetable production only. Dan Run commune have a dam and irrigation systems, so local farmers could cultivate the dry rice for extra incomes generating.

They are also interested in vegetable production, but they like to cultivate around their house and its own plot of land instead of large scale at rice paddy land. Their activities also occur year round with small and medium scale (Scale identification shown in section 4.2.1 "A"). Different and integrated vegetable commodities between farmers are also seen. They like to grow four or five vegetable varieties integrated in the same land with small scale, according to households' group discussion in Dan Run. Fishing, livestock husbandry, and fruit are also done year round according to the farmer's seasonal time (see figure 5.2). Those activities are the extra activities for generating income for their families.

The differences within Dan Run and Sam Raong communes are farm production alternatives and vegetables scale. Dry rice in Dan run and sugarcane in Sam Raong is the only one different farm's choice. The production costs and outcomes from both crops are almost the same. The significant factor leading farmers to decide in different alternatives is the natural condition. Dan Run has irrigation systems from dam and canal, so dry rice is very suitable crop for them. Sam Raong does not have any irrigation system leading farmers to decide to plant sugarcane instead because it could be supplied with water from ponds or wells, according to households' group discussions.

B. The Importance of Agricultural Activities in people's livelihood

To explore the perception of farmers in agricultural activities is very important to know farmers objective. The strategy of farmers to manage with all farm activities for producing food and generating income is also expressed. In addition, the attention to vegetables, which is the case study and potential marketing crop is specially illustrated.

Below tables are the results of pair wise ranking, tool of PRA (shown in chapter4 section 4.4.2 "A"). It shows the decision of farmers on the importance of one farm activity when compared to another activity.

Asking farmers to compare between rice and another farm activity which is an important source of food production, the answer is always rice (shown in table 5.2). So, it clearly shows that rice is the main crop of staple food for home consumption. Farmers regard rice as their main crop that can not be replaced by other crops. They always store rice in their house for consumption the whole year, and the surplus rice product is sold to milling industries or middlemen in their village. Vegetable production is the second main crop for supporting food security. It is used for consumption, exchanged for other kinds of vegetable within the neighborhood, or sold to traders in their communes or district. Sugarcane, maize, and livestock production are only the secondary activities because those activities have high risks for harvesting and raising. Even they could provide large amount of cash, but they have high investment costs for production. Fishing is the

last choice because many people could not catch any fishes in their communes except for some households who have fishing equipments.

Table 5.2: Farm activity for food security objective

	Rice	Vegetable	Sugarcane	Fishing	Livestock	Fruit
Rice	**Rice**	**Rice**	**Rice**	**Rice**	**Rice**	**Rice**
Vegetable			Vegetable	Vegetable	Vegetable	Vegetable
Sugarcane				Fishing	Livestock	Fruit
Fishing					Fishing	Fishing
Livestock						Livestock
Fruit						

Source: Households Group Discussions in Sam Raong and Dan Run, 2009

Another answer was given when we ask farmers which farm activity provide high cash income to their family. The result of pair wise ranking indicates vegetable as the main source of income generating (Shown in table 5.3). Farmers expressed their decision in group discussions of Sam Raong and Dan Run communes that vegetables is very important crop for generating cash income to the households due to the short duration of cultivation and less investment comparing with rice or sugarcane. Usually, rice is being used for farmers' consumption while vegetables and sugarcane generate cash to support children's education, to buy household's equipment, to buy farm inputs and equipment, and to spend on other necessary and unexpected needs. Rice and sugarcane are also very important sources of generating income, but they cannot compete with vegetables due to the budget of investment. However, those three main crops are not only important in all farm income sources but also in the total income sources (including off-farm and non-farm). According to the commune officers and 6 village headmen in Dan Run and Sam Raong communes, off-farm and non-farm activities are of marginal importance compared to farms activities in general, in view of their villages and communes. It does not mean people who have done off-farm (hired labor costs for seedling and harvesting) or non-farm (teacher, civil servants, migrants, and traders) got less income than farm income. The reason is that those activities have been done by very few people while most households are interested in farms diversification to ensure their livelihood.

Table 5.3: Farm activity for generating income objective

	Rice	Vegetables	Sugarcane	Fishing	Livestock	Fruit
Rice	**Vegetables**	**Vegetables**	Sugarcane	Rice	Rice	Rice
Vegetables			**Vegetables**	**Vegetables**	**Vegetables**	**Vegetables**
Sugarcane				Sugarcane	Sugarcane	Sugarcane
Fishing					Livestock	Fishing
Livestock						Livestock

Source: Households Group Discussions in Sam Raong and Dan Run, 2009

It is noticed that, all farm activities are important for farmers in both communes. It exactly confirms that farmers are strongly oriented towards the strategy for food security and risk reducing through their diversification of farm activities. However, vegetable is regarded as the potential crop for trading because it provides the highest cash incomes to households compared to other activities, according to farmers' group discussions in Sam Raong and Dan Run. So, how do farmers adjust in vegetable production to link to the markets? And what are the problems of farmers to engage in vegetable markets while their main objectives are food security and risk reducing? The answers will be discussed in section below.

5.2 Vegetable Market Integration Characteristic of Soutr Nikom

Vegetable market integration is an accelerating process of generating households' income. It concludes both production and trading management. Hence, this is the main section to study farmers' characteristic in market integration by using vegetables as the case. This section concludes three parts including vegetable production management, vegetable trading management, and linkages between stakeholders and vegetable growers. These parts will be interpreted and discussed from PRA tools and SPSS variables. SPSS variables such as land size, labors, place of growing, scale of growing, vegetable commodities, place of buying inputs, rate of checking inputs expire dated, rate of checking inputs instruction usages, rate of bargaining the prices, rate of accepting the training course from GOs and NGOs, kind of training, time of training, and rate of changing old perceptions will be analyzed by descriptive, cross-taps, and compare means. The tables and figures will be presented outputs for discussions. And vegetable seasonal calendar, trading accessing, and stakeholders involving will be discussed from PRA tools by using figures for interpretations.

5.2.1 Vegetable Production Management

A. Scale and Time of Supplying Vegetable Commodities

The decision of investing in land scale and labor size is very important for vegetable production development. As the experience from Sam Raong and Dan Run communes, farmers have many farm activities, which means that farmers lack labor forces to specialize in vegetable production improvement throughout the year with suitable scale of supplying to the markets. This is the problem that limits farmers' engagement in the markets.

According to households' questionnaire survey, there are two or three labors per household used to grow vegetables (shown in table 5.4). This result indicates only the numbers of household labor forces, not their working time.

The working time of labor forces in vegetable crop is very tight. Farmers strongly use their time for land preparation, fertilizer application, weeding, irrigation, harvesting, and transportation. According to group discussion in Sam Raong commune, farmers irrigated vegetables two times a day, early morning around 5am and afternoon around 3.30pm. The number of working hour in vegetable field every day was around 4 to 6 if two labors did work in the field. This working time was only after the rice harvesting season. Hence, farmers do not have enough labors during rice cultivation period because most of their members were already busy. This issue had made farmers in Sam Raong grow vegetable seasonally only.

This difficult situation also happened in Dan Run in another way. Through group discussion in Dan Run, because farmers had been busy with both rain-fed and dry rice production within whole year, they can only grow vegetables in small scale due to the lack of labors. There are the same labors used in vegetables as Sam Raong farmers, but the time of visiting the fields and irrigation for the crops was much shorter.

Table 5.4: Average labors size used for vegetable growing

Communes	***Labor Size Used for Vegetable Growing (Unit per Household)***	
	Means	Std.D
Sam Raong Commune (n=30)	2.80	1.186
Dan Run Commune (n=30)	2.43	0.858

Source: Households Survey, 2009

Land size used for growing vegetable is also the problem for a market engagement strategy according to the result of households' survey in Sam Raong and Dan Run communes. The result of questionnaire survey shows that, farmers in Sam Raong have average total cultivation land around 1.32 ha while Dan Run have 1.82 ha (shown in table 5.5). Farmers distributed the land for cultivating each crop according to their own strategy.

Table 5.5: Average total cultivating land size

Communes	*Average total Cultivated Land (Ha)*	
	Means	Std.D
Sam Raong Commune (n=30)	1.32	0.67
Dan Run Commune (n=30)	1.87	1.09

Source: Households Survey, 2009

The land used to grow vegetable is also showing contrast between the case communes (shown in table 5.6). From questionnaire survey, we can see that people in Sam Raong commune were more confident to invest in vegetable production with around 0.41ha when their total cultivating land was only 1.32 ha. In contrast, Dan Run farmers have around 1.87 ha of total cultivating land, around half a hectare more than that in Sam Raong, but they distributed very little land for growing vegetables, with only 0.15ha. This is the significant difference in deciding in land scale investment for vegetables crop. This is also the reason why Sam Raong commune can supply much more vegetables' quantity than Dan Run. According to this result farmer in both communes distributed small land size to growing vegetables, which is the main crop for trading.

Table 5.6: Average land size for vegetable growing

Communes	Average land size used for vegetable growing (Ha)	
	Means	Std.D
Sam Raong Commune (n=30)	0.41	0.298
Dan Run Commune (n=30)	0.15	0.112

Source: Households Survey, 2009

The difference of almost double land scale as shown above may be caused by farmers' decision in place of growing. We can see through table 5.7 that, farmers in Sam Raong decided to use the large land size of rice field, or rice field plus individual parcel to grow vegetables. Both land plots occupied around 73% in total place of growing making their scale larger, while Dan Run preferred to use the land around their house and its own parcel around 97% in total place. The individual parcel land and land around the house are always small, and the rice field land was used for dry rice instead (households questionnaire survey, 2009).

Table 5.7: Farmers' decision making of place for vegetable growing (%households/places)

Place of growing vegetable	*Commune*	
	Sam Raong Commune	Dan Run Commune
Around the House	3.33%	46.66%
As its own parcel land	23.33%	50%
At rice crop land	33.33%	3.33%
Rice Crop + Own Parcel	40%	0%
Total	100%	100%

Source: Households Survey, 2009

Different farmers always have different attention on scale of vegetable production. Some farmers grow vegetables in only subsistence way while others have done in commercialization. According to the discussion with key informants (Sam Raong and Dan Run commune officers) we decided to classify farmers into three groups (small, medium, and large) depending on their land size used to grow vegetables. The local authorities have identified the scale of vegetable growers as following. Farmers who use the land less than 0.05ha are the small scale farmers because most of them grow vegetables with subsistence objective. Ranking from 0.05ha to 0.5ha is regarded as the medium scale because those farmers grow vegetables not only for consumption but also for trading to generate incomes. And, farmers who grow vegetables larger than 0.5ha are the large scale farmers. Commercialization is their main purpose. Below figure shows the proportion of different characteristic in scale decision of farmers in Sam Raong and Dan Run commune.

According to household's survey using land size analysis mentioned above, we can measure that 17% of vegetable growers in Dan Run decided to grow vegetables in small scale while in Sam Raong had 10%. However, the majority of farmers in both communes decided in medium scale for trading (47% in Sam Raong and 83% in Dan Run). What should be noticed is that around 43% of farmers in Sam Raong Commune had decided to invest in vegetable production in commercial scale while none of them in Dan Run (see figure 5.3). This situation indicates that, only some farmers in Sam Raong were interested in large scale growing. More than half of the households' surveyed in Sam Raong and all in Dan Run have much hesitation to have vegetables in a commercialization model.

It is the clear evidence to show that, many farmers on both communes do not regard trading process as their main objective of their vegetable growing scale. Most of them do not want to use large land scale for only vegetables. They need diversified farm activities on the total cultivated land, for securing food together with earning cash income to support their necessary expenses.

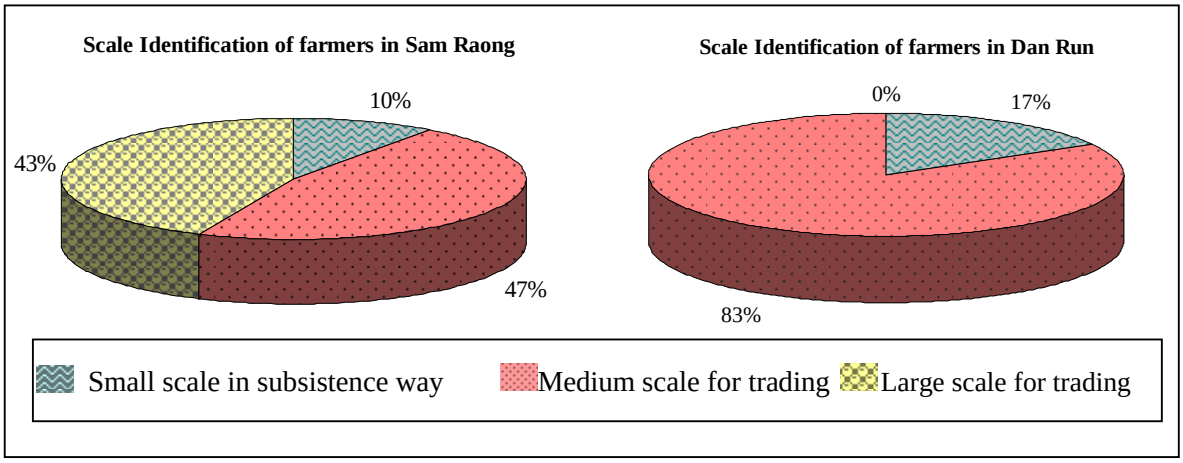

Figure 5.3: Farmers' decision in vegetable scale
Source: Households Survey, 2009 (Land size analysis)

The tendency of numbers of vegetable varieties growing was not different between the two communes, as shown in figure 5.4. Three integrated varieties of vegetable were very popular with farmers in both Sam Raong (34%) and Dan Run (40%). The diagram below illustrates that vegetable growers in Sam Raong commune have less integrated commodities than Dan Run because they mostly cultivated from one to three kind varieties. In contrast, beside three integrated varieties which had the highest ratio, we see that from one to eight diversified commodities were grown by farmers in Dan Run. The higher the numbers of vegetable varieties, the more the benefits diminish for farmers, as they get only small quantity from each vegetable

commodities. But, it is the way of reducing the risk in the case of failure in one or two commodities. However, when farmers specify their commodities, they got high quantity of specific commodities.

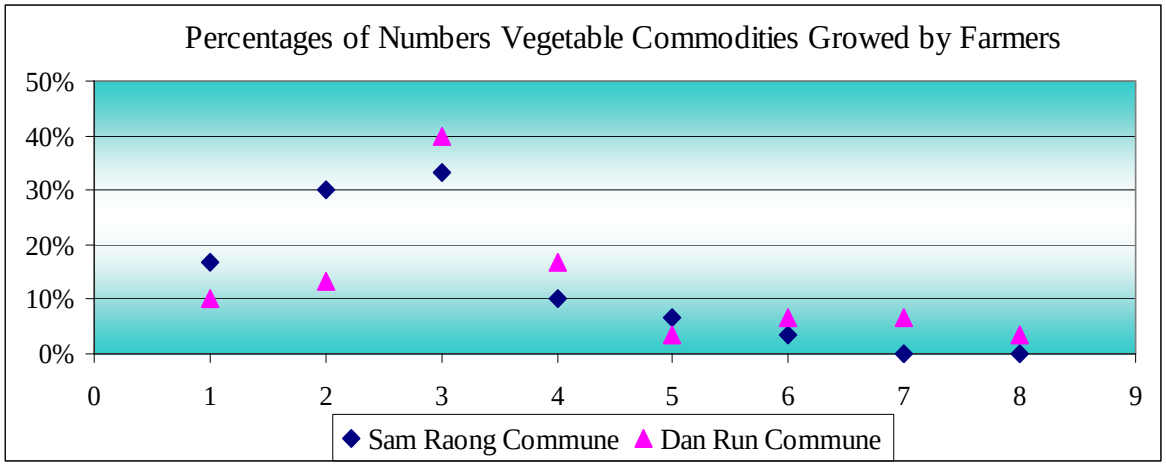

Figure 5.4: Tendency of numbers of vegetable commodities growing
Source: Households Survey, 2009

Schedule of growing is also another significant factor affecting vegetable production and supplying to the markets. KIT et al. (2006) mentioned in its literature that farmers need to sell their products to the markets in time to get the stable and high price. As the current situation in Sam Raong and Dan Run communes, the process mentioned by KIT and its partner institutions is not the main factor for local farmers. Instead it is the seasonally and small scale growing, which are the problems which negative effects to the markets engagement of farmers for getting the stable and high prices. Figure 5.5 below, which is the result from households' group discussions in Sam Raong and Dan Run commune, explores the characteristic of local farmers in vegetable growing schedule and scale preferences.

Vegetable Growing Duration	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sept	Oct	Nov	Dec
Sam Raong Commune												
Very Seasonally with Large Scale Vegetable Growing (Better than small scale but still not very efficiency)												
Dan Run Commune												
Regularly with small scale vegetable growing supplying (Not efficiency)												

Figure 5.5: Calendar and Scale of Supplying Vegetable Commodities
Source: Households Group Discussion, 2009

According to CENTDOR report in 2009, consumers, food vendors, retailers, restaurants, and hotels need high quantity of vegetables products regularly throughout the year. The report also stated that those market actors really like local vegetable products, but they always buy vegetable from another sources when local product cannot fulfill their regular demand (CENTDOR, 2009).

When we look to the timetable of growing vegetables of local farmers, some problems have been found. Some farmers grow vegetable in large scale but very seasonally while others grow throughout the year but in small scale. According to group discussions, farmers in Sam Raong commune prefer large scale growing, but the period of cultivation is just from December to April. Sometimes harvests are at the end of February and the end of April. It is different in Dan

Run commune where farmers grow year round with flexible cultivation and harvesting. Farmers can harvest their vegetable products many times; unfortunately it was very small scale supplying (shown in figure 5.5). So, it clearly shows that local vegetable products can not reply positively to those traders and consumers requirement.

B. Inputs Market Accessing (Fertilizer, Seeds, Pesticides, and equipments)

Efficient use of farm inputs is a factor bringing farmers to engage with a good market. If farmers do not use the productive inputs for their farm production, they hardly engage with the good market because of the low quantity and quality of their products (Tukan et al., 2006). With this literature review, the argument is made that farmer in Sam Raong and Dan Run commune have difficulties to integrate with markets to earn profitable incomes. The way of using inputs in their vegetable production is not efficient in terms of inputs 'quality, usage instruction, and prices. That is the problem results in low productivity of local vegetables' product. And, it negative effects to the vegetable supplying to the markets because of their low quantity, quality, and seasonal growing.

According to key informant interviewed, vegetable inputs are easily accessed by local farmers. They have never lacked vegetable inputs since 1996. Fertilizer and pesticide can be found at the shops in their villages, commune town, and district town. Farm equipment is also available at Dom Dek market located in Soutr Nikom district town which is not very far from farmers' location. We can see that local farmers have very convenient access to all kind of inputs at markets at reasonable price. Even so, different vegetable growers decided to access different inputs markets according to their own thinking, according to key informant interviewed. Some vegetable growers accessed the small shops in their own village even though the price was higher than in the town. Time and transportation costs affected farmers' choice in this case. Sometime they can take a loan from an inputs shop, and they return money back after they harvest. So, that is also a suitable way of accessing for farmers who have little capital. Other farmers decided to access market in their commune town because it is not very far from their location, and the quality and price are also acceptable. Actually, farmers in this group have enough capital for buying inputs, but they lack of fast transportation (motorcycle) to access the market in the district town. If they travel to the district town by bicycle, it is quite far (around 35km to go and return). And, many farmers decided to buy inputs at Dom Dek, district town market. Good roads in whole district significantly affect farmers' choice to access vegetables' inputs at Dom Dek market. Various kinds of inputs are available in that market. Farmers can choose all kinds and scales of inputs with reasonable prices. However, this way of accessing is mainly serving for farmers who have good transportation (motor) and enough money for buying.

Through the household questionnaire interview, we make a comparison statistically between Sam Raong Commune and Dan Run Commune to figure out what reasons farmers give for accessing inputs in different places. Table 5.8 illustrates that, Sam Raong commune farmers who are specialized more in vegetable' varieties accessed market in district town the most with 67% while only 47% of vegetable growers in Dan Run did. This shows that farmers in both communes trust on the quality and prices of inputs at Dom Dek market rather than other places. It was totally the same proportion 30% in each commune of Sam Raong and Dan Run to access the market in the commune. What should be concerned is the different rate at village market level. Because most of vegetable growers in Sam Raong commune are the medium scale and large scale growers, they prefer the good quality inputs with reasonable prices from market at communes or district town for their production to low quality inputs seen in village shops. There is only 3.3% of Sam Raong and up to 23.3% of Dan Run for accessing village shops (Shown in table 5.8).

Table 5.8: Places for buying vegetables' inputs from vegetable growers

Place for buying input	*Commune*	
	Sam Raong Commune	Dan Run Commune
Small shop in village	3.3%	23.3%
Market in commune town	30.0%	30.0%
Market in district town	66.7%	46.7%
Total	100.0%	100.0%

Source: Households Survey, 2009

Concern about farmers' usage inputs can be raised when we see the figure 5.6 below which is the analysis result from households' questionnaire interviewed. This diagram seems to argue with the statement above. Wherever farmers buy inputs, they never or rarely check the input, which causes many problems (proportion shown in figure 5.6). It seems to suggest that the quality said by farmers was just from buyers or other people. Farmers themselves bring low awareness or knowledge of checking those inputs such as expired date and instruction usages. If we compare two communes, Sam Raong was a little bit better at inputs accessing. But, if we mention the efficiency in using inputs, both communes were inefficient. From the households 'survey, the reason was that farmers pay less attention to expire date and usages instruction.

Another sensitive reason was that expire date and usages instruction on the labels of inputs are written in foreign languages such as English, Thai and Vietnamese which made farmers can not understand. Therefore, who exactly should be to complain in this case? Is it farmers? Is it sellers? Is it importer? Is it local authorities? Is it NGOs? Or is it government? However, this problem is slowly solved step by step because some import industries have tried to create a new poster written in Khmer script to stick on the origin bottle or tank of fertilizer, pesticides, and pesticide sprayer, according to key informant interviewed..

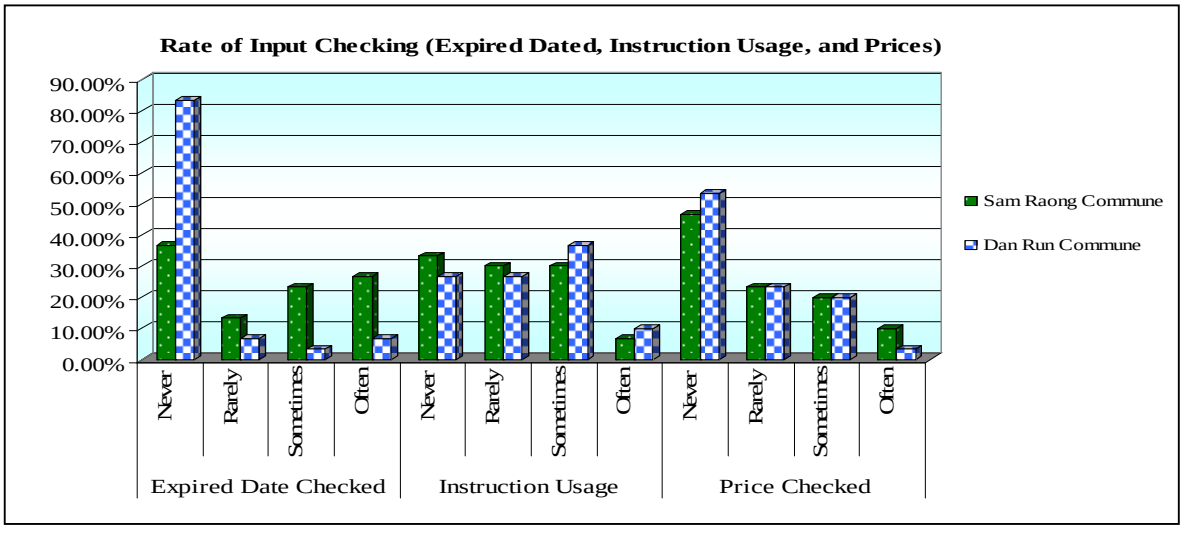

Figure 5.6: Rate of Checking Input (Expired Dated, Instruction Usage, and Prices)
Source: Households Survey, 2009

From the argument above, farmers themselves had recognized the problems happened in their production. Around half of individual households interviewed in both case communes replied that, they had been meeting the problems of their applying inputs including chemical fertilizer, seeds, and pesticides. There are three main problems of accessing vegetable inputs. The high input prices and far distance from the farm were not as very severe problems as we expected.

The most severe problem was low quality of inputs. The quality of inputs they use is so low, it limits their vegetable productivities or pest control capacities, as be shown in figure 5.7. That is the common problems occurring in both Sam Raong and Dan Run commune.

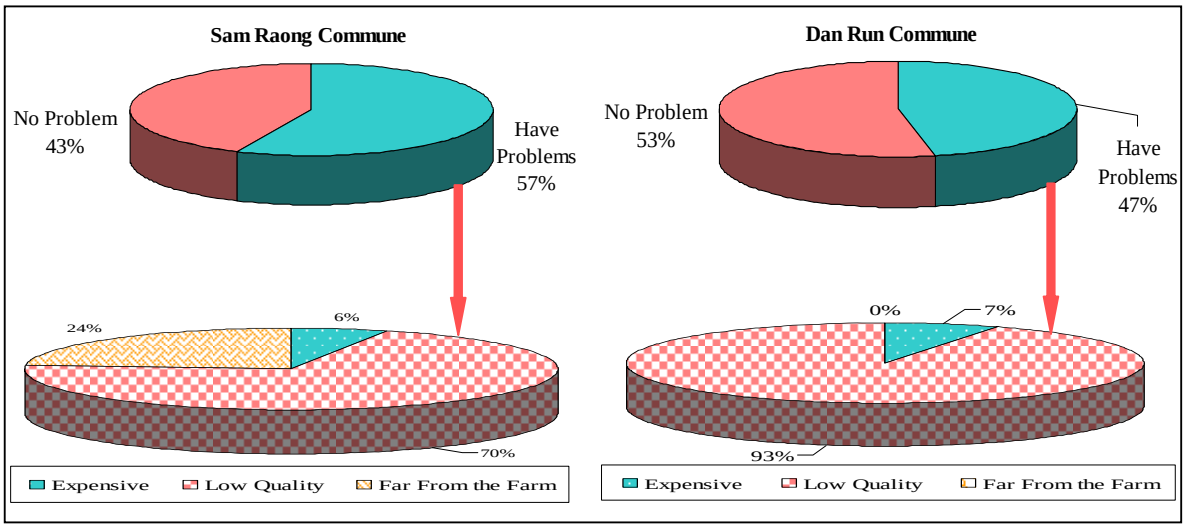

Figure 5.7: Input problems accessing of farmers
Source: Group Discussion, 2009

C. Vegetables Techniques Applying

Applying new techniques is a way of improving productivity and reducing costs to meet the good markets. As Kaganzi and his colleagues (2008), farmers 'awareness to accept the new farm production techniques is important not only to increase the farm productivity but also to attract the markets. Sam Raong and Dan Run communes have not adapted with the new techniques provided by government authorities and relevant NGOs in their location yet Farmers' awareness to learn the new technique to grow vegetables in intensive way throughout the years is still very low. That is the reason why farmers in Sam Raong have difficulties to cope with much water during rainy season while farmers in Dan Run hardly grow vegetables on another land type beside the highland. So, it is another problem that limits the level of farmers 'engagement to the markets through supplying vegetables in year round with high quantity.

According to households' questionnaire survey, it seems that there is no difference among case communes located in Sourt Nikom district in term of the rate of involvement of government authorities and NGOs. Local people in each commune can get equal opportunity of receiving vegetable training course from relevant institutions. Many farmers participated in vegetable techniques training course from government authorities and NGOs. Through table 5.9 around 56% of households interviewed in Sam Raong and 40% in Dan Run learned the new techniques from government authorities.

Table 5.9: Level of receiving vegetable techniques training from GOs

Vegetable Training	*Communes*	
	Sam Raong	Dan Run
No	43.3%	60.0%
Yes	56.7%	40.0%
Total	100.0%	100.0%

Source: Households Survey, 2009

The majority of local people participated in training course from NGOs, according to household questionnaire survey (shown in table 5.10). It likely shows that many farmers prefer to learn the new techniques from NGOs rather than from GOs.

Table 5.10: Level of receiving vegetable techniques training from NGOs

Vegetable Training	*Communes*	
	Sam Raong	Dan Run
No	20%	26.7%
Yes	80%	73.3%
Total	100%	100%

Source: Households Survey, 2009

There were many institutions from GOs and NGOs involving to help farmers to get the new techniques of vegetable production improvement. According to households' group discussions in Sam Raong, vegetable growers in Sam Raong commune mainly received training courses or supporting techniques from both GOs and NGOs. There are two institutions of GOs such as IPM program, and Sam Dach Techo Hun Sen Fund. Those government authorities worked with farmers very closely. IPM staffs had visited farmers to provide the pest management knowledge at least once a month. They provided the guiding book and posters aiming to reduce the rate of using chemical fertilizer and pesticide in their vegetable production. Also, the book shows how to apply and store pesticides in order to avoid bad effects on farmers' health. Cambodian Red Cross and Sam Dach Techo Hun Sen Fund provided the training of new techniques on vegetable production to the poor or smallholders farmers in commune. Also, there are five institutions of NGOs from which farmers received vegetables techniques training. They are Sre Khmer organization, ECOSORN, ADDA, GTZ, and FAO. Those NGOs worked with farmer on new varieties and modern inputs. They tried to encourage farmers to apply compost fertilizer with new variety of vegetable commodities rather than to apply chemical fertilizer (Households' group discussion in Sam Raong).

In Dan Run commune it is a little bit different from Sam Raong. According to households' group discussion there are five institutions of government authorities involved in vegetables techniques transferring in such Agricultural Department of Siem Reap province, local district council, local commune council IPM, and Cambodian Red Cross. And, there are two institutions, named FAO,

Table 5.11: Times of farmers participated in vegetable techniques training from GOs per year

Communes	*Number of times which farmers participated per year*	
	Mean	*Std. Deviation*
Sam Raong Commune	7.71	5.924
Dan Run Commune	6.67	6.228

Source: Households Survey, 2009

How active GOs and NGOs are to provide techniques to local farmers? This question will be illustrated by tables 5.11 and 5.12. Through households' questionnaire survey, farmers in both communes can get almost equal opportunities to learn the new vegetables techniques from government authorities, around 7 times in Sam Raong and 6 times in Dan Run per year (shown in table 5.11). But, the number of times for receiving from NGOs was significantly different within two case communes, according to households' questionnaire survey. Sam Raong commune participated in vegetables training from NGOs around 10 times a year while Dan Run got only 5times (see table 5.12). Vegetable growers in Sam Raong commune had stronger

intention to learn the new vegetables techniques to improve their vegetable productions compared to farmers in Dan Run.

Table 5.12: Times of farmers participated in vegetable techniques training from NGOs per Year

Communes	*Number of times which farmers participated per year*	
	Mean	*Std. Deviation*
Sam Raong Commune	10.17	7.51
Dan Run Commune	5.50	3.93

Source: Households Survey, 2009

The main agenda of GOs and NGOs was the improvement of vegetable production only, and there were not different lessons within two case communes so far. The institutions also trained vegetable production and trading together whenever farmers suggest during the training days. Hence, it shows that the agencies for providing trading knowledge to farmers do not exist yet. This is the problem that farmers have difficulties in getting the knowledge of trading concepts.

According to households' questionnaire survey, government authorities mainly focused on how to improve vegetable productivity only. As table 5.13 shows that around 82% of farmers in Sam Raong got vegetables techniques development only while Dan Run got around 75%. And, some farmers also got not only vegetable production development but also trading concepts with 17% in Sam Raong and 25% in Dan Run.

Table 5.13: Lessons of vegetable techniques training from GOs

Kinds of Training	***Commune***	
	Sam Raong	Dan Run
Vegetable Production Only	82.4%	75.0%
Trading Only	0%	0%
Vegetable Production and Trading	17.6%	25.0%
Total	100.0%	100.0%

Source: Households Survey, 2009

The situation of vegetables techniques training from NGOs was not different from GOs. Non-Government Organizations mainly transferred vegetables techniques development only. According table 5.14 which is the result of households' survey, NGOs focused on vegetable development around 95% in Sam Raong and 86% in Dan Run. Very few households got training course about vegetable production development together with trading concepts.

Table 5.14: Lesson of vegetable techniques training from NGOs

Kinds of Training	***Commune***	
	Sam Raong	Dan Run
Vegetable Production Only	95.8%	86.4%
Trading Only	0%	0%
Vegetable Production and Trading	4.2%	13.6
Total	100%	100%

Source: Households Survey, 2009

Whatever the content of the GOs or NGOs training for the farmers, the result for changing traditional farmers' perceptions on vegetable production techniques improvement was not very achieved. The rate of changing new techniques after being trained from GOs and NGOs in both communes was very low (shown in table 5.15 and table 5.16). But, many of them have also

changed some of their traditional techniques. It means farmers still believe in their traditional techniques and ignore the new ones which are not familiar to them.

According to households' questionnaire survey, around 76.5% in Sam Raong and 83.3% in Dan Run have applied some new techniques from government authorities. Very few households in both communes decided to change to the new vegetables techniques according to government authorities. Around 5.9% of farmers in Sam Raong and 8.3% of farmers in Dan Run totally changed to the new vegetables techniques. But, some households also completely ignored the new techniques provided by institutions of government (shown in table 5.15).

Table 5.15: Farmers' awareness to apply new vegetable techniques after received training from GOs

Rate of changing behavior after received vegetable techniques training from GOs	*Commune*	
	Sam Raong	*Dan Run*
Changed	5.9%	8.3%
Changed Some	76.5%	83.3%
Not Changed	17.6%	8.3%
Total	100.0%	100.0%

Source: Households Survey, 2009

The situation of farmers for accepting the new vegetables techniques from NGOs was almost the same with GOs. According to households questionnaire survey through table 5.16, around 79.2% of farmers in Sam Raong and 63.63% in Dan Run have made some changes to the new techniques according to NGOs. It is the highest proportion compared to the group of farmers who totally changed and totally ignore the new techniques (see table 5.16).

Table 5.16: Farmers' awareness to apply new vegetable techniques after received training from NGOs

Rate of changing behavior after received vegetable techniques training from NGOs	*Commune*	
	Sam Raong	*Dan Run*
Changed	12.5%	31.81%
Changed Some	79.2%	63.63%
Not Changed	8.3%	4.54%
Total	100%	100%

Source: Households Survey, 2009

Box 5.1: Why farmers have difficulties in accepting the new techniques provided by GOs and NGOs

> Mr. Ean Derm, a local farmer in Sra Mor Thom village, Dan Run commune expressed his feeling about new techniques. "I could not follow them (FAO, IPM, Cambodian Red Cross, and others). The techniques they provided were too difficult to apply and took time. My eggplant, wax gourd, and other varieties grew very slow when I applied compost fertilizer and organic pesticide as they suggested. I think my own techniques provided by my parents are better than those by NGOs because they are easier, and I am used to it already. Anyway, I wanted to sell my vegetables before the other people, so chemical fertilizer could help me.

Source: Household Deep Interviewed, 2009

Typically, it is not easy to change all farmers' old techniques in a short time. The new vegetables techniques that were transferred were likely to be too difficult and complicated to apply for farmers. The Box 5.1 is the story of one farmer who do not really like the new vegetables techniques provided by GOs and NGOs.

5.2.2 Vegetable Trade Characteristic

Local farmers in both communes had multiple choices for selling their vegetable products. Middlemen, markets in communes, markets in district town, wholesalers from Siem Reap City, wholesalers from other provinces, and markets in Siem Reap city are the current market available for farmers' vegetable trading. Vegetable growers sold their vegetables to two market agencies, as shown in table 5.17. There is evidence that farmers have tried to influence the market agencies for getting the suitable price. It is a reasonable trading process, but we should put the question whether those markets which farmers are engaged with are good enough.

Table 5.17: Total Options of Selling Vegetable of households

Communes	*Mean*	*N*	*Std. Deviation*
Sam Raong Commune	2.5333	30	1.16658
Dan Run Commune	1.8000	30	.71438

Source: Households Survey, 2009

To know which market actor is the good one, we must know how farmers access the output markets and which prices that those markets give to farmers. As the result from households' group discussion, even farmers have several options for selling their vegetables, but the markets which they engaged with is not good enough. Farmers still do not get high and stable prices of their vegetables because they remain selling their products to the middlemen or local markets which offer very fluctuation prices.

Most of vegetable growers in case communes have more than one choice for selling. According to households' group discussion, farmers in Dan Run commune had more than one selling options. Middlemen or collectors played the most important role in their location, but those middlemen did not have full right to set up the price of vegetable commodities anymore. The price always resulted from negotiations between farmers and a collector. When negotiation failed, farmers tried to sell their products directly to the markets in the commune or to the district town. Because farmers' vegetable products were still in small quantities, they could not attract the wholesalers in Siem Reap city or wholesalers from other provinces (households' group discussion in Dan Run). It is different from Sam Raong commune in term of market agencies; even they had almost the same selling options, according to households' group discussion. Many Vegetable growers in Sam Raong commune have sold directly to the wholesalers from district town, Siem Reap city, and other provinces because of their large quantity of vegetable products, especially cabbage. Some commodities such as tomato, salad, and long bean held no attraction for the wholesalers, so farmers sold to middleman, to market in commune, directly to Dom Dem market. Small vegetable holder who had small amount of product could not reach the wholesalers, so many of them sold to the middlemen or combined their product with other farmers for selling directly to the wholesaler, based on households' group discussion. Obviously, multiple selling options had brought power for price bargaining to farmers. But, it could not bring trading empowerment to farmers, if they still keep growing on small scale and seasonal supply. Figure below shows the market chains of vegetables that farmers have accessed from vegetables' inputs and output markets.

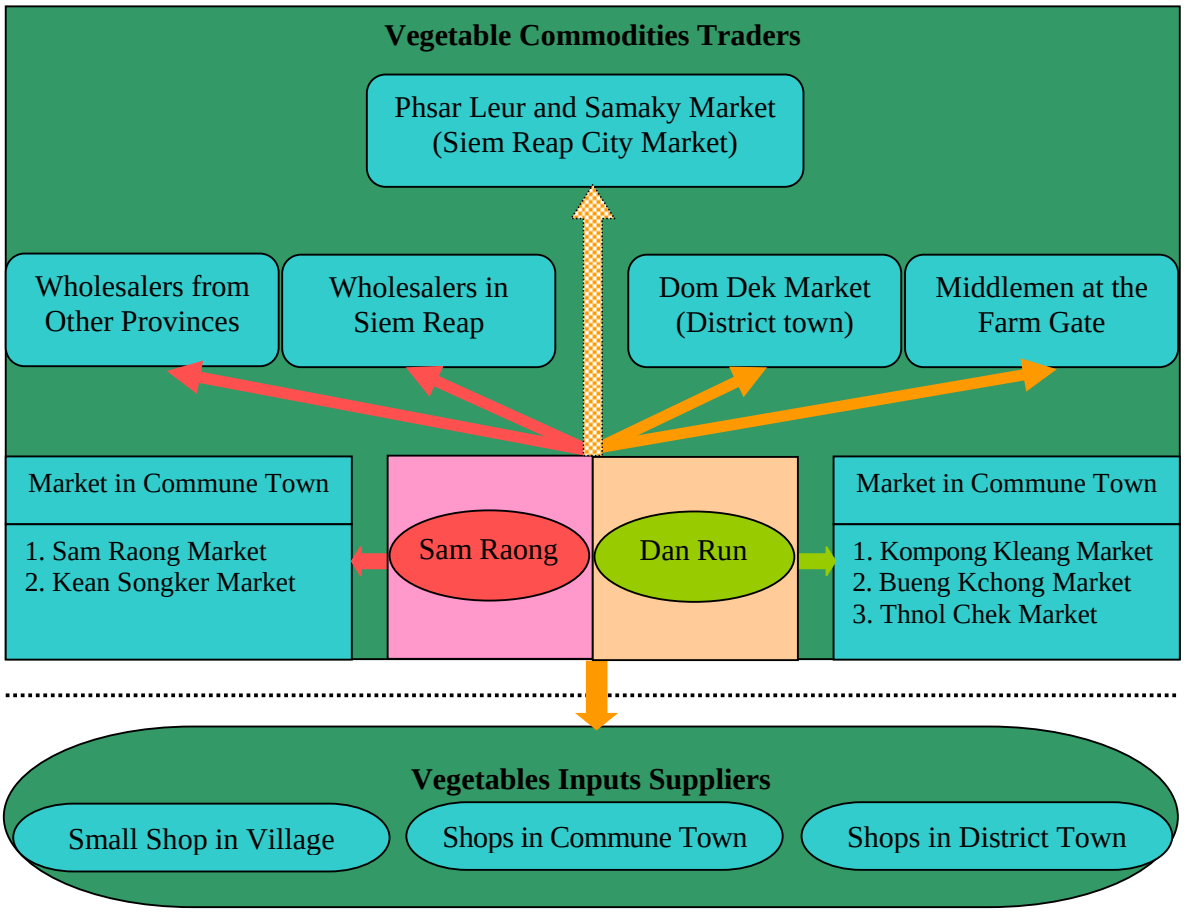

Figure 5.8: Inputs and Output markets accessing of farmers
Source: Households' group discussions and key informants interviewed, 20009

Figure 5.8 above shows the chains of vegetable trading process from local producers to different traders and input suppliers. Farmer is located in the middle of the chain. They accessed the input suppliers in different places depending on the distance, quality, quantity, prices and relationship with the vendors. During harvesting time the vegetable buyers always came to buy vegetables from seller with negotiated prices. Even though, farmers accessed many buyers to get the suitable high price.

According to households' group discussion, farmers met many market agencies including market in communes, market in district town (Dom Dek), and middlemen, despite the fact that Sam Raong commune could access two more market agencies including the wholesalers in Siem Reap province and wholesalers from other provinces. Regarding the big and good markets in Siem Reap city, according to households' group discussions, the level of accessing directly to those big markets remains very low, even the vegetable price is higher than elsewhere (at least from 500 Riel to 1000 Riel per Kg of cabbage, Chinese kale, Chinese cabbage, and eggplant etc, higher than middlemen in villages). The price of each commodity at markets in district town is also higher than the price from middlemen around from 200 Riel to 400 Riel per Kg. Anyway, the price from wholesalers in Siem Reap city and other provinces which farmers in Sam Raong have accessed was higher than middlemen around 500 Riel per Kg of each commodity. And, the prices from middlemen and small markets in communes were the lowest prices and unstable due to the seasons. However, the price from markets in Siem Reap city, wholesalers in Siem Reap city and other provinces, and prices in markets in district town were stable and not as fluctuating as the price from middlemen.

During group discussion some farmers replied that they used to deliver to those big markets in the city, but the result was not satisfactory. They must have license to sell on the markets in the city; otherwise, the authorities never let them sell their vegetables. It is very difficult to ask for license from market authorities even though they pay fees for it. Another way of selling vegetable in the city is at night from 11:30pm to 3am. Farmers could sell their vegetables at that time, but few customers bought their products (Households' group discussions).

One vegetable distributor in Phsar Lue market (a big market in Siem Reap city) mentioned that, she and other customers including hotels, restaurants, and groceries prefer to buy their vegetable products because they can regularly buy everyday from traders in this market. Anyway, they do not want to buy vegetables from any strangers, referring to farmers who occasionally go to sell. Eventually, markets in Siem Reap city are the dynamic places which can provide the high prices, but unfortunately they have not served directly for local vegetable producers yet (A trader interviewed, 2009).

Two cases of farmers in Sam Raong and Dan Run commune will be narrated to show the different prices of Chinese kale within different market actors. The first story is about Mr. Yim Yon, a villager in Kok Russey Tbong village, Dan Run commune who always sold his Chinese kale to middlemen and Dom Dek markets (name of district town market). The second story is of Mr. Vann Pron, a villager in Ang Kunh village, Sam Raong commune who sold his Chinese kale to wholesalers, middlemen, and Dom Dek market.

The story of Mr. Yim Yon lets us know that he still regards middlemen as the best partner for trading even though he knows the price from other market actors like Dom Dek market and Phsar Lue market at Siem Reap city. He seems comfortable with middlemen due to easy access and less requirement of quantity and quality (shown in box 5.2).

Box 5.2: Why farmers still regard middleman as the best trading partner. (The story of Mr. Yim Yon)

> I prefer to sell my Chinese kale to the middlemen in my village because it is the convenient way for me, Mr. Yim Yon said. When I wanted to sell my Chinese kale 30kg, the middlemen bought from me in 30kg. And, when I wanted to sell in 300kg, they also bought 300kg from me. They did not put any pressure on me about quantity, quality, and time of supply. Last year, one middleman offered me 2200 Riel per kg of Chinese kale, and the second middleman gave me 2400 Riel per kg. Anyway, that time my neighbors told me that the price of Chinese at Dom Dek market was 3000 Riel/Kg while at Phsar Lue in Siem Reap city was 3300 Riel/Kg. I also wanted to sell my Chinese kale to Dom Dek Market and Phsar Lue because the price was very high, but I could not. I have not any transportation to deliver my products to that market. If I rent a transportation to go the city, the costs would very expensive for me. And, what happen when nobody buy my products? I do not want to take any risk, so middlemen are my choice of selling.

Source: Household Deep Interview, 2009

The second story is about Mr. Vann Pron, villager in Sam Raong commune. This story shows the contrasting decision of selling vegetables to the markets compared to the story of Mr. Yim Yon above. Mr. Yann Pron decided to sell his Chinese kale to wholesalers and buyers at Dom Dek market due to the high price. But, he can still not accept the higher price with stability from a hotel in Siem Reap city because of their many requirements. He seems to have a trading concept, but his production management is not good enough to reply positively to that hotel's requirements (shown in box 5.3).

Box 5.3: Why local people reject requirement of market actors likeHotels and Restaurants?

I always sell my Chinese kale to Dom Dek market because the buyers at that market offered me reasonable prices, around 2800 Riel per Kg. That market also not very far from my farm, so I can rent tri-cycle motor to deliver my products to that market easily. When I could not rent the tri-cycle motor, I tried to contact with wholesaler in Siem Reap city. Last year I sold around 500kg of Chinese kale to wholesaler at the price of 2600Riel per Kg. Anyway, last time I also contacted several middlemen, but all of them gave me the price around 2000 Riel to 2200 Riel per Kg of my Chinese kale. So, I did not sell to them. In addition, last two years a luxurious hotel in Siem Reap city came to contact me and other farmers to supply Chinese kale and tomatoes. They were satisfied to give us 3300 Riel/kg for Chinese kale and 2500 Riel/kg for tomatoes. That was very high price for me and other farmers. But, we did not sell our products to that hotel because they have very strict requirements. According to that requirement, we have to supply 100kg of Chinese kale and 100kg tomatoes within three days. If I could not deliver enough quantity to them, I have to pay some compensation according to the contract. Anyway, they asked us to form a community for accumulating products, but how could we organize thiswhen most of farmers in this village grow vegetables at the same time. During harvest season all of us want to sell first, so can we wait till our turn? Also, we grow vegetables only in dry season, so how could we supply to that hotel regularly within a whole year? That is why I always sell my vegetables to the wholesalers and Dom Dek market because it is more convenient, and I don't care much about contract.

Source: Household Deep Interviewed, 2009

5.2.3 Farmers Positions in Vegetable Market Integrations

To identify where farmers are located in the chains according to their production and trading characteristics above, this section will discuss the position of farmers in market integration matrix chains and why so. KIT and its counterpart institutions (2006) identify that there are four functions or positions in market integration where farmers could be located in the chains, shown in box 4.3. The reality of farmers' characteristics in vegetables market integration in case study site will be analyzed according to that literature review.

As can be seen the production and trading management of local vegetables growers, farmers currently rank in the third position. The arrow moves from 1 to 3, shown in figure 5.9. This farmers' position should be appreciated because the movements from one quadrant to another is not very easy for rural farmers. Due to the evidences and discussion in sections above, we can see that, farmers tried very hard to manage both vegetables production and trading. In production management, farmers decided the scale and time for growing according to their own efforts and time of farm activities. They managed the land plot for growing vegetable carefully to make it easy for growing, weeding, irrigating, harvesting, and transportation. Choosing vegetable commodities that can meet the demand of buyers was also the benefits of local farmers. In addition, some farmers specialized only with few commodities enabling them to grow on large scale, while other farmers grew many commodities to meet different market agencies. The using of seeds, fertilizer, and pesticides in vegetable production was also in very good progress even though many farmers have not understood well about the importance of checking expire date, usages instruction, and price bargaining. Most of farmers also applied compost fertilizer together with chemical fertilizer to attract the buyers because the less chemical fertilizer is used, the more consumers they attract. Moreover, farmers were dynamic to participate in some relevant institutions that transfer the new techniques. They spent their busy time on the farm to participating in the workshop or training by GOs or NGOs. More or less farmers could know and understand some of the new techniques to apply for their vegetables.

For trading influencing, farmers did not completely depend on middleman. Middlemen also could not dictate the prices because farmers had multiple options before they decided who or where they should sell to. At least two options for selling were identified. And, farmers had power to bargain the price with any traders who want to buy their products. This case let us

know that farmers always get ready and prepare the trading functionality to get high profit from their vegetable productions.

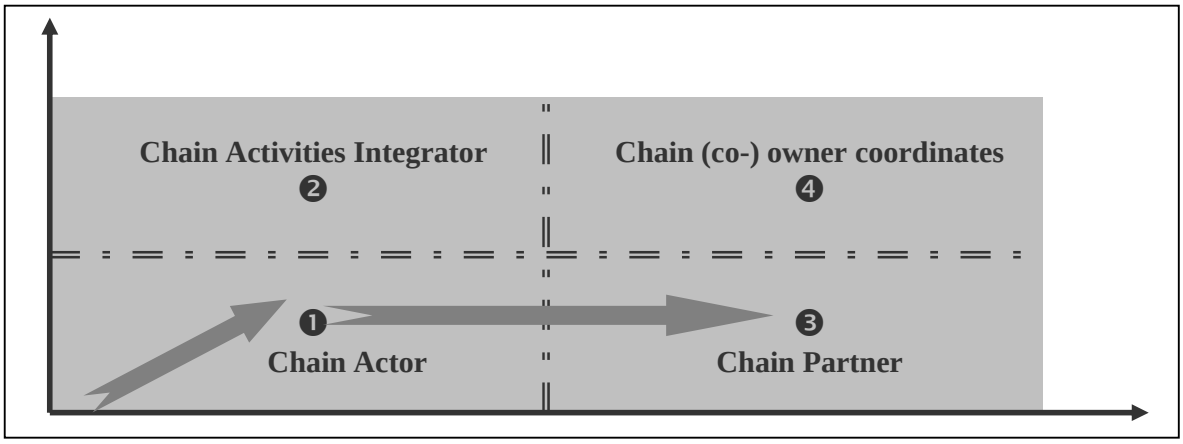

Figure 5.9: Farmers' Position in Vegetable Market Integration
Source: Households group discussion and Individual household survey, 2009

Box 5.4: Farmers' Function Movement in Vegetables Market Integration

(1→1) Farmers improve vegetable production by themselves without any influence over trading process
(1→2) Farmers enter more functions by focusing not only vegetables production but also processing activities for selling to a trader
(1→3) Farmers improve both vegetables production and trading influencing process, without any processing activities
(1→4) Farmers enter multiple functions through improvement productions, processing, trading, and cooperation

However, through the diagram 5.9 above, we can see the arrow moving from 1 to 3. That's very good start to build efficiency market integration. But, we still argue that this process of moving is still incomplete due to the low awareness of farmers in vegetable production, low cooperation among farmers in their location, and loose relationship with other market agencies like hotel, restaurant, or supermarket in city. Farmers were still lacking knowledge of using the right inputs for each vegetable commodity. They also paid little attention to expire date and usages instruction. Chemical fertilizer and pesticide were applied according to farmers' thinking by themselves without any suitable techniques using and protective equipment. The awareness of receiving the new vegetables techniques remains low because farmers still believed on their outdated techniques by ignoring the new techniques provided by GOs or NGos. The biggest issue in this case is scale and time of supplying vegetable. Buyers needed high quantity of vegetable products with regular times, but farmers still could not supply under requirement of buyers. Growing seasonally and on very small scale for each vegetable commodity are problems for market engagement.

5.3 Benefits Received From Vegetable Market Integrations

Gradually, the level of engaging in vegetable market integration is significantly affecting the income as well as the shares of total income of households. The vegetable production preparation and trading negotiation are the main causes affecting their income. This section aims to analyze the outcomes after farmers integrated their vegetables production and trading. And, farmers' strategy or objective for their livelihood is also discussed by using the total expense of households' survey per commune. All costs, incomes, and margins of households farm

diversification will be analyzed by using compare means to find out how vegetables play a role in generating income. Tables and Figures are mainly used for clarification the accurate and proportion data. However, only summary production costs, incomes, and margins of each farm alternatives will be shown because the main propose to argue is just focus on how vegetables play roles in farms' income distribution after being affected by farmers' options in vegetables production and trading process.

5.3.1 Costs and Margins of Farm Activities

There are seven farm activities of households in Sourt Nikom district. All those activities play very important role for food security consumptions and income generation for farmers' livelihood. Even though all those seven activities are important to farmers, they have differernt roles in terms of production costs, gross income, and margins. The most important activities in terms of cash income generation will be shown in this part.

A. Costs of Farm Activities

Farmers have not spent much in total costs if we see the table 5.18 below. There was around 1,300,000 Riel to 1,500,000 Riel in total expense of surveyedhouseholds in each commune on all eight farm activities in Sam Raong and Dan Run. But, those costs included the production costs and hired labor cost only (costs spent by cash only). If we calculate also the family labors costs and non-labor costs (farmers help each other), the total costs would be much more than that. (All costs, inncluding all production costs, hired labor costs, family labor costs, and non-labor costs are shown in appendix). But in rural areas we rarely calculate all those costs together because they are not the opportunity costs. Farmers normally spend their time doing such different activities. Also, the social relationship in that location is good. So, those are the benefits for the farmers, but they are not the costs of productions.

According to the total farm expense of households' survey in Sam Raong and Dan Run commune, farmers mainly spent on rice production which can secure the food consumption throughout the year. When we compare the table 5.2 which is the result of a ranking tool with data of total expenses of households per commune, it becomes the clear that farmers currently prepare food security strategy rather than marketing objective. They do not invest much money to vegetables that is regarded as a crop for trading; instead, they spend more on rice and other farm activities to secure the food and reduce the marketing risk.

As seen in table 5.18 below, rain fed rice received high rate of spending among all farm activities in both case communes, 524000 Riel in Sam Raong and 427000 Riel in Dan Run. What farmers needed is sufficient staple rice for family consumption. So, it is the reason that big expense on rice production was found commonly among farmers. Other common expenses involved fruit and fish production. Farmers in both Sam Raong and Dan Run were not spending much money on those activities because their products were mainly consumed in households themselves. They spent neither much money nor households labors. Their attention to those two productions was very little. Through table 4.14, people in Sam Raong spent around 2000 Riel (0.5USD) on fruit production costs and 7000 Riel (1.7 USD) on fishing activities while Dan Run spent 40,000 Riel (10 USD) on fishing activities and spent no cash on fruit production. That was very little amount of investment money. Beside rainfed rice (high spending costs), fruit and fishing activities (low spending costs), other activities had different amounts of production costs by Sam Raong and Dan Run (households questionnaire survey, 2009).

In Sam Raong commune farmers invested around 340,000 Riel in vegetables while Dan Run spent around 220,000 Riel (see table 5.18). Dan Run spent less on vegetables production than Sam Raong of around 100,000 Riel (25$). In addition, sugarcane and dry rice production were also costly, according to table 5.18 below. Of all agricultural activities, dry rice crop in Dan Run

cost most. It cost around 437,000 Riel, 10,000 Riel more than rainfed, in Dan Run case. Sugarcane in Sam Raong has similar amount of investment as vegetables production. It cost around 287,000 Riel, around 53000 Riel less than vegetables, in Sam Raong case. Large amounts of chemical fertilizer applyed in both dry rice and sugarcane were found as the cause of high production expenses. The last and unexpected level of investment was livestock activity. According to table 5.18, farmers in Sam Raong spent on around 180,000 Riel on livestock activity. High spending around 436,000 Riel was done by Dan Run, as shown in table 5.18. Most of farmers have raised livestock at their houses for multiple purposes even its expenditure on feed, vaccination, cage, and initial animals were high. Cattle are used for land preparation and transportation of rice, sugarcane, and vegetables, while pigs and poultry are the main source to support households' finance. Its manure was also used as fertilizer to reduce the cost of chemical fertilizer. Livestock also serves as the dowry from parents when their children get married and as special food during special religious festivals such as Khmer New Year and Phchum Bin (Ancestors dedication).

Table 5.18: Total expense of households surveyed on farm activities per commune (1USD=4150Riel, 2009)

Means of Farm Activities Costs	*Sam Raong (Riel)*	*Dan Run (Riel)*
Rice Rain-fed	524,047	427,817
Dry Rice	0	437,293
Cash Crop(Sugarcane)	287,833	0
Fruits	2,333	0
Fish	7,033	40,333
Livestock	180,600	436,151
Vegetables	340,488	221,047
Total Costs	**1,342,334**	**1,562,641**

Source: Households Survey, 2009

B. Farm Activities Gross Incomes

After investing in those farm activities, farmers got gross incomes. However, the gross incomes reported here did not included the values of rainfed rice, dry rice, vegetables, fruit, fish, or livestock that farmers keep for home consumption or seed for cultivation in the next season. The true important role of each farm activity may not be explored referring to this number of gross income because they have their own different values. It is difficult to calculate those farm values of activities through quantitative measures. However, cash incomes are very important for local people's necessary spending. So, this section depicts only the cash flow in household per commune just to know which farm activity plays the most important role in terms of generating money and to distinguish whether there is difference or not between Sam Raong and Dan Run commune.

The analysis of the total farm income of households suggests that farmers' main objective is to secure the stable food consumption within whole year. The high investment on rice crop is mostly used for home consumption rather than selling. The cash income from rice crop was still very low compared to vegetable which gets less investment. In addition, the higher investment in vegetables in Sam Raong commune allows them to get twice as high gross income, as compared to Dan Run.

There was very different amount of gross income generated from each farm activity, according to households questionnaire survey as shown in table 5.19. There was vegetable which provided the highest income to farmers in average around 2,837,000 Riel in Sam Rang. That commune

also got advantage from sugarcane crop which provided around 983,000 Riel per year. Rainfed rice was also giving around 802,000 Riel to Sam Raong commune. Vegetables, sugarcane, and rainfed rice were the most important sources of generating cash in Sam Raong commune. Livestock, fishing, and fruit activities were not offering much cash to households in Sam Raong at all, but it played another role as mentioned in section "A" above.

Regarding to Dan Run commune, farmers also earned the highest gross incomes from vegetables around 1,522,000 Riel, as be shown in table 5.19. Dry rice was the second highest source receiving 923,000 Riel per year. Livestock and rainfed rice generated similar amount of cash with 640,000 Riel and rainfed rice got 589,000 Riel respectively. Farmers also got some cash from fishing activity almost 200,000 Riel per year. However, vegetables rank on the top of the list of all farm activities and provided the highest gross income to households in both Dan Run and Sam Raong commune.

Table 5.19: Total income of households surveyed on farm activities per commune (1USD=4150Riel, 2009)

Means of Farm Activities Gross Income	*Sam Raong (Riel)*	*Dan Run (Riel)*
Rice Rain-fed	802,070	589,233
Dry Rice	0	922,943
Cash Crop(Sugarcane)	983,333	0
Fruits	20,500	0
Fish	5,000	198,167
Livestock	138,717	640,933
Vegetables	2,837,787	1,522,840
Total Income	**4,787,407**	**3,87,4117**

Source: Households Survey, 2009

C. Farm Activities Profits/Margins

Margins are the cash which farmer received, minus the costs. From showing only gross income it is hard to know how much farmers can save for necessary expense in their families. Through table 5.20, profit from each of the farm activities is shown. Based on gross income (only depicting cash flow) minus the costs, farmers in Sam Raong still received profits from four kinds of farm activities, according to total farm' net incomes of households survey analysis. The most profitable crop was vegetables which farmers earned around 2,497,000 Riel per year while total margins of all farm activities were only 3,445,000 Riel. Sugarcane, rainfed rice, and fruits also provided some savings to households while fishing and livestock activities were not included. Anyway, vegetables were also the most important crops providing the highest profits in Dan Run commune. Farmers also got savings from dry rice, livestock, rainfed rice, and fishing activities. However, though this is analyzed from Sam Raong and Dan Run which are the study cases, the savings made by vegetables is very important for local farmers' livelihood in general and cash incomes in particular.

Table 5.20: Total margins of households survey on farm activities per commune (1USD=4150Riel, 2009)

Means of Farm Activities Margins	*Sam Raong (Riel)*	*Dan Run (Riel)*
Rice Rain-fed	278,023	161,417
Dry Rice	0	485,650
Cash Crop(Sugarcane)	695,500	0
Fruits	18,167	0
Fish	-2,033	157,833

Livestock	-41,883	204,783
Vegetables	2,497,299	1,301,793
Total Margins	**3,445,072**	**2,31,1476**

Source: Households Survey, 2009

5.3.2 Different benefits from vegetable production in the two case communes

To specify and to extend the costs, incomes, and margins on vegetable production, we built one figures to describe and discuss the different benefit between Sam Raong and Dan Run commune.

The vegetable costs between communes were not very different from each other if we look at figure 5.10, according to result of households survey analysis. Farmers in Sam Raong commune invested in vegetable production around 100,000 Riel, 25USD more than Dan Run. This was not a significant difference between the communes at all. When considering the difference in income generated, we can see that the amount of money reached is quite different. Sam Raong farmers earned nearly 3 million Riel per year while Dan Run only had a half. Regarding to margins from vegetables, Sam Raong once again received around one million Riel of savings more than Dan Run, according to table 5.20. That is a significant amount of money in rural areas of Cambodia. We noticed that, this higher saving was mainly caused by margins from vegetables. Even though some farm activities in Sam Raong commune have not existed like dry rice production and there has been losses in production like fish (-2000Riel) and livestock production (-41000Riel), the margins from vegetables still could compensate the loss and gain higher profits, as compared with the low vegetable production in Dan Run.

The compensation of the loss on some farm production was not the only benefits from vegetables. Through group discussion with ranking tool and shown in table 5.3 above, is other evidence. Cash from vegetables is often used to buy agricultural inputs such as chemical fertilizer, pesticide, seeds, and other farm equipments. Daily expenses on food and children school fees were also regularly paid. Money for donation or participation on many ceremonies in villages such as wedding party, funeral ceremony, and other special festival were taken mostly from vegetable incomes. That saving was also used for health care when a member of family got the problems. In addition, many people said that, they can afford to buy new motor, television, radio, and other house equipments since they started to grow vegetables in an intensive way. What people claimed above lets us know how important the role of margins of vegetables is in farmers' livelihood. However, the efficiency profitability goes to whoever is already integrated in vegetables markets in a good way. Unfortunately, the good margins absolutely cannot be reached to farmers who don't make their changes in vegetables management pattern in accordance with the price fluctuation at the market and unstable demand of market actors.

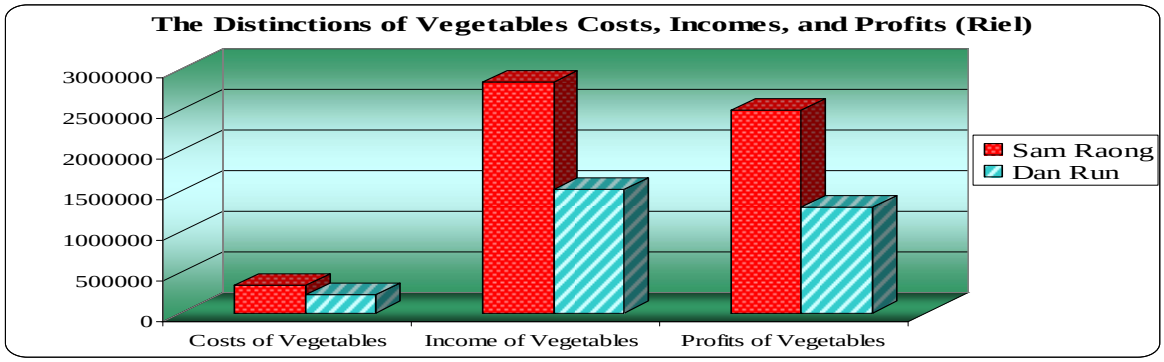

Figure: 5.10: Distinctions of Vegetable costs, incomes, and profits of Sam Raong and Dan Run
Source: Households Survey, 2009

Box 5.5: Story of different vegetables' profits received

Mr. Tin Bun Tang is living in Sam Raong Tbong village, Sam Raong commune claimed that "I bought a motor last two years ago after I had tried to save money from my vegetables for several years. My family has a better life since 2002 when we have grown vegetables on large scale in paddy rice field during dry season. I must try more for my children's future. This year, I only cultivate cabbage and mushroom because my brother in Siem Reap city told me that both varieties are strongly needed on the markets. I hope that I'll get high profits this year

Mrs. Than Saum, is living in Sramor Thom village, Dan Run commune said that: I grow many varieties such as eggplant, wax-gourd, cucumber, and long bean, etc. in the garden beside my house. Last year I sold it to several middlemen in my village and outside the village. They set the lower price than Dom Dek market as my neighbor told me, but I was so lazy to sell to Dom Dek because it is far. So, I sold them all to those middlemen, for I could get some money to buy fertilizer to apply in my rice crop.

Source: Interviewed, 2009

Diagram below shows in detail the average income from each vegetable commodity in both communes. Most of the commodities which have high prices at the market were achieved high incomes by Sam Raong commune except for Chinese cabbage, which gave a higher income in Dan Run. It is true that choosing vegetable commodity is also very important. Many farmers in Sam Raong choose vegetable commodities of high price and strong demand at the market. For illustration, cabbage attracts many wholesalers in Siem Reap city and other provinces, so farmers in commune try to grow cabbage to fill the high demand of those good stakeholders. In contrast, Dan Run commune grows various commodities on very small scale, so they can get only small quantity from each commodity (shown in figure 5.11).

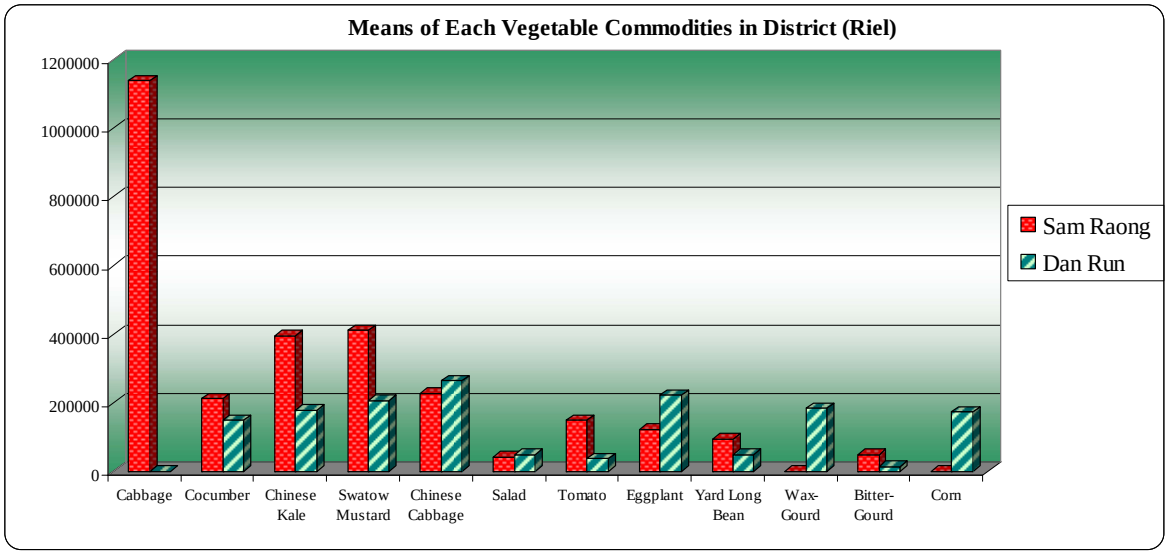

Figure: 5.11: Gross incomes of each vegetable commodity
Source: Households Survey, 2009

5.3.3 Vegetables Income as part of All Farm Activities Incomes

It is very important for farmers to build the close attention to their vegetables product specifically and intensively. This income distribution analysis includes the cash incomes from vegetables and other farm activities only. Through the accurate amount of money in the tables

above, the pie chats below are established to show the proportion level of vegetables income as part of total cash income among all farm activities.

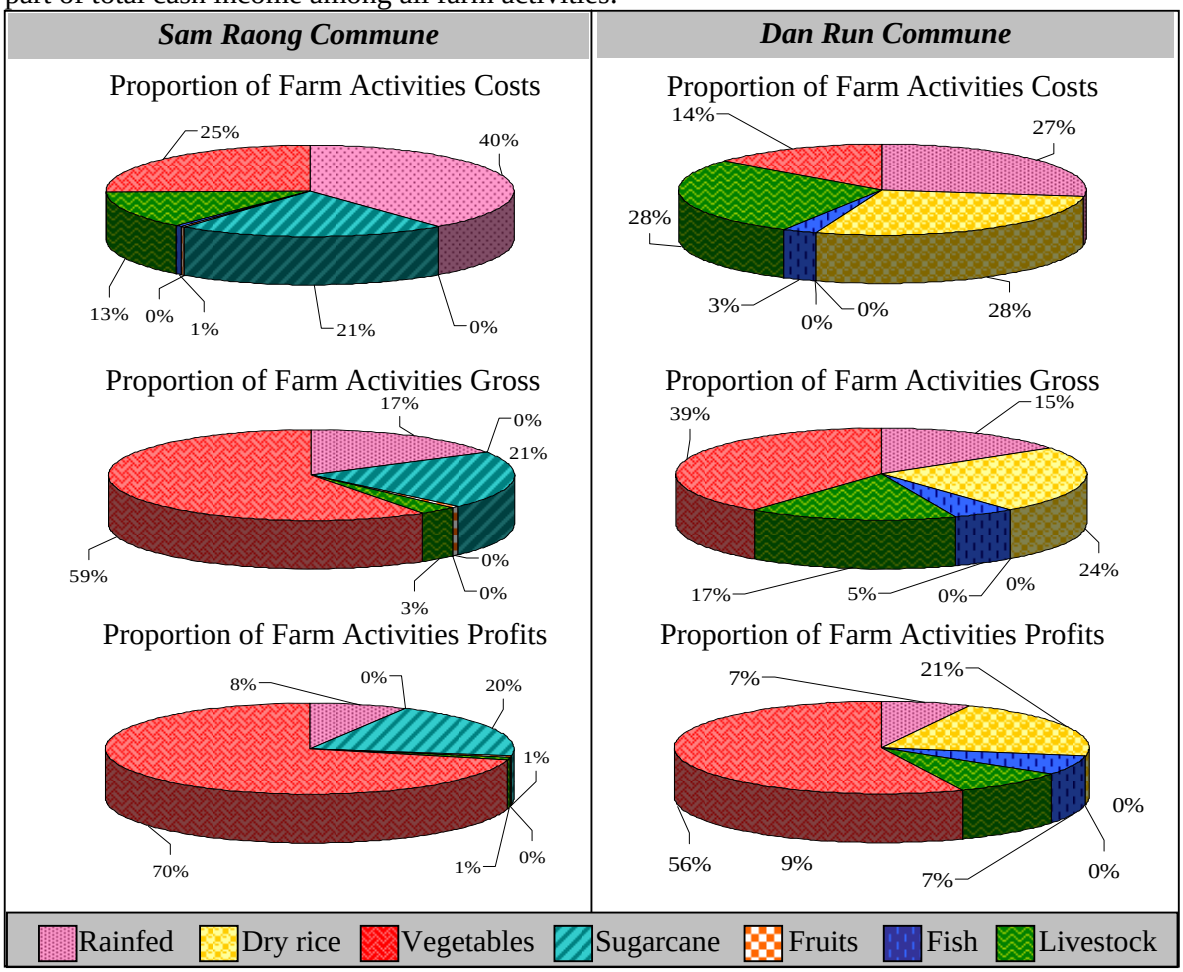

Figure: 5.12: Costs, Incomes, and Profits Distributions of Each Farm Diversifies
Source: Households Survey, 2009

According to the conceptual framework of this study, reducing costs and increasing margins were the expected results. But, the reality of study site showed that the more costs they spent and invested, the more margins they got. It seems to conflict with what conceptual framework proposes if we only see the amount of money. Actually, the more costs means the more level of investment in this context. Using large land size for growing vegetables requires costly expense on land preparation, seeds, chemical fertilizer, pesticide, and farm equipments, etc. But, those large scale growers also got high profits from what they invested. However, reducing costs for getting high net income was not the outcomes from the farmers in this case. Farmers paid less attention to how to reduce the operational costs for vegetables. They just care about how to make their vegetable's varieties to get high productivity and quality when selling to the markets. That is the shortcoming of local farmers making them unable to receive the efficiency profits.

Even the cost reduction was not significantly affected by farmers' vegetables market integration, but the margins were. It is an evidence for that different decisions in production and trading management leads to different outcomes in terms of revenue, when we know the size of the different profits from vegetables between two case communes. Pie chats above stated the differences. There were not many different in proportion. Vegetable' income constituted almost 60% of total income in Sam Raong commune and 39% in Dan Run commune. The share of

margins was also different because proportion of Sam Raong was 70% while Dan Run was distributed with 56% (figure 5.12).

The difference in percentage in shares of total income from vegetables in both communes above was not very different, and it did not seem to show the reality at all. But, it was very realistic difference when we look back at the tables 5.19 and 5.20 related to the amount of money. More than one Million Riel in income and margins generating is not a small issue in rural areas of Cambodia. The same district administrative management, same market opportunity from Siem Reap city, and similar natural conditions has still lead to very different vegetables' income. This is the strange point, but it is commonly occurring in rural Cambodia.

However, the difference in vegetables' income is affected by two main reasons. Farmers' decision in production management including techniques, scale, and inputs management is the first main cause. Farmers in Sam Raong commune used more intensive techniques together with large scale, making their vegetable productivities much higher than for farmers in Dan Run who paid less attention on vegetables investment. Inevitably, we agree that farmers in Sam Raong decided the better choices than Dan Run to manage their vegetable production for meeting the good market actors, but both Sam Raong and Dan Run are still not very efficient in vegetables production management to meet the markets.

Trading options dynamic agencies are also another main reason. Farmers in Sam Raong were flexible to sell their products to many different stakeholders according to their commodities and quantity to reach the high prices. Farmers in Dan Run were still afraid of unreliable prices at markets so they do not want to contact with the new market actors. The market agencies such as middleman and small markets in commune were the best choices for them in their own decisions. However, in the context of such high demand of vegetable from the city, farmers in both communes have not reached the high benefits from their trading process. Many stakeholders including hundreds of hotels, restaurants, supermarkets, and more than ten big markets in Siem Reap city were waiting for local vegetables products. Hence, this finding identifies that farmers are still maintaining low awareness to take risk for preparing the marketing strategy.

5.4 Determining Factors Affecting Vegetable Growers' Characteristics in Market Integration

Farmers' characteristics in vegetable production and trading process are directly effecting on their incomes and livelihood. Different characteristics had lead to different benefits, as Sam Raong has better market integration accessing than Dan Run commune. However, those characters of farmers in vegetable market integration were determined by many factors. Through the literature review discussion above, there are many factors affecting farmers in marketing process including initial assets endowment, infrastructure, private sector involvement, GO and NGOs involvement, and policy intervention. All those factors may or may not appear in this study context, so this study just uses them as the concepts to find out what factors affect in reality. Getting to know the answer, the identification factors are needed from households' group discussion, key informants interviewed, and households interviewed. The results from problem trees in PRA tools, answered by local commune officers, and interpreted data from households' surveys will be interpreted to identify the factors. The correlations identification between factors and all components of farmers' characteristics in vegetables market integration will be discussed.

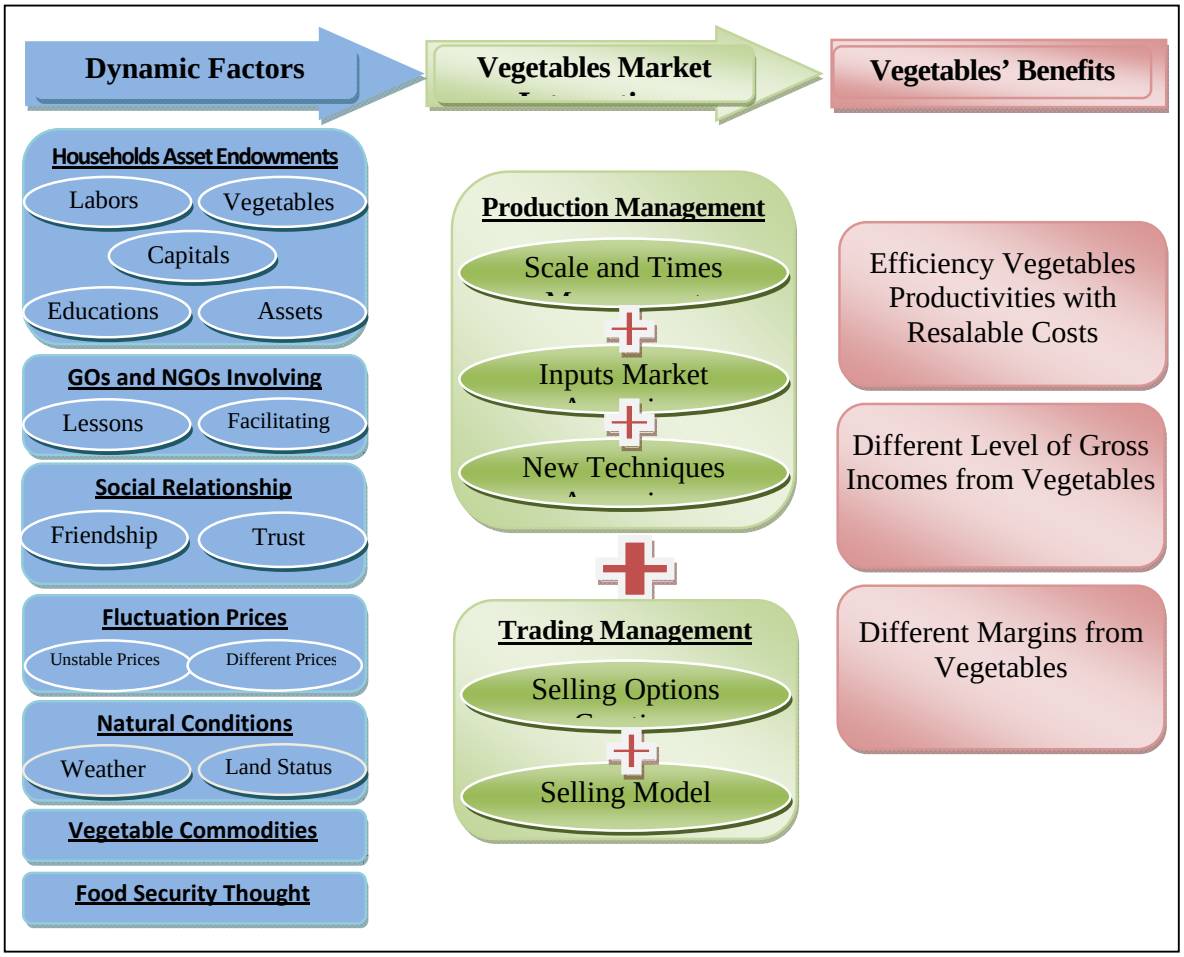

Figure 5.13: Factors Affecting to Vegetables Market Integration

5.4.1 Households Assets Endowment

Household' Labors

The perceptions by vegetable growers showed that their own asset endowment was the most important factors affecting to their decisions. Household's labor is one of the most significant factors. Vegetable is very different from rice crop. It needs labors everyday for irrigating and weeding at least one time a day. The amount of fertilizer and pesticide used for vegetables are also twice higher than that for rice. Farmers used their own labors, from the land preparation to harvest during busy period, revealed from households' group discussion and observation, 2009. We can assume that, if farmers have enough specializing labors in vegetables, they can cultivate vegetable on large scale and regular times. Unfortunately, it was not possible for farmers in this study case yet. As explained in section 5.2.1 "A", both cases, farmers had difficulties to assign a member to look after the vegetables production because there are a lot of work needs to be done, such as looking after cattle, weeding, house work, and other farm activities. The lack of land to expand the scale for vegetable is not a cause, but the main factor is labors. This study argues that land size is not the significant determining factors for farmers' current perception. According to table 5.5, farmers in Sam Raong have around 1.32ha while farmers in Dan Run have around 1.87ha of cultivating land, but they used little size for growing vegetables according to table 5.6, Sam Raong used 0.41ha; Dan Run used 0.15ha. It showed that farmers have large land scale, but the labor shortage shares a factor to limit the land size for growing vegetables.

Households Assets/Equipments

Households belongings and assets such as television, radio, bicycle, motor, and farm equipment could be important causes effecting to farmers' decisions. In fact, television, radio, and farm

equipments were not important factors affecting to farmers' choices at all. Few programs on television and radio showed market information or agricultural techniques, according to both commune officers. So, even though farmers have the media equipment, they still cannot get any information related to their vegetables production improvement or marketing information. Anyway, farmers who lack farm equipment could borrow from their neighbors, so it was not the obstacle for changing farmers' perception so far. However, a dynamic asset which significantly affected farmers' perception in vegetable production and trading is transportation facility. It affected directly on the access to inputs suppliers and output selling markets.

Table 5.21: Input Supplier Places Accessing by Transportations

Transportation Facility		Place for buying input			Total
		small shop in village	small market in commune	market in district town	
Bicycles	No (n=0)	-	-	-	-
	Yes (n=60)	13.8%	30%	56.7%	100%
Motor	No (n=21)	9.5%	42.9%	47.6%	100%
	Yes (n=39)	15.4%	23.1%	61.5%	100%
Traditional Cart	No (n=13)	23.1%	23.1%	53.8%	100%
	Yes (n=47)	10.6%	31.9%	57.4%	100%
	Yes (n=42)	14.3%	23.8%	61.9%	100%

Source: Households Survey, 2009

Farmers who owned a facility for transportation, especially motor, can easily access the inputs in the district town. According to households' questionnaire survey, we can see the proportion of accessing inputs at district town from motor owners was round 60%, table 5.21. Bicycles and traditional cart owners were also holding high proportion to access in district town. However, in fact they did not affect seriously farmers' choices at all. Through observation, we recognize that most of inputs bought from markets in district town were transported by motors. Sometimes farmers transported by bicycles while traditional cart had been not seen. This situation lets us claim that, farmers who own motor are aware of accessing inputs shops in district town rather other places nearby them. Having not spent much time and gasoline, they received good quality and lower prices of inputs. Farmers who did not have motor preferred to access inputs at markets in their commune or villages. They could not rent a motor to buy inputs at district because it was the costly process. On the other hand there were over 40% of farmers who owned motors, but they didn't access market in district town. And, nearly 50% of farmers who didn't have motor still wanted to access market in district town. So, there must be factors beside transportation affecting farmers' decision in input market accessing (households' questionnaire survey, 2009).

Anyway, to sell their products to different places, farmers need good transportation for delivering also. According to households' group discussion, motor is the best facility in the district for delivering vegetable products to the markets. Vegetable growers who owned motor would bring their products to the market in the district if the price negotiation with the middlemen at the farm gate failed. Occasionally, farmers delivered their vegetables not only to the district town but also to the markets in Siem Reap city by their motors attached with Reumork (local name of Cambodia, a tricycle attaching beside motor for delivering many products). It was a very different situation with vegetable growers who did not have such facility for transportation. They agreed to sell their product to the middleman even though they knew the price offered by middlemen was lower than others. They thought that if they rent a motor or Reumork for transportation to the markets in district town or city, they would spend more money. Some farmers tried to deliver their products to the market in communes or district town by bicycle. But, bicycle carried only small quantity of vegetables product. Also, farmers had to

spent their time and energy to ride bicycle and to sell it to the market. It was not very efficient way at all, so the majority of farmers decided to sell to middleman at farm gate because it was the easiest way to save time and energy. However, this issue made farmers who didn't have any good facility for transportation to have only one option or few choices. Though, this is only a part of households' asset, it plays dynamic role to affect farmers' decision in number of selling options.

Households' Understanding/Education

Labors' skill and education are other dynamic factors. It directly affects two components of vegetable production managements that are inputs application and new techniques practicing. According to key informants interviewed farmers who have good transportation but do not access vegetables input at Dom Dek market lack the knowledge and skill in using inputs for vegetable. They had thought that inputs in villages, communes, and district are the same, so it is unnecessary to spend time and money going to the district town. Actually, the kind and brand of inputs may be the same as farmers revealed, but the expired date, quality, usage instruction, and price were quite different. So, this is the issue making farmers confused. While around 50% farmers who did not have any good transportation still tried to buy inputs in district town. Their understanding of using inputs on vegetable was better, so they accepted to go further from their location to access the good quality inputs and suitable prices at the market, according to key informants interviewed. However, households' understanding is claimed as the dynamic factors affecting to farmers decision to access the input suppliers.

Good education and strong ability of grasping the lessons from training are the advantage of farmers. According to key informants interviewed, many farmers who are familiar with the lessons provided by NGOs or GOs might change their old techniques for growing vegetables to update and easy ones. When they understood the lessons together with their own experiences, vegetable growers had tried to apply the new techniques for testing in the first step. Later on, they increased the scale of growing if they found that it provided the high productivity as expected. Most of farmers who have good education and experiences with growing vegetables were eager to learn the new techniques, so they can test if it offers higher or lower productivity comparing with their old techniques. In contrast, farmers who have low education and are not familiar with the lessons hardly made up their mind to change to another model, according to key informants interviewed.

Households Vegetables Expenses/Capitals

Capital is also another factor in asset endowment. Farmers mainly used their own capital for investing in vegetable production. Their scale of growing vegetables also depended on their limited capital. Vegetable growers rarely took the credit or borrowed money to invest in their vegetable productions, according to households' group discussions, 2009. So, the large scale of growing vegetable required individual high amount of production costs. For illustration, department of agriculture in Siem Reap city had brought a new equipment for irrigating vegetables to save much time and labors. The equipment is used to store water and automatically supply to whole vegetable gardening field. A labor just press on open button, the water will be sprayed to all vegetables in very short time. It is very good way to save labors' working time. Unfortunately, few farmers could afford the prices of that equipment. It costs around two thousand US dollars. Most of local vegetable growers had never expected to buy it due to such expensive costs, key informant interviewed.

Households' capital is also the dynamic factors making contribution to the level of changing old traditional techniques. Though the lessons from NGOs or GOs training were very good to provide the high productivity, they could not be applied when vegetable growers cannot afford the production costs. Modern extensive and intensive techniques required investment including

costs for seeds, fertilizer, pesticide, and equipments. So, farmers who could not afford those costs had not changed their own techniques to the modern one from trainers at all, according to households' group discussions. No matter how good techniques were, if farmers could not afford the production costs for investment according to that model, they would have never changed their own mind.

5.4.2 GOs and NGO Involvement

Techniques provided to farmers significantly affect farmers' perception. It is not true that all techniques were accepted. The specific lessons would be the cause. If we look back to the table 5.15 and 5.16, most of farmers in Sam Raong and Dan Run commune have changed some of their old techniques for growing vegetables. If GOs, and NGOs did not play any intervention, farmers might still keep their outdated techniques which provide very low productivity. As explained in section 5.2.1 "C", what GOs or NGOs needed was to change to the modern techniques. But, it needs time to do so. However, farmers started initial step to apply the new techniques already, so both GOs and NGOs are really helpful to farmers.

5.4.3 Social Relationship

Friendship

Relationship between vegetable growers and sellers is affecting farmers' choices of buying inputs and selling output in an expected place. One story of Mr. Than Saum, a vegetable growers in Sra Mor Thom village, Dan Run commune let us know the effects of an relationship between an input supplier and a farmer. "I always buy chemical fertilizer and pesticide at a shop near my house in the village. The shop keeper is very good guy because he has many experiences of using those inputs. He always told which kind of fertilizer and pesticide to use in my vegetable commodities. He also asked me how his provided inputs had worked. If it was not good and suitable, he could change to other kinds. That is the reason why I have bought fertilizer, pesticide, and sprayer from his shop around three years already" (a household deep interviewed). Through this evidence, we can judge that social relationship between farmers and input sellers is important in the village for making up farmers' mind to buy inputs in the place they expected only. The process of their relationship is very good way for using efficiently the inputs though consulting from the inputs seller. According to key informant interviewed, some shops in villages and communes in both Sam Raong and Dan Run had stored a lot of under standard fertilizer and pesticide that are out of date, inefficient for specific commodities, unclear, or have strong chemicals, which badly affect farmers' health. They had bought those products at low prices and sold to farmers at high prices though they told farmers how to use. Sometimes, what they had told to farmers were not from the standard techniques, but they came from the sellers. Farmers who have low education would believe and apply it without thinking anything. Even though the relationship is good, it also provides high risk for farmers in case of receiving wrong techniques and higher price in comparison with other input supplier.

Close relationship between market agency and vegetable producers has led to unique trading process. According to key informant interviewed, some farmers had very good friendship with the middleman or collector whom they had known clearly, so they did not want to sell to other. Relatives, neighbors, or friends have been available for building a good relationship with local vegetable producers in trading process. There were three main internal reasons for farmers to decide so. Broken relationship was the first reason. They was afraid that, their good relationship would be broken if they decide to sell to another middleman or other places. Anyway, they had trusted with their relations. They believed that middleman would bring high price to their vegetables' product because of their good relationship. So, they did not spend more time accessing with other market actors. Lastly, loosing good collector who can buy their product in the future was another worry of farmers. They thought that it would only be good for today or this season if they sold to another market actor. Their current middleman would not buy their

product anymore the next season or harvest, so they were concerned that nobody will buy their product and they cannot find other actors. No matter what benefits became more or less, farmers decided to sell to only one trader, who has very good relationship with them, for getting sustainable profits.

Trust

The social relationship between farmers in village was very good. They had always helped each other on social works such as preparing the house, sharing special foods, exchanging vegetable commodity for cooking, sharing money for celebrating a ceremony, helping each other for rice planting and harvesting, etc, according to households group discussions. But, they did not help each other in vegetable production. Each household grew and sold their vegetable commodities in very individual way. This condition makes us wonder why they thought so. That is still the question related to the trust in vegetable selling process within farmers. Farmers had not trusted each other to organize a community, household group discussion. They had not believed that their colleagues can supply enough quantity with required quality to hotels and restaurants in the city while they also did not believe in themselves. If their group fails in supplying vegetables to those stakeholders, they have to compensate the losses to that stakeholder because they broke the contract. The worry about trust is the core problem which blocks the cooperation of farmers for vegetables trading. This made farmers sell their vegetables product in individual perception model.

5.4.4 Vegetable Price Fluctuation from Different Stakeholders

The prices from middleman, wholesalers, markets in commune, market in district town, and markets in city is different, according to household group discussions. This condition helped farmers to create more options to reach suitable prices for their products. In our case, farmers in Sam Raong did not sell their cabbage to middleman in the village or commune anymore because the wholesalers from Siem Reap city and other provinces had provided higher price. But, other commodities including Chinese cabbage, Chinese kale, cucumber, and tomato had been sold to the middleman due to their limited quantity. When middlemen decreased the price of their commodities, they would have other options to sell to the market in district town or market in their commune town, (Household group discussion). Clear evidence is in Dan Run commune. Because the price was very fluctuant and different among traders, farmers tried to deal with several middlemen to reach the higher prices, (households' group discussion). The assumption is that a different price from different stakeholders is the dynamic market factor affecting farmer's decision in the choices of selling vegetables. And, more choices in selling are the good marketing strategy for farmers in the case of fluctuating prices. That is only the side of farmers' advantage from prices competition between different market agencies. On the other hand, this price fluctuation made bad impact on farmers' decision in terms of production investment level. Many farmers from group discussion replied that, they do not dare to expand their scale because it needs higher investment. Neither government nor private sectors guarantee the prices of each vegetable commodity. And, vegetables' prices always fall during harvesting season without controlling from authorities. So, it is risky for vegetable growers to enlarge their level of investment. However, price fluctuation is the significant factor in trading, creating options and expanding investing level.

5.4.5 Natural Conditions (Weather and Land Status)

Natural condition is likely to affect farmers' view. In group discussion at Sam Raong commune, farmers agreed that weather and land status are the factors affecting most their decision in scale and seasonality of vegetables. They claimed that vegetables do not need too much water. If they take the risk to grow in rainy season, their vegetables would be damaged by huge amounts of water. So, they had decided to grow in dry seasons only because it is the best choice to avoid the natural risk. We should raise the question "why can farmers in Dan Run commune cultivate in

both dry and rainy seasons?" Is it caused by vegetable commodities or land preparation? Another debate from households' group discussions in Dan Run commune is that farmers claimed that they cannot enlarge their scale due to the lack of high land that would help to avoid huge amounts of water. Farmers hardly convert their low land. Again, we put the question back "Why could farmers in Sam Raong enlarge their land scale from the rice land?" Is it caused by vegetable commodities or land preparation? Are natural conditions still the dynamic factors? Surely, it is the important factor blocking farmer's interest in expansion of the land scale for investment in intensive way. But, it should be the indirect factors; farmers can maintain if they wish to.

5.4.6 Vegetable Commodities Selections

Different choice of vegetable commodities is another factor leading farmers to be unable to form a trading community. There are three different kinds of vegetables on average that each household has grown, and those kinds are different among farmers in the village. Around 12 commodities have been found in the district for trading, according to households' questionnaire survey. Therefore it was very difficult to group farmers as the community. If farmers have the same commodities to supply to the hotels and restaurants in the city they could sign contracts. For clarification, two years ago a luxury hotel in city required 500kg of Chinese cabbage, 700kg of cucumber, and 500kg of tomato per week, so five farmers in a small group could supply that amount that week and another small group would be next week (example from key informant interviewed). It was very difficult to facilitate farmers who grow the same Chinese cabbage, cucumber, or tomato to group together with each other, because all farmers always integrated their vegetable varieties, a Sam Raong commune officer claimed. However, integrated vegetables in gardening is a good strategy for meeting different good traders, but it was the obstacle for grouping vegetable growers in a community that could sell their specific commodity to a stakeholder through contract.

5.4.7 Food Security Thought

Food security is another main factor for determination. Farmers revealed that, they lack land of growing vegetables, but it could be different if we see the table 5.5 above. They allocated a very small plot of land to grow vegetables if we compare with the rice cultivated land. Farmers in both communes allocated little land for vegetable even they knew that it could provide high income to their families. Food security thought had brought farmers to decide so. They trusted on rice production rather than vegetables. Most of farmers' time and land area were for rice production because it could provide staple rice for consumption for the whole year, and some surplus product could be sold to buy another kind of food including fish and meat. This traditional process ensures adequate food for families. Farmers did not dare to enlarge more land to grow vegetables because they are afraid that they would not have enough rice for their consumption. Also, the fluctuation of vegetable price on market would be the sub-factor affecting to farmers decision. This issue brought about low interest of farmers to take risk for growing vegetables on very large scale or specializing vegetable only. Farmers had never thought that income from vegetables can secure the food for the whole year, if they abandon the rice production, according to households' group discussion.

In short, many factors discussed in the literature review are confirmed through this study. Nevertheless, there are some unexpected factors that have arisen, as fluctuation of prices from market agencies, natural condition, vegetables commodities' choices, and food security thought. Three factors in the conceptual framework are excluded after this research. The first excluded factor is private sector involvement. According to households' group discussion, private sectors including input suppliers, middlemen, wholesalers, processors, and retailers, etc. had played little involvement to improve vegetables productivities or to improve trading process. Their main purpose is to get profit, so they don't care much about farmers' issues. Infrastructure is the

second factor which is not significantly affecting farmers' choices in vegetables production and trading. Because the roads, markets, commune house, ponds, and wells, etc are good enough for farmers. So, it does not affect to farmers' decision to change to vegetables production and trading process. And the last, what we are surprised about is that the policy intervention factor does not directly affect farmers' perceptions as predicted. It was shown that there is no special intervention from government to bring farmers to meet dynamic market actors at all, according to key informants interviewed. Vegetable producers and traders had to negotiate by themselves without government's engagement or facilitating. The government does not engage directly to bring farmers to meet a good market actor in the city. This is a topic for further research.

6 CONCLUSION

Market integration can play a very important role by contributing to sustainable good livelihood conditions for farmers in rural areas. However, farmers need to know how to act and participate in the integration process otherwise other stakeholders in the chain will gain relatively more. Farmers have to engage actively in market integration by preparing both production and trading process. Two case study sites – the communes of Sam Raong and Dan Run in Sourt Nikom district, Siem Reap Province, Cambodia – were selected for this study of farmers' participation in market integration, their benefits from it, and factors affecting their perceptions about it.

Base on experiences in Sam Raong and Dan Run commune, market integration strategy does not make sense for farmers. The vegetables production and trading characteristic of farmers to meet the markets was found to be partly inefficient due to the number of factors. Even though Sam Raong commune has benefited more from market oriented vegetable production than Dan Run commune due to better management; still, neither commune is benefiting in an optimal way from their trading due to a number of shortcomings in their marketing strategies.

Sam Raong and Dan Run commune have good vegetables trading conditions due to the high demand from traders and consumers in Siem Reap city. As McNew (1996) claimed that, to get high profits from a production, farmers must build marketing strategy to receive the product price with efficiency and to reduce the price shock. And, KIT with its partners (2006) also reported that to attract the products to the markets for getting reasonable product price, farmers must develop ability such as developing techniques, setting quality standards, delivering products in time, and negotiating price. Both Sam Raong and Dan Run communes did not prepare a good marketing strategy so far.

Estelle and his colleagues (2004) mentioned that diversification to many activities is a strategy for farmers to secure the food consumption and to reduce the risk. Both Sam Raong and Dan Run followed this strategy. Labor, cultivating land, and investment were mostly used for six farm activities in each commune to secure the food rather than specializing in a crop for trading strategy.

Finding shows that vegetable growers in Sam Raong have cultivated vegetables on large scale with several specific commodities. This decision has facilitated the links to better market actors like wholesalers from Siem Reap city and other provinces. But, they grow their vegetables during dry season only because in the rainy season households' labor and cultivating land were used for rice to ensure the staple rice consumption throughout the year. This seasonal pattern limits the marketing opportunities in the city like hotels, restaurant, supermarket, and other markets who demand regular vegetable supply. In contrast, farmers in Dan Run cultivate vegetables around the year, but unfortunately it is on very small scale. This restrains their chances not only to meet the good market actors from the city but also the wholesalers with which farmers in Sam Raong are interacting. Hence, the current scale of vegetables investment and time of supplying to the markets of farmers in both communes are the constraints of their market engagement strategy.

Applying intensive techniques with good quality of inputs is the market integration strategy to attract the buyers (KIT at al., 2006). That's really hard for local farmers to do so in reality. Their traditional techniques transferred by their parents and ancestors are deep in their mind difficult to change. And, the farmers' own judgment of using fertilizer or pesticide is that it has severe consequences which bring more pest and more diseases to their crop. Soil fertility and human health also can be seriously affected. We can see this problem due to the result that farmers

rarely checks expire date, usage instruction, and price. Pests seemed to be increased while their vegetables productivity was not as high as they expected. Regarding to new vegetables techniques accepting from GOs and NGOs, farmers have changed only some of their old traditional vegetables techniques. Most of farmers do not completely changed to the new techniques due to the difficult of learning and risk of high expenses. And, they still believe in their own traditional techniques.

Farmers' production management is mainly serving food security purpose, so their trading process must be not very well developed. Even though farmers have multiple options to engage with several buyers, but in the view of the market potential, given the many dynamic markets and market actors in the city as well as in their own locations, farmers have not optimized their market integration yet. As we can see, both case communes have engaged with more than one market actors for selling their vegetables. Sam Raong farmers have reached better outcomes from their trading than Dan Run because they have prepared their commodities to fill the traders' requirement in better way. Enough quantity and specific commodities for meeting the demand of different traders are their advantages, while farmers in Dan Run have too diversified, small-scale commodity portfolio making them attractive only to the small collector and small market in the commune rather than to the wholesalers who operate in Sam Raong.

Through the integration of production and trading process, farmers are generating different vegetable incomes according to their production and marketing strategies. Farmers in Sam Raong commune with its superior vegetables market integration enjoy higher margins than Dan Run – their income is on average more than one Million Riel, approximately 250USD, higher. Furthermore, there are the dynamic factors affecting farmers' decision for getting those different outcomes. Households' assets endowment, GOs and NGOs involvment, social relationships, fluctuation of prices, food security thoughts, commodities selecting, and natural conditions have affected significantly farmers' orientation in vegetable market integration. Therefore, farmers in the two communes have tried to engage in vegetables market integration in a good way, but that more needs to be done in this respect.

This household study has strived to identify all issues happened in market integration strategy. It has discussed the problems why farmers cannot get high profitability outcomes from their production and trading management. It is an example for farmers and development actors to see the shortcoming of farmers' orientation and important factors which affect farmers' decision in marketing strategy. To evaluate deeply on all components of market integration process, further research is needed. There is very little literature review discussed on all components in market integration like evaluating on the value of labors, education, land, capital, etc in market integration characteristic. So, an issue for further research is to study on price analysis on specific commodities. This could be a study to explore the marketing issues for building the marketing strategy of famers on their specific farm activity of their interest.

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APPENDICES
Farm Diversified Expenses and Incomes

Rain-fed

Commune		Non Labor Costs of Rain-fed	Hired Labor Costs of Rain-fed	Family Labor Costs of Rain-fed	Productions Cost of Rain-fed	Total Costs of Rain-fed	**Total costs concluding non-labor and households labor costs**	Total Gross Income of Rain-fed	Net Income of Rain-fed	**Margins concluding non-labor and hhs labors costs**
Sam Raong	Mean	137350.00	273496.67	276466.67	250550.00	**524046.67**	**937863.34**	**802070.00**	**278023.33**	**-135793.34**
	Std. D	189347.935	138485.975	148312.341	129146.826	-	-	625129.892	-	-
Dan Run	Mean	83000.00	248690.00	226733.33	179126.67	**427816.67**	**737550.00**	**589233.33**	**161416.67**	**-148316.67**
	Std. D	144988.703	293971.395	171168.385	161560.873	-	-	1221533.390	-	-
Overall	Mean	110175.00	261093.33	251600.00	214838.33	**475931.67**	**837706.67**	**695651.67**	**219720.00**	**-142054.99**
	Std. D	169429.022	228167.326	160753.570	149414.854	-	-	968000.706	-	-

Dry Rice

Commune		Non Labor Costs of Dry Rice	Hired Labor Costs of Dry Rice	Family Labor Costs of Dry Rice	Production Costs of Dry Rice	Total Costs of Dry Rice	**Total costs concluding non-labor and households labor costs**	Total Gross Income of Dry Rice	Net Income of Dry Rice	**Margins concluding non-labor and hhs labors costs**
Sam Raong	Mean	.00	.00	.00	.00	**.00**	**.00**	**.00**	**.00**	**0**
	Std. D	.000	.000	.000	.000	-	-	.000	-	-
Dan Run	Mean	39333.33	239660.00	170983.33	197633.33	**437293.33**	**647610.00**	**922943.33**	**485650**	**275333.33**
	Std. D	94865.907	237970.345	152321.262	185888.451	-	-	969716.456	-	-
Overall	Mean	19666.67	119830.00	85491.67	98816.67	**218646.67**	**323805.00**	**461471.67**	**242825**	**137666.67**
	Std. D	69403.430	206003.966	137247.812	164056.883	-	-	823875.876	-	-

Vegetables

Commune		Non Labor Costs of Vegetable	Hired Labour Costs of Vegetable	Family Labour Costs of Vegetable	Productions Cost of Vegetable	Total Costs of Vegetable Production	**Total costs concluding non-labor and households labor costs**	Total Gross Income from Vegetable Production	Net Income	**Margins concluding non-labor and hhs labors costs**
Sam Raong	Mean	.00	53344.83	440566.67	287143.33	**340488.16**	**781055**	**2837787**	**2497299**	**2056732.17**
	Std. D	.000	63552.018	317538.994	138818.554	-	-	-	-	-
Dan Run	Mean	.00	25883.33	598323.33	195163.33	**221046.67**	**819370.00**	**1522840**	**1301793.33**	**703470**
	Std. D	.000	54563.737	371122.052	170732.783	-	-	-	-	-
Overall	Mean	.00	39381.36	519445.00	241153.33	**280767.5**	**799979.69**	**2180313**	**1899778**	**1380333.31**
	Std. D	.000	60250.507	351549.177	161092.286	-	-	-	-	-

Cash Crop (Sugarcane)

Commune		Non Labor Costs of Cash Crop	Hired Labor Costs of Cash Crop	Family Labor Costs of Cash Crop	Productions Cost of Cash Crop	Total Costs of Cash Crop	**Total costs concluding non-labor and households labor costs**	Gross Income of Cash Crop	Net Income of Cash Crop	**Margins concluding non-labor and hhs labors costs**
Sam Raong	Mean	.00	68333.33	93966.67	219500.00	**287833.33**	**381800.00**	**983333.33**	**695500.00**	**601533.33**
	Std. D	.000	122216.127	139666.224	300167.626	-	-	1495299.147	-	-
Dan Run	Mean	.00	.00	.00	.00	**.00**	**.00**	**.00**	**.00**	**0**
	Std. D	.000	.000	.000	.000	-	-	.000	-	-
Overall	Mean	.00	34166.67	46983.33	109750.00	**143916.67**	**190900.00**	**491666.67**	**347750.00**	**300766.67**
	Std. D	.000	92352.341	108778.969	237772.903	-	-	1159674.36	-	-

Fruit

Commune		Non Labor Costs of Fruit	Hired Labor Costs of Fruit	Family Labor Costs of Fruit	Productions Cost of Fruit	Total Costs of Fruit	**Total costs concluding non-labor and households labor costs**	Gross Income of Fruit	Net Income of Fruit	**Margins concluding non-labor and hhs labors costs**
Sam Raong	Mean	.00	.00	10000.00	2333.33	**2333.33**	**12333.33**	**20500.00**	**18166.67**	**8166.67**
	Std. D	.000	.000	18615.900	7849.153	-	-	47251.893	-	-
Dan Run	Mean	.00	.00	.00	.00	**.00**	**.00**	**.00**	**.00**	**0**
	Std. D	.000	.000	.000	.000	-	-	.000	-	-
Overall	Mean	.00	.00	5000.00	1166.67	**1166.67**	**6166.67**	**10250.00**	**9083.33**	**4083.33**
	Std. D	.000	.000	13991.523	5627.314	-	-	34702.916	-	-

Fishing

Commune		Non Labor Costs of Fishing	Hired Labor Costs of Fishing	Family Labor Costs of Fishing	Productions Cost of Fishing	Total Costs of Fishing	**Total costs concluding non-labor and households labor costs**	Gross Income of Fishing	Net Income of Fishing	**Margins concluding non-labor and hhs labors costs**
Sam Raong	Mean	.00	.00	8066.67	7033.33	**7033.33**	**15100.00**	**5000.00**	**-2033.33**	**-10100**
	Std. D	.000	.000	24615.573	24892.158	-	-	27386.128	-	-
Dan Run	Mean	.00	1666.67	86333.33	38666.67	**40333.34**	**126666.67**	**198166.67**	**157833.33**	**71500**
	Std. D	.000	9128.709	152733.334	62998.814	-	-	624372.075	-	-
Overall	Mean	.00	833.33	47200.00	22850.00	**23683.33**	**70883.33**	**101583.33**	**77900.00**	**30700**
	Std. D	.000	6454.972	115417.709	50097.473	-	-	448855.882	-	-

Livestock

Commune		Non Labour Costs of Livestock	Hired Labour Costs of Livestock	Family Labour Costs of Livestock	Production Costs of Livestock	Total Costs of Livestock Production	**Total costs concluding non-labor and households labor costs**	Gross Income of Livestock Production	Net Income	**Margins concluding non-labor and hhs labors costs**
Sam Raong	Mean	.00	5666.67	157116.67	174933.33	**180600.00**	**337717**	**138716.67**	**-41883.33**	**-199033.33**
	Std. D	.000	21724.503	228266.997	338454.213	-	-	530554.227	-	-
Dan Run	Mean	.00	517.24	138720.00	435633.33	**436150.6**	**574870.57**	**640933.33**	**204782.8**	**66062.76**
	Std. D	.000	2785.430	105365.277	738081.541	-	-	1556272.712	-	-
Total	Mean	.00	3135.59	147918.33	305283.33	**308375.5**	**456337.25**	**389825.00**	**81406.08**	**-66512.25**
	Std. D	.000	15699.174	176505.572	584251.226	-	-	1180232.866	-	-