The transformation of modern food retailers in Indonesia:

opportunities and challenges for smallholder farmers

by

Sahara

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Dedication

This thesis is dedicated to my family: my beloved husband, Raden Deden Djaenudin, who has provided neverending support all the way since the beginning of my studies and to my children, Radja Ahmad Nur Fikri and Dwi Fitri Maharani, who have been great sources of motivation and inspiration.

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Declaration

I certify that this work contains no material which has been accepted for the award of any other degree or diploma in any university or other tertiary institution and, to the best of my knowledge and belief, contains no material previously published or written by another person, except where due reference has been made in the text. In addition, I certify that no part of this work will, in the future, be used in a submission for any other degree or diploma in any university or other tertiary institution without the prior approval of the University of Adelaide and where applicable, any partner institution responsible for the joint-award of this degree.

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Abstract

Much of the literature examining the modern food retail sector in emerging economies analyzes the factors determining farmers' participation in supermarket channels, the economic impact of participation, the institutional arrangements of evolving supply chains, and the role of intermediaries in linking farmers to supermarkets. This thesis adds to this literature in four important ways. Firstly, few studies examine contractual arrangements between farmers and supermarket buyers in Indonesia. Secondly, studies around the world analyzing modern food channels have paid little attention to the subjective attitudes of farmers in marketing decisions, assuming all farmers would sell to supermarkets if they have the capacity. Thirdly, available studies have paid little attention to the importance of relationship quality between farmers and buyers. Finally, most studies use current assets in analyzing determinants of farmers' participation in supermarket channels resulting in endogeneity problems.

The specific objectives of the thesis are to analyze: (1) the differences and similarities between farmers selling to traditional and supermarket channels with respect to household, farm and marketing characteristics; (2) factors determining chili farmers' participation in supermarket channels and the impact of participation on household income; (3) the perception of chili farmers regarding the quality of relationships with their buyers in the traditional and supermarket channels; (4) the nature of contractual arrangements between chili farmers and their buyers, and the determinants of farmers' commitment in the two channels; and (5) the importance of buyer attributes and determinant factors that influence farmers when choosing preferred buyers.

The research demonstrates that households in the supermarket channel have higher levels of human capital, more capitalized on non-land assets, and are more

specialized in chili production than those in the traditional channels. They participate in the supermarket channels through middlemen, particularly farmer groups. The important determinants of supermarket participation are education, years of growing chilies, distance from house to asphalt road and storage capacity. Participation in supermarket channels is associated with an increase in per capita income.

This study incorporates three relationship quality variables in the analysis: trust, satisfaction and commitment. Similar to traditional channel farmers, supermarket farmers have low levels of trust in their main buyers. With respect to satisfaction and commitment, supermarket farmers have more positive perceptions than traditional channel farmers. Trust and satisfaction have a significant influence on farmers' commitment, while the actual price has no influence. Verbal agreements are the preferred contractual arrangements between farmers and buyers in the supermarket channel. The analysis of farmers' subjective attitudes towards buyer attributes indicates that the attributes of price premiums and receiving cash immediately are the most important when farmers in the two channels choose preferred buyers. The LC cluster analysis suggests heterogeneity among chili farmers in the two channels.

The results of this study have important implications on how to improve support to small farmers in Indonesia. The results confirm that integrating small farmers into supermarket channels should be promoted as a powerful strategy for helping farmers increase income. However, since many chili farmers still prefer to deal with buyers in the traditional channel, it is important to lower transaction costs in these markets. Traders need to maintain and improve the quality of relationships with chili farmers. The government should focus on public goods, including road, power and wholesale market infrastructure.

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List of acronyms

ACIAR   Australian Centre for International Agricultural Research
ANOVA   Analysis of Variance
BIC   Bayesian Information Criterion
BW   Best Worst
FDI   Foreign Direct Investment
FFVs   Fresh Fruit Vegetables
HGG   Head of Grower Group
HSD   Honesty Significant Difference
HVAPs   High Value Agricultural Products
ICASEPS   Indonesian Centre for Agriculture Socio-Economic and Policy
           Studies
IDR   Indonesia Rupiah (The official currency of Indonesia)
IFPRI   International Food Policy Research Institute
IMR   Inverse Mills Ratio
KMO   Kaiser-Meyer-Olkin of Measure of Sampling Adequacy (KMO-MSA)
LC   Latent Class
LL   Log-likelihood
OLS   Ordinary Least Squares
MANOVA   Multivariate Analysis of Variance
SIS   Standardized Interval Scale
SPSS   Statistical Package for Social Sciences
SQRT   Square Root
TCE   Transaction Cost Economics
TEM   Treatment Effects Model

1. Introduction

Expanding per capita incomes, growth in urban populations, and changing lifestyles are shifting food consumption, production and distribution patterns of the agri-food industry in developing countries (Reardon et al., 2009). Policy changes that drive privatization, trade and foreign direct investment (FDI) have also contributed to these profound changes in modernizing the agri-food industry channels. Supermarkets, export markets, fast food chains, large-scale food processing sectors and specialized/dedicated wholesalers have spread rapidly in developing countries, beginning in the early 1980s and continuing today (Reardon et al., 2009).

To manage their business, modern food industry channels have imposed new procurement practices, differentiating them from those used in the traditional channels. The new procurement practices include consolidating purchases in distribution centers and sourcing networks, increasing chain coordination through contracts with wholesalers and growers, and requiring specific requirements (Reardon et al., 2004). These new practices require investments in production technology and equipment, in management and co-ordination, in consistency and timing, and in larger volumes supplied to consolidate buying points (Reardon et al., 2004).

For farmers, the ongoing transformation can be associated with new market opportunities which potentially lead to rising profits and income; however, participation in the new emerging markets, particularly for small farmers, is not easy due to the costs associated with new investments and their knowledge constraints regarding the specific requirements (Boselie et al., 2003; Dries et al., 2009; Kaganzi et al., 2009; Reardon et.al., 2009; Weatherspoon and Reardon, 2003). Small farmers' participation in modern supply chains has important consequences for agricultural development and poverty reduction strategies in developing countries (Reardon and Berdegué, 2002). In 2010 the

rural population accounted for about 54.7% of the total population in developing countries, and about 48.2% of the total economically active population of developing countries was employed in the agricultural sector (FAO, 2011). According to IFAD (2010), of the 1.4 billion poor people living on less than US\$ 1.25 a day, about 70% live in rural areas and rely mostly on agricultural activities. They have limited access to farm assets, education, infrastructure, markets and institutions (IFAD, 2010). These issues influence their ability to move out of poverty.

Previous studies have not provided clear conclusions on whether small farmers can participate in modern supply chains. Reardon et al. (2009) report that, in the case of dual-scale sectors, supermarkets mainly source from larger farmers, excluding small farmers. However, this study also finds that in some cases there is evidence that modern markets source from small farmers even when large farmers are accessible. In addition, few empirical studies examine the opportunities and challenges faced by small farmers when the food retail sector modernizes. For policymakers interested in food security, poverty reduction, and economic growth, understanding these issues and how to better address them can help small farmers adapt to the changes brought about by the modern food sector transformation.

This thesis aims to contribute to the knowledge of small farmers' participation by investigating the opportunities, challenges, and changes in market relationships faced by small farmers during the rapid transformation of modern food chains in Indonesia. This chapter presents the background and motivations for the study and identifies research gaps. The specific objectives of the study and an outline of the thesis structure are presented at the end of the chapter.

1.1 Background and overview

In this study, the term supermarket refers to modern food retailers, including hypermarkets, supermarkets and convenience stores. Supermarkets are making a significant contribution to national retail food sales in Indonesia. Pandin (2009) reports that the number of supermarket outlets in Indonesia increased significantly from 2004 to 2008. During this period, the numbers of hypermarket outlets increased from 34 to 130; supermarkets from 956 to 1,447; and convenience stores (mini-markets) from 5,604 to 10,289. About 83% of the outlets were located in Java Island (Pandin, 2009). While it is difficult to establish the contribution of supermarkets to national food sales, Natawidjaja et al. (2007) report that supermarkets accounted for around 30% of national food retail sales in 2007, a three-fold increase in market share since 1998. This study also reports that the share of fresh fruit and vegetables (FFVs) products increased from virtually zero to 8% of supermarket retail sales over this period. It is expected that supermarkets' share of retail food sales will continue to increase along with rapid growth of per capita income, urbanization, and liberalization in foreign direct investment (Natawidjaja et al., 2007).

Similar to international trends, the leading supermarket chains in Indonesia such as Carrefour and Giant impose modern procurement practices. They have shifted away from using the traditional wholesale system to using centralized distribution centers, specialized wholesalers and specific standards of products (Chowdhury et al., 2005; Natawidjaja et al., 2007). These modern procurement systems are transforming agri-food markets as they require greater product homogeneity, quality, timing, safety, sorting, grading and packaging (Reardon et al., 2009). These specific requirements have important implications for all actors in agri-food supply chains, including small farmers.

The agricultural sector in Indonesia is dominated by the presence of small farmers. According to data from the most recent Indonesian Agricultural Census (2003), around 56% of the farmers had a land holding of 0.5 ha or less (Statistic Agency, 2004). In the case of Java Island, which has the largest production zone of horticultural products and the highest concentration of supermarkets, the landholding size is even smaller than the country average. About 75% of the farmers in Java Island had a landholding of less than 0.5 ha. Considering the dominance of small farmers, their participation in the supermarket chain can potentially contribute to agricultural development in Indonesia.

For farmers who can meet the specific requirements, supermarkets offer new market opportunities and provide higher net prices than traditional markets, which potentially increase farmers' income (Hernández et al., 2007; Neven et al., 2009; Rao and Qaim, 2011). At the same time, meeting the requirements creates significant challenges for small farmers. First, farmers need greater investment relative to selling to traditional markets (Reardon et al., 2003; Reardon et al., 2009). For example, farmers may incur additional costs for quality seeds and inputs, food safety certification and capital investments such as irrigation, green houses and refrigeration facilities (Reardon et al., 2004; Weatherspoon and Reardon, 2003). Second, to ensure that farmers meet the private standards, supermarkets establish vertical coordination mechanisms such as formal or informal contracts (Reardon et al., 2009). However, the high transaction costs involved in contracting with a large number of small farmers mean supermarket chains often to seek to work with a smaller number of larger farmers (Dries et al., 2009; Reardon and Timmer, 2007). For these two reasons, there is widespread concern among researchers and policy makers that small farmers will be excluded from supermarket channels.

Despite the rapid increase of supermarket penetration, empirical research examining the impact of supermarket participation on small farmers is still limited, particularly in Indonesia. A few studies have examined factors that determine the inclusion of small farmers in supermarket channels (Hernández et al., 2007; Natawidjaja et al., 2007; Neven et al., 2009; Rao and Qaim, 2011; Schipmann and Qaim, 2010). Farmers who have more assets have been shown to be more likely to participate in the supermarket channels, with relevant assets including irrigation (Hernández et al., 2007; Natawidjaja et al., 2007; Neven et al., 2009), and land (Natawidjaja et al., 2007; Neven et al., 2009; Rao and Qaim, 2011; Schipmann and Qaim, 2010).

The effects of farmers' participation in supermarket channels have also been explored in these studies (Hernández et al., 2007; Natawidjaja et al., 2007; Neven et al., 2009; Rao and Qaim, 2011). With the exception of a study by Rao and Qaim (2011), these studies assess the income effects by comparing the gross margin of farm crops between farmers selling to supermarket channels and farmers selling to the traditional channel. Rao and Qaim (2011) note this method has limitations since it does not measure other variables that may influence household income.

Another group of empirical studies focuses on exploring the institutional arrangements between farmers and modern markets including supermarkets, particularly via intermediaries (Bijman, 2008; Dolan and Humprey, 2000; Farina, 2005; Henson et al., 2005; Guo et al., 2007; Kaganzi et al., 2009; Lawrence et al., 1997; Moustier et al., 2010; Schipmann and Qaim, 2011). Intermediaries (e.g., specialized wholesalers, traders, farmer organizations) play a central role in connecting farmers to supermarkets. They organize a number of small farmers, providing them with all the necessary product-specific guidelines required by supermarkets and the required inputs. According to these studies, details of contractual arrangements between farmers and

their intermediaries vary among countries and among agricultural industries. Therefore, there is a need for additional empirical evidence to draw conclusions regarding the impact of supermarket penetration on small farmers.

This study aims to contribute to this literature by identifying and addressing four gaps. First, while some studies have utilized lagged assets in examining determinants of farmers' participation in supermarket channels (Hernández et al., 2007; Neven et al., 2009), others studies still use current assets (e.g., Rao and Qaim, 2011; Schipmann and Qaim, 2010). If only current assets are used in the participation regressions, the endogeneity problem emerges, since household assets can be influenced by farmers' participation in the supermarket channel (Hernández et al., 2007; Neven et al., 2009). Thus the use of lagged assets in the analysis can assure a more robust outcome.

Second, the available studies in the modern market areas have paid little attention to the importance of relationship quality (e.g., commitment, trust and satisfaction) between farmers and buyers. An emerging literature on agri-food relationships suggests that improving relationship quality between farmers and traders can reduce transaction costs (Batt, 2003; Fischer and Reynolds 2010; Giha and Leat, 2010; Gracia et al., 2010; Gyau et al., 2011). Transactions in modern channels require closer coordination between suppliers and buyers due to the high quality products and safety standards of modern markets. This allows them to better coordinate supplies with consumers' demands, and exchange information on current market situations. Understanding which aspects of farmer-buyers relationships - trust, satisfaction, and commitment - should be improved can enhance the market performance of chilies in Indonesia.

Third, as Schipmann and Qaim (2011) note, previous studies scarcely address the details of contractual arrangements between farmers and buyers under the rapid

penetration of modern retail markets in developing countries. For policy makers, understanding the details of contractual arrangements between farmers and buyers is very important in helping small farmers to design contracts with their buyers. Contractual arrangements imposed by modern channels involve a number of specific requirements that are often difficult for small farmers to meet. Thus examining the details of contractual arrangements between farmers and buyers can help small farmers to address the difficulties.

Finally, the previous studies in the farmer participation in supermarket channels tend to incorporate only observable variables such as land and non-land assets and household characteristics in the analysis, giving little attention to farmers' subjective attitudes in making decisions about choosing buyers (Blandon et al., 2010; Schipmann and Qaim, 2011). Schipmann and Qaim (2011) criticize previous studies that tend to assume that all farmers would sell to modern market channels if they had the capacity, because at the empirical level this seems unrealistic. For instance, the payment delays that are common in modern markets may prevent farmers from participating in modern market channels. By incorporating the subjective attitudes of small farmers with respect to the relative importance of buyer attributes when they choose preferred marketing channels or buyers, this study provides more a comprehensive picture with respect to observable and non-observable factors determining supermarket participation.

The analysis presented in this study is based on an empirical study focusing on chilies produced by small farmers in Indonesia. This study focuses on chili farmers for several reasons. First, in Indonesia, chilies are important high value agricultural products (HVAP) that are consumed daily by most Indonesian people and are produced by small farmers. According to some estimates, there were about 463,000 families involved in chili production and similar numbers in processing and marketing activities

in 2003 (Mustafa et al., 2006). Second, unlike other fresh vegetable products that are harvested all at the same time, farmers can harvest chili crops weekly or fortnightly over a month or more. Therefore, for small farmers this crop provides a steady cash flow. Thirdly, until recently, chilies were primarily traded in traditional markets, but supermarkets currently sell chilies in the fresh produce section in order to attract consumers.

1.2 Objectives

This thesis examines opportunities, challenges, and market relationships between chili farmers and their buyers in the supermarket era. To better understand these issues, it is important to examine similarities and differences in the characteristics among households that sell their chilies into traditional and supermarket channels. The five principal research objectives are to:

1. understand the differences and similarities between farmers selling to traditional and supermarket channels with respect to household, farm and marketing characteristics;

2. analyze the determinant factors of chili farmers' participation in supermarket channels and the impact of their participation on net household income;

3. examine the nature of contractual arrangements between chili farmers and their buyers and the determinants of farmers' commitment in the two channels;

4. analyze the perception of chili farmers in Indonesia regarding the quality of the relationship with their buyers in the traditional and supermarket channels; and

5. analyze the importance of buyer attributes and understand the determinant factors that influence farmers when choosing preferred buyers.

1.3 Structure of the thesis

This thesis is organized into eight additional chapters. Chapter 2 reviews the role of supermarkets in developing countries and the emerging food policy agenda in the supermarket era in order to explain the focus of the study. Empirical studies dealing with the impact of supermarket chains on small farmers, the determinants of farmers' participation in modern retail markets, contractual relationships, the quality of the relationships between farmers and buyers, and the preferences for buyer attributes are also reviewed in order to identify appropriate variables and methods for this study. The last part of this chapter provides an overall picture of the chili industry in Indonesia.

Chapter 3 presents the details of the methodology used in this study. It begins with detailed activities of the field work completed to obtain the data, including the development of the questionnaire and sample selection, data entry and cleaning. Appropriate models addressing each research objective are also presented and discussed.

The following five chapters address each research objective. Chapter 4 deals with the first research objective and describes the characteristics of respondents in the traditional and supermarket channels with respect to the selected variables of household, farm and marketing characteristics. It describes the types of farmers selling to traditional and supermarket channels

Chapter 5 deals with the second research objective and presents the determinants affecting Indonesian chili farmers' participation in supermarket channels and the impact of this participation on household income. In order to assure a more robust outcome, lagged household assets are utilized. Likewise, several different analysis methods are applied including a probit model, OLS regression, and treatment effects model.

Chapter 6 compares the perceptions of chili farmers in Indonesia regarding the quality of the relationships with their buyers in the traditional and supermarket channels. Three relationship quality variables are included in the analysis: trust, satisfaction and commitment. These variables are the key determinants in buyer-seller relationships. Improving the quality of these three variables can foster relationships between chili farmers and their buyers, which in turn improve the market performance of chilies in Indonesia. Factor and discriminant analyses are performed to examine the perceptions of farmers regarding the three variables.

Chapter 7 provides details of the contractual arrangements between chili farmers and traders. The perceptions of chili farmers regarding the advantages and constraints relevant to selling to supermarkets are also identified. Given the important role of commitment in contractual arrangements, this chapter analyzes factors determining farmers' commitment to stay in the market relationships with their buyers. The contractual arrangements are analyzed using descriptive statistics (t-test and chi-square test), while the determinants of farmers' commitment are examined using the ordinary least square (OLS) method.

Chapter 8 deals with the fifth research objective and determines the relative importance of buyer attributes when chili farmers choose preferred buyers. In this chapter, the subjective attitudes of small farmers with respect to preferred buyer attributes are examined using a relatively new method, Best-Worst Analysis. Socioeconomic factors that affect their choices are also explored in this chapter. In order to understand how chili farmers in each channel differ in their perception of buyer attributes, a Latent Class (LC) cluster analysis is performed.

Chapter 9 begins by summarizing and discussing the main findings of Chapters 4 to 8 focusing on the constraints faced by small farmers when participating in

supermarket channels, the income impacts of the participation, and the market relationships between farmers and traders (i.e., contractual arrangements and the quality of relationships). The similarities and differences between chili farmers in supermarket and traditional channels are also highlighted. These findings are then explored from the perspective of policy. Finally, the contributions of the study and suggestions for future research are detailed.

2. Literature review

2.1 Introduction

This chapter briefly discusses the development of supermarkets in developing countries and the emerging food policy agenda in the context of the rapid emergence of supermarkets. The development of supermarket chains has several implications for the agri-food supply chain and the various economic agents (producers, traders, input suppliers, retailers and consumers) involved in the chain. The empirical and theoretical literature dealing with 1) the determinants and impacts of farmers' participation in supermarket channels, 2) contractual arrangements between farmers and buyers, 3) the importance of relationship quality in agri-food chains, and 4) farmers' preferences of buyer are also presented and discussed. The last section highlights the chili industry in Indonesia in order to provide an overall picture of the current market situations regarding chilies. The purpose of this literature review is to understand the need for this research, clarify relevant previous research in this area and identify the appropriate methods and variables for this research.

2.2 Supermarkets in developing countries

The expansion of supermarket chains in developing countries over the last 10-15 years has been well documented by Reardon et al., in a series of articles. Reardon et al. conclude that the spread of supermarket chains in developing countries occurred in several waves (Reardon and Timmer, 2007; Reardon et al., 2010). The first wave started in the early to mid-1990s and included several countries in South America, East Asia (except China and Japan), Northern-Central Europe, and South Africa. In these countries, the average share of supermarkets in overall food retail increased from 5-10% in the early 1990s to some 50% or more by the mid-2000s. The second wave includes

countries where the supermarket diffusion started in the mid-to late 1990s including Southeast Asia (except transition countries like Vietnam), Central America and Mexico, and Southern-Central Europe. By the mid-2000s, supermarkets accounted for 30-50% of overall food retail in the second-wave countries. The third wave started in the late 1990s or early 2000s in China, Vietnam, India and Russia, and some countries in Africa and Central and South America. In these third-wave countries, the average share of supermarkets in overall food retail reached about 10-20% by the mid-2000s.

There are several factors driving the number of supermarket chains in these countries. These factors can be divided into demand and supply elements. On the demand side, three main factors drive the increase in demand for supermarket services in developing countries. The first is rapid growth of per capita income enabling households to increase demand for processed food where supermarkets offer greater variety and lower costs of these products than traditional retailers due to economies of scale in procurements (Reardon et al., 2004). Rising incomes also allow consumers to change their dietary habits from staple foods, such as rice, towards more variety HVAPs (Pingali, 2006; Stringer et al., 2009). HVAPs refer to agricultural products with a high economic value per kilogram, per ha or per calorie' (Gulati et al., 2005). Meat, milk, eggs, and fresh fruit and vegetable are examples of HVAPs.

The second important factor is urbanization, with the consequence of more women participating in labor markets (Pingali, 2006). Working outside their home increases the opportunity cost of women's time and their incentives to seek shopping convenience and processed foods to save cooking time (Regmi and Dyck, 2001). The third factor influencing HVAP consumption is the growing access to cars and public transportation, and the rapid growth in refrigerator ownership (Reardon et al., 2004). Access to cars and public transportation reduce transaction costs of consumers

accessing supermarkets. Refrigerators improve storage facilities enabling households to shift from daily shopping in traditional retailers to weekly or monthly shopping in supermarkets. In this respect, consumers can choose between fresh or frozen foods and store them in the refrigerators in order to maintain their quality (Kennedy, et al., 2004).

On the supply side, the increase in foreign direct investment (FDI) induced by policies allowing liberalization of the retail sector is the main reason leading to the spread of supermarkets in developing countries (Reardon et al., 2004). Before 1990, the development of supermarkets was very slow because only domestic/local capital was involved. After this period, international retail chains from Europe, the US, and Japan undertook FDI in the retail sector in developing countries. For example, Bolling and Somwaru (2001) report that sales by food processing affiliates owned by the United States in South America increased from US$5 billion to $15 billion between 1989 and 1998. There were two main reasons driving the penetration of the international retail chains: (1) saturation and intense competition in home markets; and (2) higher margins to be made by investing in developing countries since initial competition in receiving countries was weak (Reardon et al., 2005). The investments made by international retail chains resulted in consolidation and multi-nationalization of supermarkets in developing countries. For example, in Indonesia, Carrefour (one of the top international retail chains) now has 49% of the supermarket sector (Pandin, 2009).

Although the speed of supermarket expansion differs among the countries in these three waves, there is evidence that the patterns of expansion are similar. Supermarkets initially serviced high income consumers in the urban areas, and then moved to medium and small towns and finally to rural towns, and to the middle class and then the working urban class (Weatherspoon and Reardon, 2003). In most of the first wave countries, supermarkets have reached into the lower-middle and lower

income consumer markets and into small towns. A similar situation has occurred in the second wave countries. In China (one of the third wave countries), after spreading beyond the largest cities, supermarkets are moving to smaller towns and to the poorer, more remote interior (Stringer et al., 2009). The development of supermarkets in developing countries mirrors similar trends in the US that took place a few decades ago (Balsevich et al., 2003).

Likewise, the expansion of product categories tends to be similar among the third wave countries. In the first stage, supermarkets focused on processed, dry, and packaged foods such as noodles, dairy products and grains. Due to economies of scale, supermarkets were able to offer these products at lower prices than traditional retailers (Reardon et al., 2007). Then, supermarkets focused on fresh food categories (Pingali, 2006). Although their progress in gaining control of fresh food markets has been slower, supermarkets' share of fresh produce sales is expected to increase. This is because of a substantial change in dietary habits among consumers in developing countries from staple crops to HVAPs (Ali et al., 2007; Chowdhury et al., 2005; Pingali, 2006; Stringer et al., 2009).

In order to increase efficiency, manage on-time delivery of the right quantity and quality of a product, and meet consumer needs, supermarkets have imposed new procurement systems (Reardon et al., 2007). They include: (1) the centralization of procurement comprising a shift from a per-store procurement system to a distribution system that serves several stores in a given zone, district, and country; (2) the adoption of organizational innovations making a shift from spot market transactions toward the use of specialized/dedicated wholesalers; (3) the adoption of the institutional innovation contracts with preferred suppliers, particularly through specialized/dedicated wholesalers; and (4) the implementation of the quality and safety standards as

instruments of coordination of supply chains by standardizing product requirements for suppliers who may cover many regions or countries. The implementation of new procurement systems changes the food supply chain greatly. It requires supermarket suppliers to adopt new production and management practices in order to fulfill the specific requirements such as quality standards and traceability, as well as by the need to deliver large quantities with thigh schedules (Maxwell and Slater, 2003). In this respect, increasing output by supermarket suppliers will not lead to increasing incomes unless their products meet the specific requirements posed by supermarkets (Humprey, 2007).

2.3 The emerging food policy agenda in the era of supermarkets

The implementation of the new procurement systems has changed the food policy agenda. Policy makers are concerned about how to influence the behavior of supermarkets in ways that serve the interests of important groups in society, particularly small farmers, the owners of traditional shops, and small-scale food wholesalers and retailer facilities (Timmer, 2009). Two additional issues are important: first, how food prices can internalize the full environmental costs; and second, how supermarkets can be part of the solution to the health problems which are generated by an "affluent" diet, reduced activity levels and urban lifestyles. The concerns of policy makers combined with these two issues have affected the food policy agenda.

Timmer (2009) describes the food policy agenda in the era of supermarkets in Figure 2.1. In the figure, farmers are in the bottom position of the marketing chain. In the supermarket era, products move through the marketing system which currently consists of traditional markets and supermarkets. Consumers are at the top of the marketing system and currently can choose to purchase food products either from

supermarkets or traditional markets. Four research agendas emerge. The first and second research agendas concern poverty and health issues and lie on the welfare side of the diamond in Figure 2.1. The third and fourth research agendas are food security and environment, lying on the efficiency focused side.

This thesis focuses on the first segment of the marketing chain (farmer to the marketing sector). In the marketing sector, middlemen (specialized wholesalers, processors, traders/buyers) play an important role in linking farmers to market destinations: traditional markets and supermarkets. In traditional marketing channels, produce is purchased from farmers by many small traders and then sold to larger traders who sell on to traders in wholesale markets. From the wholesale markets, produce is supplied to traditional markets. Generally, the transactions between suppliers and buyers in traditional marketing channels involve one-off transactions without a promise to repeat the transactions in the future (Rao and Qaim, 2011). In contrast, the majority of supermarket channels have shifted from spot market transactions and traditional traders to using specialized wholesalers (Reardon et al., 2009). Small farmers participate in supermarket channels via these specialized wholesalers in many developing countries (Kaganzi et al., 2009; Moustier et al., 2010). Supermarket chains establish a relatively stable relationship with their suppliers via specialized wholesalers by adopting of various vertical coordination strategies, particularly contracts (Reardon et al., 2009).
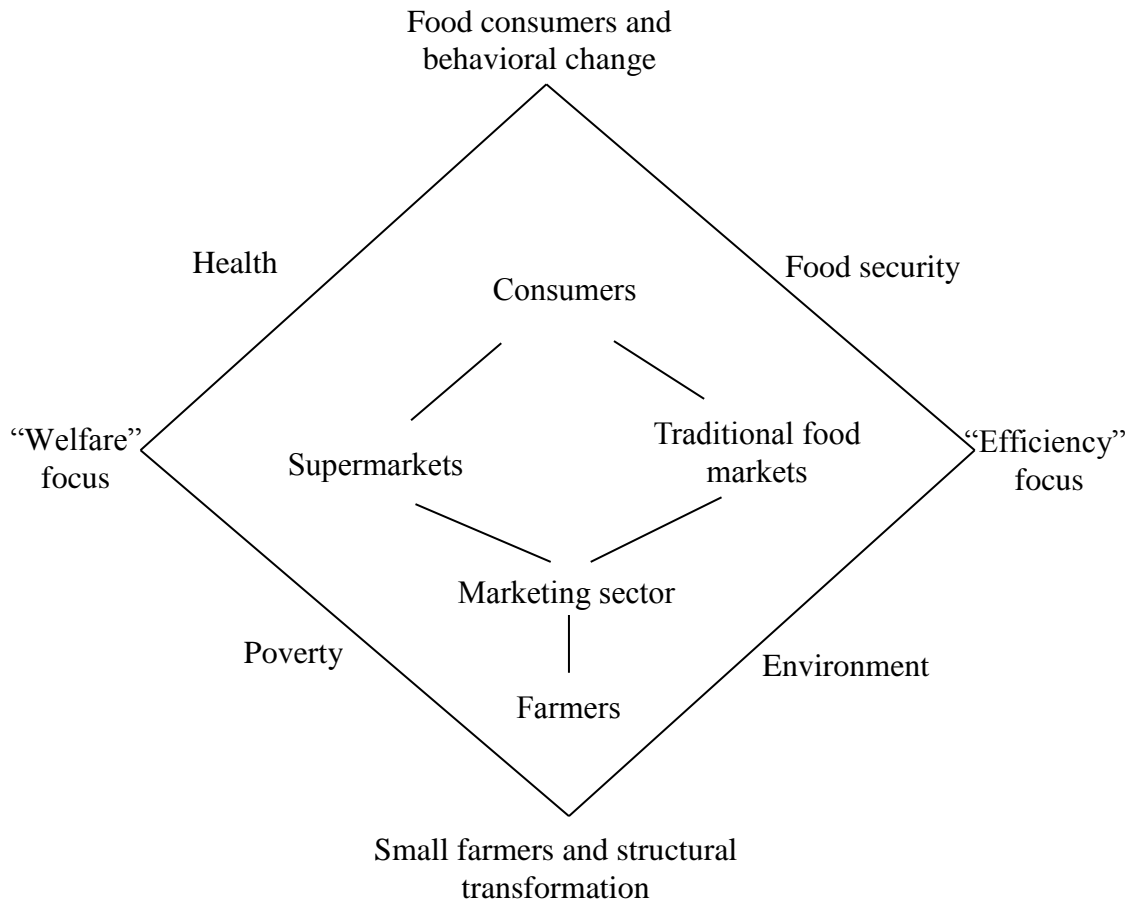
Figure 2.1 Supermarkets and food policy agenda

Adapted from Timmer (2009, p.1814)

       Not every farmer can access supermarket channels. Several factors influence whether or not a farmer will participate in a supermarket channel. Reardon et al. (2005) classify the factors into two factors: the farmer's ability (the capacity of a farmer) and willingness (incentives for a farmer) to participate. Therefore, a study that examines the factors determining farmers' access to (and entry into) supermarket channels and the impact of their participation on their income is valuable. It can provide insights on the types of constraints faced by small farmers and the strategies to assist them to overcome the constraints.

       Although farmers may have the capacity to participate in supermarkets channels, they may decide not to do so (Blandon et al., 2010; Schipmann and Qaim, 2011). This

indicates that farmers have different perceptions regarding their market channel choices. Thus incorporating the preferences of individual chili farmers when choosing buyers/traders is an important aspect in understanding the participation of small farmers in a particular buyer/marketing channel. While the capacity of farmers refers to the observable variables (e.g., land size, irrigated land, and distance to main road or markets) of supermarket participation, the preferences of small farmers regarding a particular buyer/marketing channel are associated with unobservable variables. By incorporating both observable and unobservable variables, this study provides a more comprehensive picture regarding the constraints faced by small farmers participating in supermarket channels. However, understanding market relationships (contractual arrangements and relationships quality between farmers and traders) is also an important area of research and is a parallel focuses of this thesis.

Although this thesis is not focused directly on the poverty alleviation agenda, its results may help small farmers in developing countries to access new emerging markets. The literature suggests that the participation of small-scale farmers in supermarket channel can have positive impacts on their income, which may be translated into reduced poverty (Blandon et al., 2010; Rao and Qaim, 2011; Timmer, 2009). Improving market relationships between farmers and traders can lower their transaction costs and generate improved performance of the supply chain; therefore, the economic goals of the relationship can be achieved.

2.4 The impact of supermarket chains on small farmers

The new procurement systems imposed by supermarkets have important implications for participants in the agri-food supply chains, including small farmers. The impact of supermarket chains (together with their procurement systems) on small

farmers in developing countries has received much attention in recent years. This is because small farmers in developing countries are often the most isolated and are the smallest and least powerful participants in the chain (Boselie et al, 2003). Policymakers want to know whether supermarkets can help small farmers to improve their livelihood (Weatherspoon and Reardon, 2003). Thus it will be crucial to understand the challenges and opportunities faced by small farmers.

Several challenges to small farmers selling to supermarkets have emerged. Traditionally, small farmers in developing countries sell their produce to traditional retailers operating outside of the formal sector (Boselie et al., 2003). Supermarkets are coming into this setting and rapidly consolidating their suppliers, requiring them to participate in more formal transactions (Weatherspoon and Reardon, 2003). The concept of more formal transactions or at least a commitment to supply produce consistently in terms of quality and quantity to supermarkets is very far from business as usual for small farmers (Boselie et al., 2003; Weatherspoon and Reardon, 2003). This is particularly an issue for small farmers since they generally have low levels of education and poor business and negotiating skills (Boselie et al., 2003). Another challenge concerns the limited land owned by small farmers. This results in problem assuring the consistent and sufficient volume demanded by supermarkets.

Additionally, the costs faced by farmers in supplying to supermarkets provide further challenges. To fulfill the standards enforced by supermarkets, small farmers have greater costs related to food safety certification, training costs and investments in capital such as green-houses and refrigeration facilities (Weatherspoon and Reardon, 2003; Reardon et al., 2004). For small farmers with little or no access to credit such costs can prohibit participation in the supermarket channels (Boselie et al., 2003). Transport costs to centralized collection facilities can be considerable, particularly when

chilled distribution is required by supermarkets (Boselie et al., 2003). Additionally, the costs of coordinating supply chains that involve numerous small producers are also considerable when monitoring and traceability are required (Boselie et al., 2003). The crop specific knowledge and appropriate training required to meet the supermarket standards are additional issues (Boselie et al., 2003; Dries et al., 2009; Kaganzi et al., 2009; Reardon et.al., 2009; Weatherspoon and Reardon, 2003).

Apart from the challenges, the presence of supermarkets provides opportunities for small farmers. As demand for HVAPs increase, supermarkets offer new market outlets for small farmers (Rao and Qaim, 2011). For farmers who can fulfill the new procurement systems, supermarkets often pay higher prices which have the potential to increase farmers' income (Reardon et al., 2009). This study reposts, there are two main reasons why supermarkets pay farmers higher prices (per kg) than the traditional channels. First, supermarkets want to lock-in farmers to supply to the supermarket channel. This potentially reduces supermarkets' risk of inconsistent supply and the search costs looking for new suppliers. Second, supermarkets pay higher prices to reward quality differentiation. Additionally, supermarkets often provide various inputs, credit, and technical assistance of new production technology for small farmers (via contracts). These inputs and assistance potentially improve farm productivity and product quality. Thus participation in supermarket channels is often associated with market assurance as well as stability in volume, prices and income (Rao and Qaim, 2011).

Few studies have analyzed the impacts of farmers' participation in supermarket channels. Some studies focus on the total output produced by farmers. For example, in the context of tomato farmers in Guatemala and kale farmers in Kenya, Hernández et al.

(2007) and Neven et al. (2009) report farmers selling to supermarket channels have greater input use, but higher yields compared to those selling to traditional channels.

Other studies focus on the impacts of supermarket participation on household incomes. Different methods have been utilized in order to analyze the income effects of supermarket participation. By comparing gross margins between farmers selling to supermarket channels and farmers selling to traditional channels, Neven et al. (2009) find that farmers selling to supermarket channels generate higher net incomes. Using a similar method, Hernández et al. (2007) find that supermarket farmers earn a higher gross income. However, they have higher input costs compared to farmers in traditional channels. As a result, no significant difference was found in terms of net income between the two groups of farmers. Rao and Qaim (2011) criticize the gross margin method, however, since it does not incorporate other potential variables that may influence household income. An ordinary least square (OLS) regression that regresses income as a function of supermarket participation and other variables such as household assets, education, and age can be applied to analyze the impact of farmers participation in the supermarket channels on their household income (Minot, 2007).

In practice, the decision to participate in a specific market channel may differ not only in terms of observable variables, but also due to unobservable variables (farmer self-initiative, entrepreneurial skills, network relationships). For example, farmers in supermarket channels may have higher individual abilities than farmers in traditional channels (Rao and Qaim, 2011). Farmers who choose to sell to supermarket channels may have relatively higher incomes whether or not they participate in supermarket channels. Hence, the OLS method overestimates the dummy participation coefficient since it contains both the effect of participating in the supermarket channel and the effect of unobservable variables (Greene, 2008). To eliminate the bias associated with

unobservable characteristics, some previous studies have utilized the Heckman selection procedures (Miyata et al., 2009; Rao and Qaim, 2011).

Empirical literature analyzes the effect of modern market participation on household income using OLS regression. This is followed by the Heckman selection procedure in order to take possible selection bias in supermarket participation into account. By using a standard OLS regression on the income equation and a two step Heckman procedure, Rao and Qaim (2011) find that vegetable farmers selling to supermarket channels in Kenya receive a higher income per capita compared to farmers selling to traditional channels. The OLS regression and Heckman selection procedure have been used to analyze the impact of modern markets' participation on income by Miyata et al. (2009) when they study contract farming in apples and green onions in China. The study shows that contract farming increases the incomes of farmers. Likewise, Bowlig, et al. (2008) find that there are positive revenue effects both from participation in the certified organic contract farming and from the adoption of organic farming techniques in the case of certified organic contract farming for smallholders and of the adoption of organic agricultural farming methods in Africa. Using a similar method, Schipmann and Qaim (2011), however, find that participation of sweet pepper farmers in the modern supply chain in Thailand does not lead to higher income compared to those supplying traditional markets. Consequently, more studies are needed in order to examine the income effect of small farmers' participation in modern supply chains.

This study intends to contribute in the emerging literature related to the question outlined at the beginning of this section: whether supermarket participation can improve the livelihood of small farmers. Per capita household income is utilized as the proxy to measure the livelihood of small farmers. An OLS model is utilized to estimate

household income, and in order to examine the possibility of selectivity bias in the sample as suggested by the previous studies, a treatment effect model is also used.

2.5 Determinant factors of farmers' participation in supermarket channel

There is substantial evidence that participation in modern market channels (including supermarket channels) potentially increases farmers' income (Hernández et al., 2007; Miyata et al., 2009; Neven et al., 2009; Rao and Qaim, 2011). However, technical constraints and market imperfections might lead to small farmers' exclusion resulting in increasing disparities and marginalization in rural areas (Rao and Qaim, 2011). Recent literature has mainly addressed whether supermarkets and their procurement systems lead to the exclusion of small farmers from the emerging supermarket channels (Neven et al., 2009; Reardon et al., 2009). Understanding the constraints faced by small farmers in meeting supermarket standards has become important since it helps to assist small farmers to take advantage of supermarket growth.

A growing body of literature focuses on the determinants of channel choice of farmers between modern and traditional channels (Hernández et al., 2007; Natawidjaja et al., 2007; Neven et al., 2009; Rao and Qaim, 2011; Schipmann and Qaim, 2010). These studies conceptualize the farmer's decision to participate in modern channels as a decision of technology adoption of output marketing. Reardon et al. (2005) called this model "a heuristic model" of farmers' decisions to supply to modern markets. The decision of technology adoption (selling to supermarket channels or stay in traditional channels) is viewed as binary choice decision problem by small farmers. According to Feder et al. (1985), the adoption of technological innovations is determined by the incentives for and capacities of farmers to adopt a particular technology.

In the context of supermarket adoption, the incentive variables include two aspects (Reardon et al., 2005). The first is the price differential or premium over the traditional wholesale market that the supermarket channel can pay. It should be noted, however, that this should be observed as the price average over the total product including the share not accepted due to quality rejections and all deductions for shelf fees, interest cost due to lagged payment period, and so on. Since it is difficult to produce such price information, output prices are not directly entered into empirical models of farmers' adoption of supermarkets (Hernández et al., 2007; Natawidjaja et al., 2007; Neven et al., 2009; Rao and Qaim, 2011; Schipmann and Qaim, 2010).

The second aspect affecting the adoption of the supermarket chain is the relative cost and risk of the farm and post handling technologies to meet the product quality and transactional requirements of supermarket channels compared to traditional channels. As explained in the previous section, farmers experience additional costs to meet the supermarket requirements such as volume, consistency, quality and transportation to centralized collection. These relative costs reduce farmers' choice of participation in supermarket channels (Reardon et al., 2009). Additionally, transaction costs such as physical infrastructure, roads and public communication can also affect farmers' adoption of the supermarket channel (Rao and Qaim, 2011). Small farmers living further from roads and major urban areas and cities, with less reliable transportation infrastructure and communications are less likely to be offered contracts by modern markets (Barrett et al., 2011).

The capacity variables refer to investments in various forms of capital by farmers to access modern channels including physical capital, social/collective capital and institutional capital. Farmers need to invest in physical capital such as land, irrigation equipment and greenhouse in order to meet quality and consistency

requirements in the supermarkets. Such capital can be obtained through investments (Reardon et al., 2005).

These new procurement practices force all actors along the supermarket channels including farmers to made investments in social or collective capital. Farmers' associations or cooperatives can facilitate farmers to gain access to supermarkets by investing in collective capital such as vehicle and warehouses. These investments can help farmers to reduce transaction costs. Organizational capital is viewed as "embodied" in relationships and associations that require investments to "produce" (Reardon et al., 2005).

Finally as supermarkets establish closer coordination along the chains, farmers also need to invest in institutional capital such as contracts. Under contracts, small farmers can obtain assistance programs, inputs and credits that they need to ensure the supermarket standards. Institutional capital can be viewed as "embodied" in contracts which require investments to "produce". The adoption of supermarket channels by small farmers has been found to increase when their capacity increases (Reardon et al., 2009).

Schipmann and Qaim (2010) identify three possible constraints that influence the farmers' adoption of supermarket channels. They are farm and household constraints, contextual constraints, and personal constraints. Farm and household constraints include farm size, land title, and off farm occupation, while contextual constraints include road conditions and access to services. It seems that farm and household constraints, and contextual constraints are similar to the concept of capacity variables as outlined in Reardon et al. (2005). Personal constraints refer to the demographic variables of farmers such as age, education, and years of doing farming (Miyata et al., 2009; Schipmann and Qaim, 2010; Sharma et al., 2009, Woldie and

Nuppenau, 2009). For example, old age or lower education can be constraints that prevent farmers from participating in modern channels.

Previous studies show some similarities and differences in terms of capacity, incentives and demographic variables between supermarket and non-supermarket farmers. Supermarket farmers have more land than farmers in the traditional channel in the case of vegetables in Kenya (Rao and Qaim, 2011), sweet peppers in Thailand (Schipmann and Qaim, 2010), tomatoes and kale in Kenya (Neven et al., 2009), and tomatoes in Indonesia (Natawidjaja et al., 2007). There is no difference of land area between these two channel for tomatoes in Guatemala (Hernández et al., 2007) and fruits and vegetables in Honduras (Blandon et al., 2010). Supermarket farmers tend to rent land more than traditional channel farmers (Hernández et al., 2007; Natawidjaja et al., 2007). Having a larger land area allows farmers to cultivate larger crop areas for selling to supermarkets.

It has been shown that supermarket farmers have more irrigated land compared to those supplying to traditional channels (Hernández et al., 2007; Miyata et al., 2009; Neven et al., 2009; Natawidjaja et al., 2007; Rao and Qaim, 2011). Having more irrigated land is very important to grow multiple-crops over a year (Hernández et al., 2007).

There are significant differences with respect to some non-land assets between farmers in supermarket and traditional channels. Supermarket farmers own more non-land assets than traditional channel farmers, particularly vehicles (Hernández et al., 2007; Neven et al., 2009; Rao and Qaim, 2011; Schipmann and Qaim, 2010), cattle (Blandon et al., 2010), mobile phone, irrigation equipment and storage facility (Neven et al., 2009).

Regarding demographic variables, some studies show that supermarket farmers have a higher education level than farmers in traditional channels (Neven et al., 2009; Rao and Qaim, 2011; Schipmann and Qaim, 2010). Other studies find that education level does not vary much across the groups (Blandon et al., 2010; Hernández et al., 2007; Natawidjaja et al., 2007). The studies also show that supermarket farmers tend to be younger than traditional channel farmers (Blandon et al., 2010; Schipmann and Qaim, 2010). There is no significant difference between the two channels in terms of household size (Blandon et al., 2010; Hernández et al., 2007; Natawidjaja et al., 2007; Rao and Qaim, 2011), and distance to main roads (Rao and Qaim, 2011; Hernández et al., 2007). Access to main roads gives farmers an advantage to sell to supermarkets that demand stricter delivery schedules (Rao and Qaim, 2011).

The existence of farmer organizations is very important, particularly to gain economies of scale in transportation and reduce transaction costs for the supermarket client (Neven et al., 2009). Farmer organizations also help farmers by providing some technical assistance and training, and in some cases provide sale of fertilizers, rental of agricultural equipment such as sprayers (Hernández et al., 2007). Blandon et al. (2010) and Hernández et al. (2007) show that the majority of supermarket farmers are more likely to be members of a farmers' organization. In contrast to vegetable farmers in Kenya, the participation of supermarket farmers in farmer organizations is significantly lower than traditional channel farmers (Neven et al., 2009). However, Schipmann and Qaim, (2010) find that there is no significant difference between farmers in supermarket and traditional channels in term of membership of a farmers' group.

Farmers in modern and traditional channels might also differ in other characteristics such as crop specialization and yield levels. Compared to farmers in traditional channels, farmers participating in modern markets are much more specialized

in specific crops as indicated by the higher share of the crop on their income (Hernández et al., 2007; Miyata et al., 2009; Natawidjaja et al., 2007). Modern market farmers also tend to have higher yields for the crop than traditional channel farmers (Hernández et al., 2007; Miyata et al., 2009).

The differences and similarities as outlined above are only based on mean values. Therefore, they should not be over interpreted since possible confounding factors are not included to control the results (Schipmann and Qaim, 2010). Appropriate regression models are needed in order to explain supermarket adoption. A probit model is a common approach used by previous studies. Among the capacity, incentive, and demographic variables explained above, the variables of land size, irrigated land, age, education, participation in farmer organizations, various non-land assets (such as vehicles, mobile phone), and access to main road are the most common variables used by previous studies.

The impacts of the capacity, incentive, and demographic variables on farmers' participation in supermarket channels have been found not to be uniform across industries and countries. In the context of vegetable farmers in Kenya, Rao and Qaim (2011) find that older farmers with larger land sizes who are members of farmer organizations are more likely to participate in supermarket channels. Land size and irrigated land are found to be the main factors that influence supermarket participation in the context of fresh fruit and vegetable commodities in Kenya (Neven et al., 2009) and tomatoes in Indonesia (Natawidjaja et al., 2007). However, Hernández et al. (2007) find that farm size is not a significant factor in determining supermarket participation for tomatoes in Guatemala. In this case, younger farmers, who are less likely to be members of farmer organizations and have irrigated land, tend to participate in

supermarket channels. Hernández et al. (2007) also find that access to a main road has a negative influence on supermarket participation.

Fewer studies take into account the fact that current assets might lead endogeneity problems since household assets can be influenced by supermarket channel participation. To reduce the endogeneity problem Hernández et al. (2007), Natawidjaja et al. (2007) and Neven et al. (2009) utilized lagged assets in their models. Lagged assets refer to assets owned by households before they participate in supermarket channels. By only using current assets, the analyses do not allow determination whether this is a cause or an effect of supermarket participation.

In line with the literature, this study captures farmers' incentives, capacities and their demographic characteristics in analyzing determinants influencing chili farmers' participation in the supermarket channel. As adoption of the supermarket channels refer to a binary choice problem, a probit model is applied. To address the endogeneity problem, lagged household assets which refer to capacity variables are utilized in the participation model (probit).

2.6 Contractual arrangements between farmers and buyers

Traditionally, the marketing of food products from farmers to consumers has primarily occurred through spot market transactions. The demand for high quality products and safety standards posed by supermarkets, combined with the problems faced by small farmers in supplying such products to supermarkets, has led to closer vertical coordination (Reardon et al., 2009; Swinnen 2007). Supermarkets establish closer vertical coordination with selected suppliers to influence the entire supply channel for certain products. Reducing the number of suppliers will potentially affect not only transaction cost savings, but also relational benefits in dealing with fewer, but

closer suppliers (Hingley et al., 2006). This has led to new sets of studies on contracts in the food supply chain (Dries et al., 2009; Farina, 2005; Henson et al., 2005).

The motivation for a tighter vertical coordination or governance structure can be explained by using the framework of transaction cost economics (TCE), one branch of new institutional economics. It starts with the neoclassical economic framework assuming perfect information flow in the transactions between economic agents (suppliers and buyers). Under this assumption, there is no uncertainty regarding prices, product characteristics, or the behavior of competitors or trading partners. Hence, there are no costs involved in measuring the value of products. TCE relaxes the assumption of perfect information in neoclassical economics. Under information asymmetry, opportunistic behavior ("self-interest seeking with guile") from selfish exchange partners may exist (Williamson, 1979, p.234). TCE considers this issue by incorporating two behavioral assumptions that distinguish this approach from neoclassical economics. The first assumption is related to the recognition that human agents are subject to bounded rationality. The second assumption is that at least some agents are given to opportunism. These assumptions provide incentives for economic agents to protect themselves by organizing internally into a governance structure (Williamson, 1979). The exchange partners select a certain governance structure in order to minimize their transaction costs (Williamson, 1979).

A variety of governance structures exist in the literature, ranging from spot markets to full vertical integration (Hobbs and Young, 2001; Minot, 2007; Peterson et al., 2001). In the spot market, the intensity of coordination control between the exchange partners is low (Peterson et al., 2001). Coordination of supply and demand with respect to quantity, quality, and timing is determined only through the price (Hobbs and Young, 2001; Minot, 2007). There is no commitment to repeat the

transactions with the same buyers in the future (Minot, 2007; Peterson et al., 2001). Full vertical integration occurs when one firm owns two or more stages of the production-processing-distribution process (Hobbs and Young, 2001). In this case, coordination control is exercised within the policies and procedures of a single organization (Peterson et al., 2001). In between these two extremes, a large number of coordination mechanisms have been developed to coordinate supply chains, including contract, quasi-integration and strategic alliances (Hobbs and Young, 2001).

Contracts can be classified into three types (Mighell and Jones, 1963): marketing, production and resource contracts. In a marketing contract the firm provides a market for farmer output; in a production contract the firm has more control over the farmers in terms of the use of input and production practices; and in a resource contract the firm has the greatest level of control over farmers, since the firm provides a market outlet, determines the production practice and offers some inputs as well. A quasi-integration occurs when the parties build an agreement to share the costs, risks, profits and losses, whereas a strategic alliance occurs when the parties only share their objectives and work together to achieve them (Hobbs and Young, 2001).

Costs arise from using a certain governance structure. TCE classifies the costs into *ex ante* and *ex post* types (Williamson, 1985). *Ex ante* costs include the costs of drafting, negotiating, and safeguarding an agreement. *Ex post* costs include (1) maladaptation costs incurred when the transactions drift out of alignment, (2) handling costs incurred if bilateral efforts are made to correct *ex post* misalignment, (3) set up and running costs associated with the governance structures to which disputes are referred, and (4) the bonding costs of effecting secure commitment.

Another way to classify transaction costs is to separate them into three categories: information or search costs; negotiation and bargaining costs; and

monitoring and enforcement costs (Hobbs, 1996). Information costs refer to costs incurred prior to a transaction and include costs incurred in the search for information about potential exchange partners. Negotiation costs refer to the costs incurred from physical acts during the transaction. These costs are influenced by the way in which transactions are carried out. Monitoring and enforcement costs refer to the costs that arise after a transaction, including the costs of monitoring the behavior of a trading partner.

In agriculture, contracts are increasingly important in linking small farmers to modern markets. There has been an emerging literature dealing with contractual arrangements between farmers and buyers (i.e., traders, agribusiness firms, exporter companies) in the food supply chain (Bijman, 2008; Dolan and Humprey 2000; Farina 2005; Henson et al. 2005; Gellynck and Molnár, 2009; Guo et al., 2007; Lawrence et al., 1997; Schipmann and Qaim 2011; Simmons et al., 2005). These studies show a wide variety of contractual arrangements between farmers and buyers among agricultural industries and among countries in terms of forms/types, details/specifications and motivations.

Formal and informal contracts are the most common forms of contractual arrangements between farmers and buyers. A formal contract refers to written agreements between farmers and contractors (buyers), while informal contracts refer to verbal agreements (Bijman, 2008). TCE suggests that in the case of strong vulnerabilities, a formal contract is the best form of governance structure to prevent the opportunistic behavior of some economic agents. However, with complex behaviors and under high uncertainty about the future, it may be difficult for exchange partners to foresee all possible contingencies, to write contracts that cover them and finally to enforce the contracts (Hartmann, 2010). Agency theory, another branch of new

institutional economics, allows incomplete contracts where objectives and activities of the principal and agent will not completely coincide (Barry et al., 1992).

Although contracts are becoming more important, particularly in linking small farmers to modern market channels, this does not always mean formal (written) contracts (Bijman, 2008). Informal contracts still exist, which include only verbal agreements between farmers and contractors. Schipmann and Qaim (2011) find that for sweet pepper farmers in Thailand the forms of contractual arrangements depended on the type of buyer. They find that the majority of sweet pepper farmers sell their products to the village traders without any contracts. However, oral and written contracts emerge as the most common transactions between farmers selling to the private agribusiness firms and the royal projects, respectively.

Guo et al. (2007) find that oral contracts exist in the transactions between farmers and middlemen in China, while agribusiness firms prefer written contracts. Henson et al. (2005) report that the contractual arrangements between farmers and an exporter company in Zimbabwe are mostly verbal/oral broadly working on the basis of trust and subject to on-going renegotiation. A variety of contract forms also exist in the transactions between farmers producing the selected traditional food products and their buyers in Hungary, Belgium and Italy, i.e. spot markets, contractual relationships, and equity based alliance (Gellynck and Molnár, 2009). In this case, verbal or written contracts might exist in spot markets, while contractual relationships and equity based alliance are characterized by the existence of written contracts.

Simmons et al. (2005) review contract farming relationships in Indonesia and find a wide variety of the forms of contract among regions and crops. A direct formal contract between buyers and farmers is the most common practice in the case of the broiler commodity in Lombok Province. In the case of the seed corn commodity in East

Java Province, there is a written agreement at the group level in which the contractors have a formal contract with the head of grower group (HGG) who represents the interests of farmers in his group and verbal agreements between HGG and farmers. Similar situations emerge in the contractual relationships between farmers and the contractor in the case of seed rice crop in Bali, in which the buyer contracts with farmers through an intermediary. Intermediaries such as farmer groups and cooperatives, have important roles in contracts particularly to counter the problem of high transaction costs of dealing with a large number of small farmers (Coulter et al., 1999). Farmer groups and cooperatives can bargain and negotiate prices and the terms of the contracts on behalf of their members.

It appears that the details in the contract cover some or all of these specifications: duration, quality, quantity, cultivation practice, delivery time, packaging, transport, price, technical assistance and the procedure for paying farmers (Bijman, 2008). For example, in the case of sweet peppers in Thailand, the contractual arrangements between farmers and buyers include aspects of pricing, side selling, delivery, grading, production process and input access (Schipmann and Qaim 2011). Similarly, Dolan and Humprey (2000) report that the contractual arrangements between farmers and the United Kingdom supermarkets (through the exporter companies) include aspects of financial and technical support by the companies, while farmers must supply their produce consistently through the seasons and ensure post-harvest quality and safety requirements.

The procedure for paying farmers varies widely among the countries and even within the regions in countries. Payments to farmers vary from within a week to more than one week in the case of fresh produce in Zimbabwe (Henson et al., 2005), sweet peppers in Thailand (Schipmann and Qaim, 2011) and broilers in Lombok, Indonesia

(Simmons et al., 2005). Payment at delivery is the most common in contract farming in China (Guo et al., 2007) and in the case of seed rice contract in Bali, Indonesia (Simmons et al., 2005).

Some studies have examined several incentives that motivate farmers to engage in contracts, particularly with buyers in modern markets. The motivations vary, but price is the most common factor. This is because price arrangements can reduce risk and uncertainty (Eaton and Shepherd, 2001). Guo, et al. (2007) report that price stability and market access are the main motivations for farmers to contract with their buyers. Price is also perceived as the main motivation by farmers who have contracts with village traders, while assured market access and input provision are the most common motivations of farmers who have contracts with modern retail markets (Schipmann and Qaim (2011). Swinnen (2007) finds two main motivators for farmers in Central Europe to engage in contracts: guaranteed access to markets and guaranteed prices. Access to pre-financing and quality inputs are the main motivators for small cotton farmers in Kazakhstan. Kirsten and Sartorius (2002) report that farmers enter into contract in order to reduce cost and gain access to credit, information, technology, marketing channels, managerial skills, and technical expertise.

Considering the variety in terms of the forms, details and motivations of contractual arrangements, it is important to examine contractual relationships between farmers and buyers on a case by case basis. This method will enhance the general understanding of the structure of contractual relationships (Bauman, 2000). In this study, the nature of contractual arrangements between farmers and buyers will be explored in terms of the forms of contracts, specifications of contract and the motivations of farmers to contracts.

2.7 The importance of relationship quality between buyers and sellers

An emerging literature in agri-food relationships suggests that improving relationship quality among farmers, traders, processors, wholesalers and retailers at points along the supply chain enhances efficiency, for example, by reducing transaction costs such as search, information, and bargaining costs (Batt, 2003; Fischer and Reynolds, 2010; Giha and Leat, 2010, Gracia et al., 2010; Gyau et al., 2011). Athanasopoulou (2009) notes that it is five times more expensive to acquire new partners than to keep existing ones. Further, improving the quality of buyer-seller relationships may enable farmers and traders to exchange information with respect to current and expected market situations, thus allowing better coordination of supply and demand cycles (Fischer and Reynolds, 2010; Giha and Leat, 2010; Gracia et al., 2010).

Relationship quality refers to "an overall assessment of the strength of a relationship and the extent to which it meets the needs and expectations of the parties based on a history of successful or unsuccessful encounters or events" (Smith, 1998a, p.78). According Jarvelin and Lehtinen (1996, p.245), relationship quality is "a customer's perception of how well their relationships fulfill the expectations, predictions, goals, and desires of the customer". Consequently, it forms the overall impression that a customer/seller has concerning the whole relationship including different transaction. No consensus exists on how to best measure the level of relationship quality. Arnett et al. (2003) suggest to include both economic and social components of the transaction when measure the level of relationship quality between buyers and sellers. Price paid by a buyer to a seller is included as an economic component of a relationship (Huntley, 2006).

In order to include social components in measuring the quality of relationships between buyers and sellers, many scholars utilize the concept of social embeddedness.

This concept refers to the adoption of sociological concepts in economic theory (Granovetter, 1985). According to this concept, exchange partners determine their choices (whether to stay or leave their trade relationships) based on their past experience with their exchange partners and continue to transact with those they trust. Social embeddedness can help exchange partners to address problems of coordination (Beckert, 2007). In this respect, the variables in social exchanges such as trust (Bradach and Eccles, 1989; Kwon and Suh, 2004; Moorman et al., 1986; Morgan and Hunt, 1994), satisfaction (Garbarino and Johnson, 1999; Geyskens et al., 1999), and commitment (Kwon and Suh, 2004; Moorman et al., 1986; Morgan and Hunt, 1994) have been considered important issues in the marketing literature in order to evaluate the quality of relationships between the principal (traders/buyers) and the agent (sellers).

Trust can be defined as "a willingness to rely on an exchange partner in whom one has confidence" (Moorman et al., 1986, p.82). Dwyer et al. (1987, p. 12) define trust as "a party's expectation that another party desires co-ordination, will fulfill obligations, and will pull weight in the relationship". Trust exists when trading participants are confident in the reliability and integrity of their exchange partners (Morgan and Hunt, 1994). Trust can reduce the risk of trading partners acting opportunistically during sales transactions (Bradach and Eccles, 1989; Hawes et al., 1989). Thus in a relationship with a high level of trust, the trading partners are comfortable sharing information and believe in the information receive.

Satisfaction can be classified into two categories according to Geyskens et al. (1999, p.224). First, economic satisfaction refers to "a channel member's positive affective response to the economic rewards that flow from the relationship with its partner such as sales volume and margins". Second, non-economic satisfaction is "a

channel member's positive affective response to the non-economic, psychosocial aspects of its relationship, in that interaction with the exchange partner are fulfilling, gratifying, and easy". On an empirical level, satisfaction can be measured by comparing between the preferred seller performance and the buyer expectations (Batt, 2004). Satisfaction increases when the sellers' performance exceeds the buyers' expectation.

Commitment is "an exchange partner believing that an on going relationship with another is so important as to warrant maximum efforts at maintaining it; that is, the committed party believes the relationship is worth working on to ensure that it endures indefinitely" (Morgan and Hunt, 1994, p.23). This definition is parallel with the definition of commitment from Hennig-Thurau and Klee (1997) that describes commitment as "a customer's long-term on going orientation toward a relationship grounded on both an emotional bond to the relationship and on the conviction that remaining in the relationship will yield higher net benefits than terminating it" (p.752). Commitment will exist when a partner believes the relationship is important enough to warrant maximum efforts at maintaining that relationship in the long term. When commitment results in loyalty, the likelihood of continuing to do business with the supplier and recommending the supplier to a partner, in the business relationship will increase.

A growing body of literature focuses on relationship quality between farmers and buyers. However, similar to what is reported in the marketing literature, a review of relationships in the agri-food studies reveals that no consensus exists on how best to measure the level of relationship quality between exchange partners. Some studies have utilized the variable trust as a proxy to measure the quality of farmer-trader relationships (Batt, 2001; Batt, 2003). These studies suggest that farmers prefer to transact with trusted buyers who make significant investments to help farmers grow

crops. James and Sykuta (2006) show that trust contributes significantly to farmers'
decisions when choosing between cooperative and private firm channels. Farmers
perceive a high level of trust from cooperatives rather than private firms.

Batt (2003) also utilize the variable of satisfaction in order to evaluate the
performance of the potato supply chain in Vietnam. He finds that farmers, traders and
retailers have good relationships with each other as indicated by high levels of
satisfaction. Gyau et al. (2011) study the relationship between farmers and dairies in
Germany, conceptualizing relationship quality as a composite variable consisting of
satisfaction, trust and commitment. Likewise, Giha and Leat (2010) utilize these three
variables to analyze relationship quality in the UK barley-to-beer and whisky supply
chains. The important role played by trust, satisfaction and commitment in determining
the level of relationship quality between exchange partners is also highlighted by Gracia
et al. (2010) in the case of the wheat-to-bread chain in Spain.

In line with the literature on contractual arrangements between farmers and
traders as outlined in section 2.6, Eathon and Shepherd (2001) suggest that commitment
plays an important role in the success of contractual relationships between farmers and
buyers. In contracts, farmers need to make a commitment to their buyers to supply their
produce continuously in terms of quantity and quality. However, high price fluctuations
of agricultural commodities might affect the levels of farmers' commitment. For
example, contracted farmers may sell their products to other buyers who offer higher
prices than their buyers. In order to avoid side-selling by farmers, some contractors
offer price premiums above the market price (Miyata et al., 2009). Thus price is often
viewed as the main factor in determining farmers' commitment.

Marketing literature often views the variable of commitment as the highest
construct in the relational quality model which is influenced significantly by various

relationship variables including trust (Kwon and Suh, 2004; Morgan and Hunt, 1994) and satisfaction (Garbarino and Johnson, 1999). Morgan and Hunt (1994) and Kwon and Suh (2004) demonstrate that higher degrees of trust in market relationships can be associated with greater willingness of buyers and sellers to maintain their relationships. Satisfaction can reduce the possibility of dispute between farmers and farmers; hence, increase the probability of a party to stay with their current partner (Garbarino and Johnson, 1999).

In the agri-food relationship literature, Österberg (2009) shows how member commitment with agricultural cooperatives is affected by various socioeconomic variables (age, member's experience from board work) and relationship behavior variable (satisfaction). Gyau et al. (2011) place commitment as one element of relationship quality variables when modeling market relationships between dairy farmers and their buyers in Germany. The results indicate that the actual price of milk does not influence the level of relationship quality. Relationship quality is influenced positively by relationship behavior variables (e.g., communication, cooperation, flexibility, and price satisfaction and economic variable (firm size). The positive effect of firm size on farmers' commitment suggests that larger dairy farmers show higher levels of commitment than small dairy farmers. In contrast, Boselie et al. (2003) suggest that small farmers often demonstrate a higher level of commitment to the crop due to its economic importance to their livelihood.

This study examines the perception of farmers on the quality of relationships with their buyers covering aspect of trust, satisfaction and commitment. Given the importance of commitment in contractual relationships between farmers and buyers, this study also examines determinant factors influencing farmers' commitment to stay with trade relationships with current buyers. Following the literature, this study incorporates

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both economic variables (actual prices) and relationship behavior variables (trust and satisfaction) as determinant factors of farmers' commitment.

2.8 Farmers' preferences of buyer attributes

The literature on farmers' participation in supermarket channels as outlined in section 2.5 emphasizes the importance of observable variables such as household characteristics, and various forms of capital such as land and irrigated equipment as determinants influencing participation (Blandon et al., 2010; Schipmann and Qaim, 2011). Previous studies pay little attention to the subjective attitudes of individual farmers and tend to assume that if farmers had the capacity to supply to supermarkets, all of them would sell to this channel, but this is not always the case at an empirical level. For example, when farmers choose a preferred buyer, they do not always consider getting the highest possible prices from their buyers (Lu et al., 2010b). Farmers sometimes consider other buyer attributes such as credit arrangements, the ability to negotiate, and relational variables such as trust and commitment (Boger et al., 2010; Lu et al., 2010b; Woldie and Nuppenau, 2009).

Authors such as Blandon et al. (2010), Masakure and Henson (2005), Schipman and Qaim (2011), and Umberger et al. (2010) incorporate the subjective attitudes of individual farmers when they choose preferred marketing channels/buyers. Blandon et al. (2010) find that small-scale producers of fresh fruit and vegetables (FFVs) in Honduras with relatively similar socioeconomic characteristics have different perceptions regarding market channel choices. Many producers of FFVs who are able to supply to supermarket channels decide not to participate in supermarket channels. They prefer to sell to traditional channels due to a variety of reasons such as cash payment, local selling and lack of grading (Blandon et al., 2010).

Masakure and Henson (2005) explore factors motivating small scale-producers in Zimbabwe to contract for the production of HVAPs in the context of an export supply chain. They show that farmers' motivations to contract vary according to the prevailing situations of farmers such as existence of alternative economic opportunities and imperfections in local input and output markets. Market uncertainty is a major reason for farmers to contract.

Umberger et al. (2010) study the marketing preferences of small potato farmers in Indonesia and find heterogeneity in their marketing preferences. The majority of farmers prefer to transact with buyers who have similar attributes to those in the traditional spot market (e.g., pay cash immediately, offer higher price per kg). Only a small number of potato farmers prefer to enter into more formal relationships with their buyers. In the case of contract choices, Schipman and Qaim (2011) find that sweet pepper farmers in Thailand generally prefer non-contract marketing options. The likelihood to enter into a contract increases when there are higher opportunity costs of time and fewer marketing alternatives.

Studies that examine farmers' preferences towards a particular buyer or a marketing channel utilize a number of attributes which belong to the buyer or the marketing channel. Pennings and Leuthold (2000) point out that the attitude of individuals towards an object (e.g., the marketing channels or the buyers) will lead to the intention to choose that object (the probability of choosing marketing channels or buyers) and ultimately to a choice. The intention toward an object is evaluated through various attributes belonging to that object. Thus identifying and developing buyer attributes are important aspects in determining farmers' preferences of marketing channels.

Blandon et al. (2010) apply the transaction costs approach in determining the attributes of the marketing preferences of farmers. The attributes that they identify are price structure, quantity demanded, grading requirements, payment mechanism, frequency of delivery, selling place, organization and entry cost. Umberger et al. (2010) utilize a set of attributes based on the literature of transaction cost economics and buyer-seller relationships. There are 11 buyers attributes that are used by Umberger et al. (2010): price per kg, payments at delivery, credit for certified chili seed, credit for input purchase, willingness to negotiate or match another buyer's price, money for loan, technical assistance, long-term relationships, commitment, market information, and price premiums.

Schipman and Qaim (2011) use four attributes related to the concept of transaction costs (input/credit provision, payment mode), risk factors (price) and variables of social exchange (relation to the buyer). Masakure and Henson (2005) utilize four factors motivating farmers to contracts covering the aspects of market uncertainty (reliable supply of inputs, no need to transport crops to market, and guaranteed minimum prices and market for crops), indirect aspects (acquisition of knowledge for use on traditional crops, stepping stone to other projects, acquisition of knowledge for use on new crops), income (to ability earn extra income, lack of alternative sources of income), and intangible/latent benefits (benefits to other farmers observed and satisfaction is obtained from growing export crops).

Different experimental methods exist in the literature to identify respondents' preferences towards different attributes that belong to the object. These methods include traditional discrete choice models, rating and ranking tasks, a paired comparison task and the best worst (BW) method. In traditional discrete choice models, respondents are invited to make trade-offs among combinations of attributes in purpose designed

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scenarios. Blandon et al. (2010) and Schipman and Qaim (2011) use this method to explore the marketing preferences of small farmers. Several issues, however, emerge in the application of these models. The first is related to the complexity of design and analysis, since they need sophisticated computer programs (Cohen, 2009; Flynn et al., 2007). Secondly, this method cannot be used to compare utilities across different experiments (Cohen, 2009; Louviere, 2000).

Due to the limitations, many researchers prefer to use rating and ranking tasks. These tasks are quite simple for respondents to complete and allow the application of simple statistical methods to analyze the data (Cohen, 2009). Masakure and Henson (2005) asses the relative important attributes of attributes of farmers to contract using five-point Likert scales from "very important" (5) to "very unimportant" (1). However, Flynn et al. (2007) argue that these tasks might induce behavior of respondents that will in turn influence the final results of statistical analysis. Another method, with the least cognitive demands on respondents is a paired comparison task in which respondents are asked to make a choice between the relative importance of two items shown to them (Cohen, 2009; Marley and Louviere, 2005;). However, with a large number of attributes, this method leads to a very large number of pairs to be compared. The BW method allows a reduction in the total number of choice sets by increasing the number of attributes in each choice (Cohen, 2009; Marley and Louviere, 2005). Umberger et al. (2010) use the BW method in examining the relative importance of the 11 buyer attributes in the case of potatoes.

It is expected that farmers are not homogenous in terms of their preferred buyer attributes since they have different socio economic and farm characteristics. Umberger et al. (2010) take the heterogeneity of farmers' preferences into account in the case of the potato industry in Indonesia by employing a Latent Class (LC) cluster model. While

Masakure and Henson (2005) utilize K-means cluster analysis in order to take the heterogeneity issue into account. Compared to standard cluster analysis techniques (e.g., K-Means), the LC cluster model has a number of advantages (Magidson and Vermunt, 2002): (1) individuals are classified into different classes/clusters by using a model based approach instead of an ad hoc approach; (2) the number of clusters can be determined easily by various diagnostic criteria such as the Bayesian Information Criterion (BIC) statistic; (3) standardization of variables is not required in a LC cluster since the LC clustering solution is an invariant of linear transformations of the variables; (4) the possibility to deal with different scale types of variables (e.g., continuous, categorical, counts); and (5) the LC cluster model allows for exogenous variables (covariates) that can be useful to predict the characteristics of class membership.

In this study the BW method is used to evaluate the relative importance of buyer attributes when farmers make decisions about choosing buyers. The BW task seems to be easy for farmers to complete, since they are invited only to choose the best and worst in each choice set, reducing the biases that affect rating or ranking methods (Marley and Louviere 2005; Cohen 2009). The heterogeneity of farmers regarding preferred buyer attributes is explored by employing the LC cluster model.

2.9 The Indonesian chili industry

Chilies are one of Indonesia's most important food crops. Chilies are consumed daily by most Indonesian households in fresh form. On average, per capita consumption of chilies was around 300 gram per week in 2011 (Statistic Agency, 2012). An estimated 463,000 small producers grow chilies, with year round planting and

harvesting (Mustafa et al., 2006). For small farmers, chili crops provide a steady cash flow since they can be harvested weekly or fortnightly over a month or more.

On average, the production of chilies in Indonesia increased by about 7% between 2005 and 2009. Chili production increased from about 1 million tonnes in 2005 to over 1.3 million in 2009 (Indonesian Statistics Agency, 2010). Similarly, the area cultivated by chilies rose from 187 thousand ha to 467 thousand ha in the same period. Java and Sumatra are the major producing areas in Indonesia, accounting for 80% in 2005 and 85% in 2009. There are two main forms of chilies grown by Indonesian farmers: large chili and small chili. Large chilies contributed to around 60% of chili production from 2005 to 2009.

The expansion of chilies areas potentially generates employment opportunities in rural areas. The cultivation of chili is labor-intensive since it requires greater labor than rice. It is estimated that chili cultivation needs around 2.6 times more labor days than rice (Mustafa et al., 2006). Higher labor is required, particularly during planting and harvesting periods.

Only a small amount of chilies, particularly fresh chilies, in Indonesia are traded on international markets. The volume of exported fresh chilies slightly increased from 894 tonnes and (US$ 990 thousand) in 2005 to 1.2 million tonnes (US$ 1.96 million) in 2008 (FAO, 2011). In the same period, the volume and value of imported fresh chilies rose from 291 tonnes (US$ 221 thousand) to 501 tonnes (US$ 474 thousand) in 2008. As a result, the trade balance (exports minus imports) of fresh chilies remained in surplus. However, in the same period, Indonesia had a trade deficit for dried chilies. Dried chilies are demanded as intermediate products by the food processing industry to produce sauce and paste. The volume and value of exported dried chilies reduced by 636 tonnes in 2005 to 557 tonnes in 2008. However, the value of exported dried chilies

slightly increased from US$ 773 million to US$ 971 million in 2008 (FAO, 2011). The volume and value of imported dried chilies increased significantly from 6.6 thousand tonnes (US$ 3.5 million) in 2005 to 15 thousand tonnes (US$ 12 million) in 2008. The balance of trade both on fresh and dried chilies indicates that there is an opportunity to increase value-adding of chilies in Indonesia by processing fresh chilies to dried chilies.

The domestic market is the primary market for fresh chilies. Currently, traditional channels account for an estimated 95% of chili markets, while the share of supermarkets and industrial food processors is around 5% (White et al., 2007). However, the rapid growth of modern markets has created a new market opportunity for chili farmers.

The traditional channel includes traders, collectors and other buyers who purchase chilies directly from farmers, selling to wholesale markets where chilies are sorted by size, variety and color (Mustafa et al., 2006; White et al., 2007). In the vast majority of these traditional channels, no specific farm-gate standards are imposed. Farmers can decide when to plant, which varieties to plant, and how much to plant. Traders usually provide credit support for small farmers to grow chilies and farmers in turn sell their products to traders. Traders also have important role in providing market information for small farmers (Mustafa et al., 2006). Apart from traders, chili farmers obtain market information from other farmers and farmer associations.

Small chili farmers in Indonesia participate in supermarket channels via supermarket agents and specialized wholesalers (White et al., 2007). The transaction costs associated with organizing exchanges with thousands of small farmers create opportunities for specialized wholesalers to act as intermediaries. "Saung Nirwan" and "Bimandiri" are examples of specialized wholesalers in West Java (Chowdhury et al., 2005; Natawidjaja et al., 2007). The specialized wholesalers organize teams of traders

who are the 'knowledge' link to small farmers, providing information about preferred varieties, sizes, color, quality and timing. Specialized wholesalers and their traders act as quasi extension agents, assisting growers with access to certified seeds, credit and new management practices. For example, in West Java Province, Carrefour (one of the largest supermarket chains operating in Indonesia) contracts with Bimandiri, a specialized wholesaler. Bimandiri organizes local traders and links to farmer groups providing access to hundreds of small chili farmers. The specialized wholesalers take on the responsibility to manage the farmers via their traders with all the necessary product-specific guidelines, including color, variety and length. Price agreements between producers selling to the modern channels are commonly made and are generally set fortnightly.

The chili price in the traditional channel is determined by daily fluctuations in supply and demand at the major wholesale markets. Supermarkets set chili price fortnightly using the price in these markets as the baseline. Since there is a big price fluctuation in the chili supply chain, farmers and buyers are faced with price risk. White et al. (2007) find that farmers are limited in their commitments to grow chilies, after they have experienced low prices. When prices increase, many buyers from outside farmers' villages visit farmers and offer higher prices to buy their chilies. Farmers are aware that prices must be higher when some traders visit them. In such situation side-selling might occur. This presents problems in farmer-trader relationships since lack of commitment from the sellers increases the transaction cost for buyers in the form of interrupted supplies.

Previous studies examining various market issues in the Indonesia chili sector have identified other problems faced by chili farmers in terms of marketing. First, farmers often complain about traders' exploitation in the form of low weighting, lower

price and little premium for quality (Mustafa et al., 2006). However, in many cases farmers can do nothing to overcome these issues since they have a weak bargaining position during the transactions with their traders (White et al., 2007). Second, compared to supermarket channels, the marketing channels of chilies in traditional market channels involve many middlemen (Chowdhury et al., 2005). As a result, farmers selling chilies to traditional markets receive lower marketing margins than those selling to supermarket channels (28% compared to 37%) (White et al., 2007). Meeting private standards (color, size standards, variety and supply consistency) imposed by supermarkets is another challenge for chili farmers since most of them are small-scale farmers with limited access to capital (Chowdhury et al., 2005).

Although the studies as outlined above provide important information about marketing situations of chilies in Indonesia, there is a lack of studies which specifically address the Indonesian chili industry and focus on the implications of agri-food market transformation for chili farmers. For example, Mustafa et al. (2006) examine chili supply chains in Indonesia, but they pay less attention to the important role of supermarket buyers in the chains. Chowdhury et al. (2005) and White et al. (2007) incorporate the supermarket suppliers in the analysis, but their analyses are mostly descriptive. Additionally, they have also analyzed the impact of supermarket participation on chili farmers' income by comparing the margins between farmers selling to traditional markets and farmers selling to supermarket channels. However, as outlined previously, this method has been criticized by Rao and Qaim (2011) since it excludes factors such as land size, irrigated land, education, and distance to main roads that may influence farmers' margins.

None of these studies examine the factors influencing chili farmers in marketing decisions in the era of supermarkets. For example, supermarket participation and other

possible factors that might affect chili farmers' income have not been previously explored. Therefore, a study that aims to understand challenges, opportunities and market relationships in the supermarket era is important, as it can provide insights on how to assist chili farmers to adapt to changing agri-food markets as well as improve their livelihoods.

3. Methodology

3.1 Introduction

Chapter 2 reviews and discusses the emerging food policy agenda in the era of supermarkets and empirical studies on issues affecting farmers' participation in modern retail channels. Much of the literature currently divides marketing channels into traditional and supermarket (or modern) channels. This thesis focuses on the constraints faced by small farmers when participating in supermarket channels, the impacts of participation on their household income, and the changes in market relationships between farmers and traders that are occurring (i.e., the contractual arrangements and the relationship quality). Similarities and differences between farmers in supermarket and traditional channels are also examined. To address the research objectives, this study analyzes data obtained from farmers selling to supermarket channels as well as those selling to traditional channels. The data is from a household survey of 602 chili producers in West Java province, Indonesia and is made up of two samples: farmers selling via supermarket channels and via traditional markets.

This chapter begins with a description of the questionnaire development used for the survey followed by a discussion of the methods used to select the respondent households, data entry and data cleaning, and data analysis.

3.2 Questionnaire development

A structured questionnaire was developed in order to obtain appropriate information that can be utilized to achieve the research objectives: determinants of supermarket participation and market relationships between chili farmers and their buyers in the supermarket era. The information includes variables influencing supermarket participation and household income. The appropriate variables related to

contractual arrangements and relationship quality between farmers and buyers, and the variables with respect to buyer attributes should be also incorporated in the questionnaire. The questionnaire development consisted of three steps: building a draft of the questionnaire, pre-testing of the questionnaire and refining the questionnaire. The draft of the questionnaire was developed by the study team based on information from scoping studies of the chili industry in Indonesia and a review of the literature of farmers' participation in modern retails markets (e.g., Hernández et al., 2007; Miyata et al., 2009; Neven et al., 2009; Rao and Qaim, 2011; Schipmann and Qaim, 2010), the farmers involvement in the contractual relationships (e.g., Bijman, 2008; Guo et al., 2007; Henson et al., 2005; Minot, 2007; Schipmann and Qaim, 2011; Simmons et al., 2005), and buyer-seller relationships (e.g., Batt, 2003; Fischer and Reynolds, 2010; Giha and Leat, 2010; Gyau and Spiller, 2007; Gyau et al., 2011; Gracia et al., 2010). The study team was comprised of the author and researchers from the University of Adelaide, International Food Policy Research Institute (IFPRI) and Indonesian Centre for Agriculture Socio-Economic and Policy Studies (ICASEPS).

A series of scoping studies were conducted by the study team in several chili production areas in Indonesia. One scoping study was conducted in May-June 2009 to obtain information about chili production and the current chili market situations in the key chili production zones in Indonesia. The team interviewed farmers, traders, and retailers in Bandung and Garut (highland chili-growing districts) and Brebes (a lowland chili district). The results from the first scoping study suggested that the share of chilies sold to modern markets was still quite small. Supermarkets were particularly quality sensitive compared to food processor. The quality requirements of supermarkets are commonly met by sorting conducted at the trader level rather than by imposing new quality controls at the farm level.

Another scoping study was conducted from July to September 2009 in Ciamis District, West Java Province. The results suggested that Ciamis is a major emerging zone for producers supplying the modern sector. In this district, farmers participate in the supermarkets through farmers groups or traders. An interview with a head of a farmer group in Ciamis showed that farmers in his group supply chilies consistently, though the share is small compared to traditional market sales, to one supermarket wholesaler in Bandung, Bimandiri. It is the head of group, on behalf of the group members, that signs a formal contract with Bimandiri. Another interview with a trader selling chilies to another supermarket wholesaler in Bandung, Swa Mitra Tani, indicates that there is no written agreement between the trader and the wholesaler or between the trader and farmers. Similar to the results to the first scoping study, the quality differentiations are mainly conducted by traders or at the level of farmer groups.

The third scoping study was carried out from 18 to 24 January 2010 in Bandung and the three districts of chili productions in West Java (Ciamis, Tasikmalaya and Garut). The team conducted interviews with chili producers, traders, wholesalers, specialized wholesalers, and extension office staff. The results provided the basis for the first draft of the questionnaire for the survey of chili farmers and information for the sample selection.

After the first draft of questionnaire was prepared, the pre-testing and refining of the questionnaire were conducted simultaneously. The questionnaire was pre-tested three times. The aim of the pre-testing activities was to ascertain whether the questionnaire was relevant and easily understood by chili farmers with respect to question wording, to assess whether all categories and items in the questionnaire are reliable, and to obtain feedback from respondents. The first and the second tests were conducted in Garut and Bogor districts by the study team. Successive revisions included

adapting new information related to chili production and marketing, the specific wording of questions and the length and order of the questions. Twelve experienced enumerators were recruited and trained in a five day session during March 3-7, 2010 which focused on understanding the refined questionnaires. In order to make sure that all enumerators had the same perceptions regarding the questions in the questionnaire, the third one test was conducted by the enumerators in Cianjur, West Java Province. The final questionnaire was utilized in the chili farmer survey which was conducted from 23 March to 23 April 2010. Interviews with chili farmers were conducted by the trained enumerators in the farmers' homes or in their fields.

The final questionnaire includes the following sections: household characteristics, housing and assets, agricultural land, chili production, input use and information sources, chili marketing, changes in chili production and marketing, relationship with chili buyers, perception of the quality of relationship with chili buyers, perceptions of modern channel, experience with modern channel, cash income activities, shopping habits, food consumption and desired attributes of buyer (Appendix 1 and 2)[1]. The purposes of each section used in this study are explained below.

The **household characteristic section** sought to provide basic information on each member: age, sex, education level, marital status, literacy level and the main activities. The members of households include head of household and spouse, their children, and other people who live in the households. To be a member, a person must live in the household for at least 6 months of the year or for most of the time.

The objective of the **housing and asset section** is to obtain general information on housing characteristics and ownership of assets. Household assets include current

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[1] This study uses the questions in all the sections except for the shopping habits and food consumption sections which are used by another PhD candidate.

and lagged assets. Current assets refer to assets owned by households when the interview was conducted. Lagged assets refer to assets owned by household five years ago.

The purpose of the **agricultural land section** is to collect information on the characteristics of the farm land used by or owned by the household in the period of survey. This information includes land size, type of land, and land tenure arrangements. The questions in this section are organized by plot.

The **chili production section** sought to gather information about chili production by members of the household, whether or not they own the land over the last year of survey. This section is organized by season and by plot. The seasons are classified into three. The first dry season of 2009 covers planting time of chilies about in April. The second dry season of 2009 covers planting time about July. The third season is for the rainy season cover planting time about September 2008 or September 2009. Normally, the third part will be for the current 2009 rainy season, but it can be used for the previous 2008 rainy season if the harvest from the current rainy season has not yet begun.

The **section of input use and information** covers the information regarding cost of production, sources of information about chili production method, prices and current market situation, and use of written records. The information on the cost of production refers to the largest chili plot in the most recent season for which the harvest has been completed.

The purpose of **chili marketing section** is to collect information on chili sales, post-harvest activities, and market access. In this section, the information on the sales of chilies is based on the largest plot in the most recent season for which the harvest is complete. Post harvest activities refer to grading and sorting chilies for sale. Market

access refers to the questions of the distance from the house to different types of roads and markets.

The purpose of the **section of change in chili production and marketing** is to examine changes in chili production and marketing over the five years prior to the survey. The information on investment activities for chili production in the five years is also collected.

The purpose of **section of relationship with chili buyers** is to obtain information about the numbers of traders to whom farmers deal and sell with. This section also covers the information on types of contractual arrangements and aspects/details in their contracts.

The s**ection of perception of the quality of relationship** with chili buyers sought to evaluate the nature of the long-term relationship between chili farmers and their main buyers. A main buyer refers to a buyer whose a farmer sells the largest proportion of chili quantities.

The goal of the **section of perceptions on modern channel** is to provide information about the advantages of selling in supermarket channels from the perspective of chili farmers. This section also sought the perception of chili farmers about factors that can prevent them from participating in the supermarket channel and information on what kind of government policies can improve supermarket participation.

The **section of experience with modern channel** covers the information regarding experience of chili farmers with modern channel. The problems farmers' experience when selling to chili to modern channels and the types of assistance provided by supermarket buyers are also sought.

The goal of the **section of cash income activities** is to obtain an estimate of net cash income from different economic activities and information on changes in income sources over time. The activities cover farms and non farms.

The objective of the **section of desired attributes of buyer** is to collect information on important buyer attributes when chili farmers choose preferred buyers. The 11 cards were presented to respondents. Each card contains five buyer attributes and respondents were asked to choose both the best (most preferred) and worst (least referable) options in each card.

3.3 Selection of the samples

This study examines smallholder participation in supermarket channel and focuses on the constraints faced by smallholders, income effects of the participation and market relationships with their buyers. To explore these research focuses, this study needs the samples of farmers that sell into supermarket channels and those selling into traditional channels as a comparison group.

Secondary data and key informant interviews during scoping studies (wholesalers, traders, and extension office) revealed that West Java Province is a major chili production area in Indonesia with numerous supermarkets actively buying and marketing chilies. Table 3.1 presents the chili production in the major chili production areas in Indonesia. From 2005 to 2009 West Java contributed to around 20% of the Indonesian chili production putting it as the main largest chili area in Indonesia followed by East Java and Central Java provinces. In 2008 there were 1,300 small convenience stores, 194 supermarkets and 29 hypermarkets located in West Java (Pandin, 2009). Thus West Java is the most appropriate location for this study.

The supermarket channel sample came from a list of 96 names of chili farmers whose chilies were sold to supermarkets. Key informant interviews in Bandung (supermarket buyers, specialized suppliers and dedicated wholesalers) revealed that chilies sold in supermarkets in Bandung are mainly produced in Ciamis district. The study team visited Ciamis to interview key informant in this district (farmer groups, traders and extension office). There was one farmer group in Ciamis that consistently supplied chilies to a specialized wholesaler in Bandung, Bimandiri. One trader was also found to supply chilies to another specialized in Bandung, Swa Mitra Tani. The head of the farmer group and the trader were asked to provide the names of their chili farmers. The head of farmer group provided 36 names of chili farmers, while the trader provided 60 names. All of the farmers were interviewed during the survey.

Table 3.1 The main chili production areas in Indonesia (ton)

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held by the University of Adelaide Library.

Source: Statistic Agency (2010)
Note: The values in the brackets refer to the share of chili production in each province on national level

Since there were no lists or censuses of farmers producing chili in Indonesia, several stages were conducted to select a random sample of chili farmers to be as representative as possible of the traditional channel. First, three districts in West Java were purposively selected: Garut, a major production zone; and Ciamis and Tasikmalaya representing production zones with substantial numbers of farmers selling into the modern retail sector. Next, sub-districts were selected by applying systemic random sampling based on average chili production data from 2004 to 2008. This method allows the study team to select every k^{th} element after a random start (Churchill and Iacobucci, 2005, p.439). The steps in the systematic random sampling method in selecting sub-districts in each district are described below.

1. The average production of chili from 2004 to 2008 in each sub-district was calculated and then sorted from the highest to the lowest. Then the cumulative average production was calculated on a sub-district selection basis.

2. The interval of the average production was determined by dividing the total average production and the number of sub-districts selected in the district.

3. The "random starting point" was generated to determine the initial production level of the first sub-district that was selected. The second sub-district was selected by adding the starting point plus one interval and the third selected sub-district was the starting point plus two intervals and so on.

Appendix 3, 4 and 5 provide the summary of sub-districts selection in each sub-district. Prior to the survey being conducted, one sub-district in Garut, Talegong, was hit by a land slide caused by a major earthquake. Hence, the sub-district was substituted with another sub-district, i.e., Leles. The procedure to choose this sub-district similar to the procedure in the sub-district selections as explained above. The procedure was conducted after excluding the seven sub-districts that had been chosen in Garut.

After all 14 sub-districts were selected; a list of all the chili producing villages in each sub-district was compiled. Next, a random selection of three villages from each sub-district was carried out and 42 villages were selected for study (Appendix 6). In the final step, the team members visited the land tax office and the extension office of each of these 42 villages to compile a list of chili producing households. The 12 households from each village were drawn randomly (plus an additional eight for backup from each village). The 506 chili farmers were selected from this process.

3.4 Data entry and cleaning

The survey data was entered in the Stata software by the staff from ICASEPS in Bogor. The Statistical Package for Social Sciences (SPSS) 18.0 and Stata 10 for windows were used to produce the statistical analysis.

Prior to the data analysis, it is important to verify whether the data file contains incomplete or inconsistent data. In order to avoid these problems, the values of mean and standard deviations for variables included in the analysis were produced. Based on these values, some missing and inconsistent data were identified. These problems were resolved by confirming the data with the enumerators.

After a cleaning process, seventeen households from the random sample who sold to supermarkets (about 3% of the total random sample) were included in the supermarket channel group. Four households from the random sample and one household from the supermarket sample were eliminated due to data quality issues. The final data set includes 485 traditional channel farmers and 112 supermarket farmers.

3.5 Methods in data analysis

Several statistical methods are performed in this study. These methods include: t-test, chi-square-test, Tukey test, factor analysis, probit and OLS regressions, treatment effect model, discriminant analysis, BW analysis, and LC cluster model. Details of each method are described below.

3.5.1 The t-test analysis

This study uses t-test to determine whether there is a difference between sample means of farmers in the traditional and supermarket channels with respect to the selected variables such as demographics, farm, and income characteristics (Chapter 4, 5, and 7).

The hypotheses for the t-test are set as follows (Black, 2010).

$$H_0 : \mu_1 - \mu_2 = 0$$
(3.1)

$$H_1 : \mu_1 - \mu_2 \neq 0$$
(3.2)

where H_0 is the null hypothesis and H_1 is the alternative hypothesis. μ_1 is the sample mean of group 1 and μ_2 is a sample mean of group 2. The null hypothesis is rejected if the probability p value is equal to or less than a critical value set by the researcher (e.g., $\alpha = 0.05$).

3.5.2 Chi-square test

The t-test cannot be used if a variable contains more than two categories. For example, payment methods received by supermarket and traditional channel farmers from their buyers might vary from one week, more than one week and cash payments at delivery. One method that can be used to test differences between two sample groups

with respect to variables containing more than two categories is the chi-square test. In this study, chi-square test is used in Chapter 7 to determine whether the number of respondents that fall in each category (supermarket channel or traditional channel) with respect to the contractual arrangement variables differ significantly from the number that would be expected. The chi-square test is calculated based on the observed and expected sample distribution (Williams and Monge, 2001). Similar to the t-test, the null hypothesis is rejected if the probability p value is equal to or less than a critical value set by the researcher. In this case, the null hypothesis is that there is no significant difference between the expected and observed frequencies.

3.5.3 Factor analysis

In this study, factor analysis is utilized with regards to questions examining the level of relationship quality between farmers and buyers: trust, satisfaction and commitment (Chapter 6 and 7). These variables cannot be measured directly since they are included as latent variables. Hence, they are conceptualized through several manifest variables. A manifest variable is a variable that can be directly measured or observed, while a latent variable is a variable that cannot be measured or observed directly. A latent variable is formed from several manifest variables. Factor analysis is used to describe the variability among manifest variables in terms of a few unobserved variables or latent variables called factors (Johnson and Wichern, 2007). With regards to this study, factor analysis is utilized to examine whether a number of manifest variables of the relationship quality can be used to form latent variables of interest (trust, commitment and satisfaction).

The principal component method is used to produce factor loadings. Loadings indicate the degree of correspondence between the manifest variables and the factor

(latent variable), with higher loading making the variable representative of the factor (Hair et al., 1995). All manifest variables on the respective factor should be equal to or greater than 0.5 (Nunnaly, 1978). The appropriateness of the factor analysis for the scale are tested using the Kaiser-Meyer-Olkin Measure of Sampling Adequaly (KMO-MSA) and Bartlett's test of Sphericity (Hair et al., 1995). The KMO-MSA index range from 0 to 1, with 0.5 considered suitable for factor analysis. The Bartlett's test of Sphericity should be significant ($p < 0.5$) for the factor analysis to be suitable.

The internal consistency among manifest variables on the respective factor is evaluated through examining the values of Cronbach's alpha. The value of Cronbach's alpha should be equal to or greater than 0.7 (Nunnaly, 1978). However, several studies (e.g., Batt, 2003; Garbarino and Johnson, 1999) permit a latent variable with a Cronbach's alpha above 0.6 as acceptable and sufficient for further analysis.

3.5.4 Probit regression

Supermarket participation can be viewed as a binary choice problem of selling to supermarkets or staying in traditional markets. In this study, the probit model is utilized to examine factors influencing decisions of farmers to participate in the supermarket channel (Chapter 5). A probit regression is a type of regression model in which the dependent variable, z, takes on only two values: zero and one (Wooldridge, 2009). Hence, dependent variable $z = 1$ for farmers selling to supermarket channel and $z = 0$ for farmers selling to traditional channel can be expressed as follows.

$$P(z = 1 | x) = \beta_0 + \beta_1 w_1 + ... + \beta_k w_k \qquad (3.3)$$

where w indicates a set of explanatory variables (independent variables), k is the number of dependent variables, β is beta coefficient and P represents the probability that a particular market channel will be chosen by a farmer. In this study, the

explanatory variables can be divided into those representing incentives and capacities of farmers and their demographic characteristics (Reardon et al., 2009; Schipmann and Qaim, 2010). Details of the explanatory variables used in this study are further explained in Chapter 5.

3.5.5 OLS regression

The OLS regression is used to analyze the relationship between a single dependent variable and one/several explanatory variable/s. In this study, the OLS regression is performed to ascertain the impact of farmers' participation to supermarket channel on their income (Chapter 5). Household income is set as a dependent variable (y), while farmers' participation in the supermarket channel together with incentives and capacities variables and demographic variables are set as explanatory variables.

The OLS regression is also used in examining variables that influence farmers' commitment in the contractual relationships with their buyers in the supermarket and traditional channels (Chapter 7). In this case, the level of farmers' commitment is estimated separately for each of the two channels. In each of these channels, the level of farmers' commitment set as dependent variable (y) influenced by demographic and farm characteristics of respondents

The regression analysis with a dependent variable y and k independent variables is expressed as (Koutsoyiannis, 1977):

$$y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + ... + \beta_k x_k + u \qquad (3.4)$$

where x is a set of explanatory variable, β is beta coefficient and u is random factor or error term. The equation is estimated by using OLS. This method minimizes the square of deviation of the predicted value to the actual value.

3.5.6 Treatment effect model

As outlined in Chapter 2, the decision of farmers to participate in supermarket channel is not only influence by observable variables, such as age, land size, but also due to unobservable variables, such as entrepreneurial skills of farmers, and their network relationships. Farmers who participate in supermarket channels may have more individual abilities than farmers in traditional channels which results in higher incomes whether or not they participate in supermarket channels. OLS regression can control for the effect of observable variables, but cannot eliminate the bias associated unobservable variables (Greene, 2008). To eliminate bias associated unobservable variable in modeling income effect of supermarket participation, this study utilizes one type of the Heckman selection procedures: the treatment effect model (also called the Heckman selection-correction model) in Chapter 5.

The treatment effect model uses supermarket participation regression (probit regression) to calculate the Inverse Mills Ratio (IMR) and includes this ratio as an explanatory variable in the income regression. This model is analyzed by using a maximum likelihood estimation, in which all parameter in both regressions are estimated simultaneously.

3.5.7 Discriminant analysis

Discriminant analysis is used to examine whether there is a significant difference of the level of relationship quality variables between supermarket farmers and traditional channel farmers (Chapter 6 and 7). Compared to the t-test, discriminant analysis allows comparing the two channels by taking into account the interactions between the individual relationship variables (Ndubisi and Wah, 2005).

Discriminant analysis involves deriving a variate, the linear combination of two (or more) explanatory variables that will discriminate best between a priori defined groups (Hair et al., 1995). A discriminant function is usually in the form:

$$d = \beta_1 Z_1 + \beta_2 Z_2 + \ldots + \beta_k Z_k \tag{3.5}$$

where d is a discriminant score, β is a weighting coefficients, and Z is discriminating variable in standardized form. The standardized β values indicate the relative contribution of each discriminating to the discriminating function. These values are analogous to beta coefficients in the regression analysis. In this study, the three relationship quality variables (trust, satisfaction and commitment) are employed as the discriminating variables.

3.5.8 Best-Worst (BW) analysis

In this study, the BW analysis is utilized to identify the relative importance of the 11 buyer attributes perceived by chili farmers (Chapter 8). The BW analysis adapted the procedures outlined in Cohen (2009) and Umberger et al. (2010). In this method, a Standardized Interval Scale (SIS) is calculated by examining all respondents' answers to the BW tasks and summing the respondents' choices for most and least important attributes to create two aggregate frequency values for each attribute: 'most' and 'least'. The aggregate frequency values are the number of times each attribute is chosen as most important and the least important. The square root of the 'most' frequency value divided by the 'worst' frequency is calculated (SQRT/(B/W)) for each attribute. A scale is created with the attribute with the highest SQRT(B/W) becoming 100 (most important) and all other buyer attributes are scaled relative to this attribute.

3.5.9 Latent Class (LC) cluster model

The LC cluster model is undertaken to examine whether chili farmers in each group (traditional and supermarket channels) can be segmented into several groups or clusters based on their perception on the preferred buyer attributes (Chapter 8). The LC cluster model seeks to classify similar objects into groups where the number of groups and their sizes not known a priori (Vermunt and Magidson, 2002).

The LC cluster model is preferred to standard cluster analysis since it allows the use of independent variables (covariates) that can be useful to predict the characteristics of class membership and the possibility to deal with different scale types of variables (e.g., continuous, categorical, counts) (Magidson and Vermunt 2002).

The general specification of the LC cluster model with the inclusion of covariates can be represented as follows (Vermunt and Magidson 2002):

$$f(\mathbf{y}_i | \mathbf{z}_i, \theta) = \sum_{k=1}^{K} \pi_{k|\mathbf{z}_i} \prod_{j=1}^{J} f_k(y_{ij} | \mathbf{z}_i, \theta_{jk}) \tag{1}$$

where i refers to an individual respondent; $\mathbf{y}$ denotes the vector of indicator variables; $\mathbf{z}$ is the covariate vector; θ is the parameter vector; K is the total number of clusters and k a particular indicator; $\pi_{k|\mathbf{z}_i}$ is a probability of belonging to cluster k given covariate values z_i; J is the total number of indicator variables and j a particular indicator; and y is the value of an indicator variable.

In this study, there are 11 buyers attributes performed as indicator variables. The covariates include variables of capacity, incentive and demographic variables that might influence the probability of respondents when choose preferred buyers/marketing channels.

3.5.10 Tukey test

Tukey test, often called Tukey's honesty significant difference (HSD) method, is used in Chapter 5 and 8 in order to identify whether there is a significant difference of means among groups or clusters in the analysis. The Tukey test is a common post hoc test that is used by researchers to conduct multiple comparisons of mean values from all possible combinations as well as examine where the significant difference lie (e.g., cluster 1 versus 2 and 3). The univariate test of variance (ANOVA) and multivariate analysis of variance (MANOVA) allow researchers to test differences of multiple group means, but they do not show where the means differ (Hair et al., 1995).

3.6 Summary and Conclusions

As outlined in Chapter 1, this thesis aims to analyze the opportunities and challenges faced by small farmers during the rapid grow of supermarkets. The nature of market relationships between farmers and buyers in the era of supermarkets and the type of farmers selling to supermarkets are also parallel focuses of this thesis. Current literature in the modern market areas (Chapter 2) points out that in order to achieve the research focuses, the study needs survey data from the two groups of farmers. The first group is farmers selling to supermarkets and the second group is farmers selling to traditional channels as a comparison group. A household survey of 602 chili producers provides the data for this study covering two samples: farmers selling via supermarket channels and via traditional markets. This chapter presents and discusses the activities performed as part of the fieldwork including a description of questionnaire development and sample selection. The process of data entry and data cleaning, and specific statistical tools utilized in data analysis for answering each research are also presented and discussed.

The questionnaire was developed by the study team based on the information from scoping studies and a review of the literature of farmer' participation in modern retail markets, the contractual relationships, and buyer-seller relationships. Three scoping studies were conducted. During the scoping studies, the study team interviewed key informants, including producers, traders, supermarket buyers, specialized wholesalers, food processors, and extension agents in order to collect information about production and the current market situation of chilies in Indonesia.

The questionnaire was tested and revised several times. The pre-test was done three times. The first and the second pre-tests were conducted by the study team, while the third pre-test was conducted by the study team and the enumerators. The revisions were made immediately after the pre-tests. The questionnaire gathered information on household characteristics, housing and assets, agricultural land, chili production, input use and information sources, chili marketing, changes in chili production and marketing, relationship with chili buyers, perception of the quality of relationship with chili buyers, perceptions of modern channel, experience with modern channel, cash income activities, shopping habits, food consumption and desired attributes of buyer

As explained previously, to achieve the research focuses this study needs survey data of farmers from supermarket channels and traditional channels to be compared. Based on the secondary data and key interviews during the scoping studies, the survey was conducted in West Java Province. The supermarket farmer samples were obtained from a list of 96 names of chili farmers whose chilies ended up in supermarkets. The list was provided by supermarket suppliers and traders.

The traditional farmer respondents were selected through the following several steps. Initially, three districts in West Java were selected: Garut represents the main production zone in West Java, Ciamis and Tasikmalaya districts represent new

emerging areas with substantial modern sector activities. By applying a systematic random sampling procedure to the data of average chili production in 2004-2008 in the three districts, the 14 sub-districts were selected: eight sub-districts from Garut and three sub-districts from each new emerging area. Three villages were selected randomly from each sub-district. Finally, in each of these villages 12 chili farmers were selected from a list provided by the Extension office and the Land Tax Office. The 506 respondents identified as a representative sample of chili farmers were interviewed during the survey. After a cleaning process this study utilizes 485 farmers who sell to traditional channels and 112 who sell to supermarkets for further analysis.

The survey data was tabulated in a Stata 10 spreadsheet which is also compatible with SPSS 18.0. The core analyses include the t-test which is used to identify potential differences between participant and non-participant farmers in the supermarket channel with respect to specific socioeconomic information as well as farm characteristics (Chapter 4, 5 and 7). The chi-square test is utilized to test differences between the two samples with respect to specific variables containing more than two categories (Chapter 7). Factor analysis is useful to analyze the questions related to latent concepts: trust, satisfaction and commitment (Chapter 6 and 7). Probit and OLS regressions can assess the factors that determine farmer participation in the supermarket channel and the impact of the participation on income, respectively (Chapter 5). The treatment effect model is useful to eliminate bias associated unobservable variables when analysing factors influencing supermarket participation and its impact on household income (Chapter 5). Discriminant analysis is utilized to compare the levels of relationship quality between farmers and buyers in the supermarket and traditional channels (Chapter 6). The BW analysis is utilized to identify the relative importance of the 11 buyer attributes when farmers in supermarket and traditional channels choose preferred buyers (Chapter 8). The heterogeneity issues of respondents in each channel with respect to the 11 buyer attributes were examined by

applying the LC cluster model. Finally, the Tukey test is used in order to identify whether there are significant differences of means among clusters or groups in the analysis.

The aim of this chapter is to provide overall activities of the fieldwork for this study starting from questionnaire development, sample selection, and data cleaning and entry. Several statistical methods have also been performed that are useful to analyze the survey data as well as to develop empirical models in the next chapters.

4. Characteristics of respondents in the traditional and supermarket channels

4.1 Introduction

This chapter provides an overview highlighting the differences and similarities between farmers in the traditional and the supermarket channels in terms of household, farm and marketing characteristics. It begins with household characteristics followed by household and farm assets, production characteristics, income activities, sources of information, and marketing characteristics. The reason for this is that previous studies demonstrate no clear conclusions about similarities and differences between the two groups of farmers with respect to household, farm and marketing characteristics. Addressing differences and similarities help to identify the types of farmers selling to traditional and supermarket channels.

4.2 Household characteristics

Previous studies show ambiguity in household characteristics between farmers supplying to traditional modern market channels and traditional channels. Some studies find significant differences between the two groups in terms of education level (Neven et al., 2009; Rao and Qaim, 2011; Schipmann and Qaim, 2010) and age (Blandon et al., 2010; Schipmann and Qaim, 2010). In these studies, supermarket farmers have better education level and are younger. However, other studies find that education (Blandon et al., 2010; Hernández et al., 2007; Miyata et al., 2009; Natawidjaja et al., 2007) and age (Hernández et al., 2007; Miyata et al., 2009; Rao and Qaim, 2011) do not vary significantly between traditional and supermarket channels. Other variables of household characteristics tend to be similar between farmers selling to modern and traditional channels. These variables include household size (Blandon et al., 2010;

Hernández et al., 2007; Miyata et al., 2009; Natawidjaja et al., 2007; Rao and Qaim, 2011), proportion of household members between 15 and 65 years, proportion of household members over 65 years (Miyata et al., 2009), farming time (Natawidjaja et al., 2007), education of spouse (Miyata et al., 2009), distance to main roads (Hernández et al., 2007; Rao and Qaim, 2011), and house area (Miyata et al., 2009).

In this study, the means and standard deviations of several household characteristics of chili farmers participating in the traditional and supermarket channels are presented in Table 4.1. Household characteristics that are significant (at the $\alpha = 0.05$ level) between the two groups are age, education of the head of household, the household's number of years of growing chilies, the education of the spouse, the literacy levels of the household head, and the distance from house to an asphalt road. On average, supermarket channel farmers are younger, but have more formal education. All respondents in the supermarket channel are literate. The education levels of spouses for the supermarket farmers are higher than those in the traditional channel. The result that supermarket farmers have higher education levels is similar to Neven et al. (2009), Rao and Qaim, (2011), Schipmann and Qaim (2010). The fact that supermarket farmers are younger is similar to previous studies by Blandon et al. (2010) and Schipmann and Qaim (2010).

In contrast to Natawidjaja et al. (2007) who find no significance difference in years of doing farming between farmers in the traditional and supermarket channels, in this chapter a significant difference with respect to this variable is shown. In this case, the traditional market farmers have more numbers of years of growing chilies, perhaps because they tend to be older. Chili farmers supplying to supermarket farmers live relatively close to an asphalt road. This supports the results of Hernández et al. (2007)

who find supermarket farmers live closer to paved highways compared to farmers participating only in the traditional channels.

Similar to previous studies, there are not significant differences in the case of household members, the proportion of household members between 15 and 65 years, the proportion of household members over 65 years and house area.

Table 4.1. Household characteristics of respondents in the traditional and supermarket channels

Variable	Traditional channel (n=485)		Supermarket channel (n=112)		Signifi-cance[1]
	Mean	Std. Dev.	Mean	Std. Dev.	
Household member (person/s)	4.55	1.59	4.34	1.44	1.26
Age of household head (years)	46.26	11.21	43.86	10.16	2.08**
Education of household head (years)	6.46	2.91	7.96	3.21	-4.85***
Farming time (years)	9.42	6.97	6.74	5.16	3.83***
Marital status of household head (1 = married, 0 = no)	0.97	0.16	0.98	0.13	-0.54
Age of spouse (years)	39.98	10.57	38.02	10.77	1.74
Education of spouse (years)	6.60	2.61	7.81	2.83	-4.26***
Household head can read (1= yes, 0 = no)	0.95	0.21	1.00	0.00	-2.36**
Spouse can read (1= yes, 0 = no)	0.96	0.20	0.99	0.10	-1.61
Proportion of household members between 15 and 65 years (%)	69.10	19.76	66.56	18.71	1.24
Proportion of household members over 65 years (%)	2.40	9.57	3.92	10.91	-1.48
Area of house, including yard area (m^2)	249.68	322.20	255.37	253.15	-0.17
Distance from house to asphalt road (km)	0.30	0.65	0.11	0.15	2.94***

Note: [1]Based on t-test: *** significant at the 1% level, ** significant at the 5% level, * significant at the 10% level. Std.Dev = standard deviation

4.3 Household and farm assets

To participate in supermarket channels, farmers need to invest in various forms of physical capital such as land, irrigation equipment, farm equipment, and new buildings (e.g., storage space, green house) (Reardon et al., 2005). Previous studies have shown similarities and differences between farmers supplying to modern markets and

those supplying to traditional channels regarding physical capital assets (e.g., Blandon et al., 2010; Hernández et al., 2007; Natawidjaja et al., 2007; Neven et al., 2009; Miyata et al., 2009; Rao and Qaim, 2011; Schipmann and Qaim, 2010).

In this study, the information about current and lagged agricultural assets was collected during the survey. Current assets refer to assets owned by households during the period of survey (in 2010), while lag assets refer to assets owned by households the five years before the survey (2005). In 2010, the traditional channel farm was on average 0.70 ha and the supermarket channel average farm was larger 0.80 ha. Farmers in both channels can be considered small farmers as indicated by the average farm size of less than one ha. The size of land in this study is similar to the average farm size in Indonesia as reported in the agricultural censuses of 2003, the latest agricultural census in Indonesia. According to the census, farms considered small farms are about 0.79 ha (Statistic Agency, 2004). The size of land is not statistically different between farmers in the supermarket and traditional channels. This finding is in contrast to the results from Natawidjaja et al. (2007), Neven et al. (2009), Rao and Qaim (2011), and Schipmann and Qaim (2010). However, the results are similar to Miyata et al. (2009) who find no significant differences between independent farmers and contracted farmers cultivating apples and green onions in China. Although there is not a significant difference in terms of farm size between these two groups, farmers in the supermarket channels have significantly larger areas planted with chilies.

Farmers selling to supermarkets have more non-land assets than those in the traditional channel. In 2005, a significantly higher share of storage houses and motorbike ownership was found between the two groups of farmers. In 2010, a significantly higher share of supermarket farmers owned mobile phones, storage houses and motorbikes. This result is similar to previous studies that find a higher share of

supermarket farmers own vehicles (Hernández et al., 2007; Neven et al., 2009; Rao and

Qaim, 2011; Schipmann and Qaim, 2010), mobile phones and storage facilities (Neven

et al., 2009).

Table 4.2. Current and lag assets of respondents in the traditional and supermarket channels

Variable	Traditional channel (n=485)		Supermarket channel (n=112)		Signifi-cance[1]
	Mean	Std. Dev.	Mean	Std. Dev.	
Current assets (in 2010)					
Land size (ha)	0.70	0.77	0.80	0.93	-1.12
Irrigated land (ha)	0.28	0.42	0.32	0.41	-0.99
Area planted with chili (ha)	0.34	0.44	0.48	0.72	-2.70***
Mobile phone ownership (unit)	1.19	1.10	1.54	1.25	-3.03***
Motor bike ownership (unit)	0.63	0.74	0.72	0.65	-1.19
Water pump ownership (unit)	0.28	0.50	0.31	0.50	-0.61
Mist blower ownership (unit)	1.12	0.83	1.36	0.90	-2.69***
Power tiller ownership (unit)	0.01	0.14	0.03	0.21	-0.88
Storage house ownership (unit)	0.19	0.40	0.40	0.61	-4.44***
Lag assets (in 2005)					
Land size owned (ha)	0.42	0.62	0.41	1.02	0.16
Irrigated land owned (ha)	0.21	0.41	0.17	0.31	1.05
Mobile phone ownership (unit)	0.53	0.90	0.63	0.98	-1.02
Motor bike ownership (unit)	0.42	0.64	0.56	0.70	-2.14**
Water pump ownership (unit)	0.25	0.71	0.28	0.49	-0.39
Mist blower ownership (unit)	0.96	1.00	0.96	0.91	0.05
Power tiller ownership (unit)	0.01	0.12	0.03	0.21	-0.84
Storage house ownership (unit)	0.15	0.36	0.27	0.50	-2.88**

Note: [1]Based on t-test: *** significant at the 1% level, ** significant at the 5% level, * significant at the 10% level. Std.Dev = standard deviation

Table 4.3 shows the landholdings of households in the traditional and

supermarket channels in 2010. In this study, the household landholdings can be

classified into ten categories as follow:

1. Owned and farmed: the household owns the land and grows crops on it.

2. Owned and rent it out: the household owns the land, but they let others farm it in

exchange for a fixed payment each month, season, or year.

3. Owned and pawned: the household owns the land but allows others to farm it in exchange for a loan. When the loan is repaid, the household regains the right to farm it.

4. Owned and sharecropped: defined as the household owns the land, but allows others to farm it in exchange for a percentage of the harvest.

5. Owned and not planted: the household owns the land, but it is fallow.

6. Owned and lent: the household owns the land, but offers it to someone else free of charge.

7. Pawned from owner: the household does not own the land, but is using the land in exchange for offering the owner a loan.

8. Rented from owner: the household does not own the land, but is renting land from the owner, paying by the month, season, or year.

9. Sharecropped from owner: the household does not own the land, but is farming land owned by someone else in exchange for giving them a percentage of the harvest.

10. Borrowed from owner: the household does not own the land, but is farming land owned by someone, but not paying for it. This includes land owned by the local government.

As shown in Table 4.3, this study finds that of the 0.70 ha of respondents' land in the traditional channel, around 0.42 ha (60%) was owned and farmed by the respondents and about 0.12 ha (17%) was obtained from renting. Supermarket farmers are more engaged in the land rental market as indicated by the significantly larger proportion of land rental than respondents in the traditional channel (26% versus 12%). The fact that supermarket farmers rent more land is in line with Hernández et al. (2007) and Natawidjaja et al. (2007).

Table 4.3. Landholdings of respondents in the traditional and supermarket channels in 2010 (ha)

Variable	Traditional channel (n=485)		Supermarket channel (n=112)		Signifi-Cance[1]
	Mean	Std. Dev.	Mean	Std. Dev.	
Owned and farmed	0.42	0.65	0.35	0.49	1.05
Owned and rented	0.01	0.06	0.00	0.00	1.48
Owned and pawned	0.00	0.04	0.00	0.00	1.20
Owned and sharecropped	0.00	0.04	0.01	0.06	-1.08
Owned and not planted	0.01	0.09	0.01	0.07	0.59
Owned and lent out	0.01	0.12	0.01	0.05	0.36
Pawned from owner	0.01	0.06	0.01	0.05	1.07
Rented from owner	0.12	0.26	0.26	0.49	-4.30***
Sharecropped from owner	0.03	0.20	0.03	0.15	0.03
Borrowed from owner	0.08	0.23	0.12	0.59	-1.32

Note: [1]Based on t-test: *** significant at the 1% level, ** significant at the 5% level, * significant at the 10% level. Std.Dev = standard deviation

Table 4.4. Investment in chili production activities as reported by respondents in the traditional and supermarket channels (dummy variable: 1 = yes, 0 = no)

Variable	Traditional channel (n=485)		Supermarket channel (n=112)		Signifi-cance[1]
	Mean	Std. Dev.	Mean	Std. Dev.	
Buy or rent land for chili growing	0.14	0.35	0.15	0.36	-0.37
Storage room or building	0.05	0.23	0.33	0.47	-9.16***
Water pump	0.06	0.23	0.08	0.27	-0.99
Irrigation well	0.05	0.21	0.18	0.38	-5.07***
Other irrigation facilities	0.08	0.27	0.50	0.50	-12.22***
Power tiller or tractor	0.01	0.09	00.0	00.0	0.83
Spraying equipment	0.44	0.50	0.63	0.48	-3.84***
Other farm equipment	0.16	0.37	0.39	0.50	-5.70

Note: [1]Based on t-test: *** significant at the 1% level, ** significant at the 5% level, * significant at the 10% level. Std.Dev = standard deviation

Table 4.4 provides a summary of the key differences in investments made in chili production. It appears that supermarket farmers are more likely to invest in key assets to support their chili production activities. Around 33% of respondents in the supermarket channel own storage rooms versus 5% of traditional channel farmers. About 18% and 50% of supermarket farmers invested in irrigation wells and other irrigation facilities, respectively, whereas only 5% and 8% of traditional farmers have

invested in such assets. More than half of the supermarket respondents own spraying equipment. There are no statistically significant differences in ownership of water pumps, power tillers, tractors, and other farm equipment. Buying or renting land for chili growing is also not statistically significant.

4.4 Production characteristics and changes in chili production activities

Some studies have examined the differences and similarities between farmers selling to modern market channels and those selling to traditional channels in terms of production characteristics (Hernández et al., 2007; Miyata et al., 2009). Again, there is no clear conclusion whether farmers in modern market channel have a higher production level compared to traditional channel farmers.

Table 4.5 shows the differences across the two groups with respect to the production characteristics of chilies. Supermarket farmers have significantly higher levels of chili production compared to farmers in the traditional channel. This supports the results of Hernández et al. (2007) in the case of tomatoes in Guatemala, and Miyata et al., (2009) in the case of apples. No significant difference is found in terms of chili productivity between these two groups.

The first crop of chilies is planted around April (dry season 1). Farmers in these two channels who are less risk averse and want to supply chilies continuously for the whole year plant a second and third crop of chilies in July and September. About 54% of supermarket farmers have multiple production cycles in which they grow chilies more than one season in a year. The fact that a significantly higher share of supermarket farmers has multiple cropping of chilies in a year is similar to the case of tomatoes in Guatemala (Hernández et al., 2007).

A significantly higher share (86%) of farmers in the traditional channel grows only one variety of chilies. Yet, about 67% of supermarket farmers indicate that they plant one variety of chilies. Among the varieties of chilies planted by farmers, hot beauty, hot chili, curly, and tanjung are the most common. The main varieties grown by farmers in the traditional channel are curly, hot chili and tanjung. Supermarket farmers grow mainly hot chili and curly varieties. Based on the scoping study interview, supermarkets sell all varieties, particularly hot chili, curly and small chilies, but not tanjung.

Table 4.5.   Production characteristics of respondents in the traditional and supermarket channels

Variable	Traditional channel (n=485)		Supermarket channel (n=112)		Signifi-cance[1]
	Mean	Std. Dev.	Mean	Std. Dev.	
Production (ton)	2.66	3.97	4.42	7.21	-3.54***
Productivity (ton/ha)	10.02	11.09	10.10	7.05	-0.07
Area planted with chilies in dry season 1 (April) (ha)	0.11	0.21	0.20	0.53	-2.99***
Area planted with chilies in dry season 2(July) (ha)	0.06	0.18	0.14	0.25	-3.62***
Area planted with chilies in rainy season (September) (ha)	0.17	0.37	0.14	0.22	0.70
Grow chilies more than one season in a year (1= yes, 0 = no)	0.21	0.41	0.54	0.50	-7.47***
Planted only one variety of chili (1= yes, 0 = no)	0.86	0.35	0.67	0.47	4.78***

Note: [1]Based on t-test: *** significant at the 1% level, ** significant at the 5% level, * significant at the 10% level. Std.Dev = standard deviation

This study also examines the changes in chili production activities over the five year period recorded. For the majority of supermarket channel farmers, there are some changes in chili production activities during this period (Table 4.6). About 39% of supermarket farmers have expanded the area they planted with chilies over the five year period versus 31% of traditional channel farmers. For 31% of supermarket farmers, the quality of chilies that buyers want increased over the five year period, this is compared

to only 19% of traditional channel farmers. Higher shares of farmers in the supermarket channel have increased the use of inputs for chili production activities compared to those in the traditional channel including chemical fertilizer (38% versus 29%), pesticides (51% versus 38%), herbicides (27% versus 15%), and fungicides (46% versus 31%). A significantly higher share of supermarket farmers (38%) relative to traditional channel farmers (23%) perceived that the quality of their chilies increased over the five year period.

Table 4.6.   Changes in chili production activities over the last five years in the traditional and supermarket channels (dummy variable: 1 = yes, 0 = no)

Variable	Traditional channel (n=485)		Supermarket Channel (n=112)		Significance[1]
	Mean	Std. Dev.	Mean	Std. Dev.	
Area planted in chilies increase	0.31	0.46	0.39	0.49	-1.66*
Yield of chilies increase	0.23	0.42	0.25	0.43	-0.38
Use of hybrid seed increase	0.25	0.43	0.13	0.34	2.60***
Use of chemical fertilizer	0.29	0.45	0.38	0.48	-1.84*
Use of organic fertilizer increase	0.44	0.50	0.38	0.49	0.99
Use of pesticides increase	0.38	0.49	0.51	0.50	-2.44**
Use of herbicides increase	0.15	0.36	0.27	0.44	-2.85***
Use of fungicides increase	0.31	0.46	0.46	0.50	-3.24***
Use of hired labor increase	0.27	0.44	0.32	0.47	-1.14
Quality standard buyers want increase	0.19	0.39	0.31	0.47	-2.99***
Quality of farmers' output increase	0.23	0.42	0.38	0.49	-3.29***

Note: [1]Based on t-test: *** significant at the 1% level, ** significant at the 5% level, * significant at the 10% level. Std.Dev = standard deviation

4.5 Income activities

Previous studies only provide very general information about traditional channel and supermarket channel respondent-farmers' income sources. For example, some studies only present aggregate income from the crop under consideration (Hernández et al., 2007) and aggregate household income (Rao and Qaim, 2011). Only a few studies have distinguished the sources of household incomes based on their activities. Neven et.

al. (2009) classify the sources of household income of traditional and supermarket channel farmers into farm and non-farm income. In these two channels, farm income has a higher contribution to household income than non farm income. Miyata et al. (2009) classify the sources of household income more specifically as income from the specific crop under consideration, income from livestock and non-farm income. This study provides more details on the income structures of chili farmers in the two channels compared to previous studies.

Respondents in the traditional and supermarket channels derive income from sources that include farm and non-farm activities (Table 4.7). In this study farm activities include income from planting agricultural products (chili and other food crops), livestock activities, and aquaculture activities. Non-farm activities include all the activities in Table 4.7 after excluding farm activities. Income is measured over a year. Overall, the net household income is significantly greater for farmers in the supermarket channel than for farmers in the traditional channel. There are 18 farmers who had a negative income, including 15 farmers from the traditional channel and three farmers from the supermarket channel.

The chili crop is the main income source for supermarket farmers in that its net income contributes around 41% of net household income (13.18 million of net chili income, divided by 32.54 million of net household income, times 100), this is compared to 25% for traditional channel farmers (5.72 million of net chili income, divided by 22.75 million of net household income, times 100). The net chili income is significantly greater for farmers in the supermarket channel than those in the traditional channel (IDR 13.18 million versus IDR 5.72 million). About 89% of supermarket respondents stated that chili production has become a more important share of household income over the five year period versus 69% of traditional channel farmers.

Table 4.7. Net income activities of respondents in the traditional and supermarket channels (million IDR)

Variables	Traditional channel (n=485)		Supermarket channel (n=112)		Signifi-cance[1]
	Mean	Std. Dev.	Mean	Std. Dev.	
Net household income	22.75	26.45	32.54	46.53	-3.00***
Chili production	5.72	12.08	13.18	24.88	-4.65***
Other agricultural production	6.77	11.00	6.21	15.18	0.45
Livestock and animal production sales	0.71	2.72	0.53	2.14	0.64
Aquaculture	0.08	0.64	0.23	0.78	-2.14**
Agricultural trading	1.32	6.29	1.53	13.70	-0.25
Other trading	2.06	10.03	3.62	11.02	-1.45
Rice milling business	0.27	3.48	0.00	0.00	0.82
Food processing business	0.14	1.13	0.26	1.60	-0.99
Other business	1.67	7.35	2.27	10.43	-0.72
Agricultural wage labor	0.78	2.90	0.74	2.08	0.13
Non-agricultural employment	2.45	6.60	2.88	9.16	-0.58
Pension	0.21	2.28	0.39	2.82	-0.72
Remittances from family members	0.37	1.61	0.52	1.63	-0.84
Other assistance programs	0.01	0.15	0.08	0.31	-3.70***
Other incomes	0.20	1.85	0.10	0.65	0.57
Chili production become more important as share of household income over the last five years (1= yes, 0 = no)	0.69	0.46	0.89	0.31	-4.25***

Note: [1]Based on t-test: *** significant at the 1% level, ** significant at the 5% level, * significant at the 10% level. Std.Dev = standard deviation

Earning derived from the cultivation of other agricultural products such as rice, maize, cabbage, cucumber, and tomato are important sources to farm household income for both groups, particularly for those in the traditional channel (IDR 6.77 million versus IDR 6.21 million). However, no significant difference is found in net income from the cultivation of other agricultural products between these two groups. Other farm activities (livestock and animal production sales) have small share of household income for both groups. However, supermarket farmers generate significantly higher income from aquaculture than traditional channel farmers (IDR 0.23 million versus IDR 0.08 million). Overall, farm activities contribute around 60% to the household income of

supermarket farmers and around 58% to the household income of traditional channel farmers. Based on the most recent Indonesian Agricultural Census in Indonesia in 2003 (Statistic Agency, 2004), incomes from farm activities (food crops, estate crops, livestock, fishery and forestry) contribute around 50% of total household income. Thus the contributions of farm incomes to household income in the two channels are a bit larger than the average farm income in Indonesia.

Both farmer groups also generate income from non-farm activities: agricultural trading, other trading, rice milling business, other business, agricultural wage labor, non-agricultural employment, pension, remittances from family members, other assistance programs, and other incomes. Overall, the income from these activities do not vary much across the two channels.

4.6 Sources of information

Studies examining producers' information sources for production, price and market information are limited. Understanding of information sources regarding these issues can help to assist small farmers' participation in supermarkets, particularly how to fulfill the specific requirements. Additionally, it is important to identify the main information sources in order to understand the role of institutions such as farmer group and extension office available in providing the information required by farmers.

As shown in Table 4.8, farmers in both channels obtain information about chili production methods and chili prices and markets from multiple sources. About 94% and 36% of traditional channel farmers obtain information about chili production methods from other farmers and traders, respectively, whereas 71% and 8% of supermarket channels obtain the information from such sources. Supermarket farmers obtain information about chili production methods from more formal sources compared to

traditional channel farmers. Formal sources refer to information provided by government agencies through extension officers and farmer groups. Table 4.8 shows that extension workers and farmer groups play an important role in providing information about chili production methods for supermarket farmers (60% and 54%), this is compared to only 40% and 12% of traditional channel farmers. Interestingly, about 8% and 21% of farmers in the traditional and supermarket channels obtain information of chili production methods from input companies.

Extension workers only play a small role in providing information about chili prices and markets: 4% for traditional channel farmers and zero for supermarket channel farmers. Compared to traditional channel farmers, farmer groups have a significant role in providing information about chili prices and markets for supermarket channel farmers (36% versus 4%). For traditional channel farmers, other farmers play more important role in providing information about chili markets and prices than supermarket channel farmers (56% versus 31%).

Table 4.8. Main of information sources about chili production methods and chili prices and markets (dummy variable: 1 = yes, 0 = no)

Variables	Traditional channel (n=485)		Supermarket channel (n=112)		Significance[1]
	Mean	Std. Dev.	Mean	Std. Dev.	
Chili production methods					
Traders	0.36	0.48	0.08	0.27	5.95***
Extension workers	0.40	0.49	0.60	0.49	-3.94***
Farmer groups	0.12	0.33	0.54	0.50	-10.93***
Farmers/relatives/neighbors	0.94	0.24	0.71	0.45	7.42***
Input companies	0.08	0.27	0.21	0.41	-4.41***
Chili prices and markets					
Traders	0.99	0.09	0.99	0.09	0.07
Extension workers	0.04	0.17	0.00	0.00	1.89
Farmer groups	0.04	0.18	0.36	0.48	-11.55***
Farmers/relatives/neighbors	0.56	0.50	0.31	0.47	4.74***
Input companies	0.00	0.00	0.00	0.00	0.00

Note: [1]Based on t-test: *** significant at the 1% level, ** significant at the 5% level, * significant at the 10% level. Std.Dev = standard deviation

4.7 Marketing characteristics

Similar to many other countries, the majority of chili farmers in Indonesia participate in supermarket channels via supermarket agents or specialized wholesalers (e.g., Alvarado and Charmel, 2002; Balsevich, et al., 2003; Hernández et al., 2007; Kaganzi et al., 2009; Moustier et al., 2010; Rao and Qaim, 2011). The specialized wholesalers organize teams of traders who are the 'knowledge' links to small farmers. For example, based on the interviews during the scoping studies in the study area, Carrefour (one of the largest supermarket chains operating in Indonesia) contracts with Bimandiri, a specialized wholesaler. Bimandiri organizes local traders and links to farmer groups providing access to hundreds of small chili farmers. Table 4.9 shows that about 44% of farmers in the supermarket channel sell chilies to traders and 55% sell to farmer groups, while in the traditional channel, almost all farmers sell to traders (98%).

Table 4.9 Main buyers of chilies as reported by respondents in the traditional and supermarket channel (Percentage)

Main buyers	Traditional channel (n=485)	Supermarket channel (n=112)	Significance[1]
Farmer	0.82	0.00	
Trader	97.73	43.75	
Cooperative	0.00	0.00	
Farmer group	0.21	55.36	
Processor	0.00	0.00	
Supermarket	0.00	0.89	
Consumer	0.62	0.00	
Other	0.62	0.00	
Total	100.00	100.00	299.16***

Note: [1]Based on Pearson chi-square test: ***Significant at the 1% level

Producers in the traditional market channel tend to sell to more buyers than the supermarket channel producers. Over the five year period, 66% of the traditional channel group sold chilies to more than one buyer, the other 34% sold to the same buyer (Table 4.10). In the supermarket channel, 56% sold to more than one buyer over the five

year period. However, over the last year of the survey, the numbers of producers who

sold to more buyers in both channels reduced to about 30%.

Table 4.10 Marketing characteristics in the traditional and supermarket channel

Variables	Traditional channel (n=485)		Supermarket channel (n=112)		Signifi-cance[1]
	Mean	Std. Dev.	Mean	Std. Dev.	
Buyers and chili prices					
Sold to more than one buyer in the last 5 years (1 = yes, 0 = no)	0.66	0.47	0.56	0.50	1.98**
Sold to more than one buyer in the last year (1 = yes, 0 = no)	0.33	0.47	0.31	0.46	0.58
Chili price (IDR per kg)	6,200	3,560	8,332	3,854	-5.14***
Sorting (1 = yes, 0 = no)					
Remove debris or foreign materials	0.61	0.49	0.68	0.47	-1.34
Remove small or bad chili	0.80	0.40	0.93	0.26	-3.16**
Sort into different groups by size	0.08	0.27	0.40	0.49	-9.44***
Sort into different groups by color	0.15	0.35	0.55	0.50	-9.86***
Sort into different groups by quality	0.16	0.37	0.55	0.50	-9.38***
Put into bags or boxes	0.78	0.42	0.94	0.24	-3.92***
Keeping records (1 = yes, 0 = no)					
Keep record on the amount of pesticides	0.12	0.32	0.46	0.50	-8.90***
Keep record on the dates of pesticide application	0.06	0.24	0.14	0.35	-3.02***
Keep record on the chili prices	0.22	0.42	0.81	0.39	-13.74***
Keep record on the chili quantities	0.21	0.41	0.80	0.40	-13.84***
Credit access from buyer (1 = yes, 0 = no)					
Deliver good quality seed	0.02	0.14	0.22	0.42	-8.96***
Deliver pesticides	0.02	0.16	0.23	0.42	-8.58***
Deliver other agricultural chemical	0.02	0.16	0.25	0.43	-9.17***
Provideg inputs on credit	0.02	0.15	0.23	0.42	-8.79***

Note: [1]Based on t-test: *** significant at the 1% level, ** significant at the 5% level, * significant at the 10% level. Std.Dev = standard deviation

As shown in Table 4.10, supermarket farmers receive higher chili prices per kg

than traditional channel farmers (IDR 8,332 per kg versus IDR 6,200 per kg). The

higher prices might be associated with rewarding quality. Compared to traditional

channel farmers, supermarket farmers are significantly more likely to sort their chilies

by size (40% versus 8%), color (55% versus 15%), and quality (55% versus 16%), as

well as being more likely to pack them in bags or boxes (94% versus 78%) and to remove small or bad chilies (93% versus 80%).

A significantly higher share of supermarket farmers keep written records on some aspects compared to traditional channel farmers, including chili prices received (81% versus 22%), quantities sold (80% versus 21%), and the amounts of pesticide applications (46% versus 12%) and the dates of pesticide applications (14% versus 6%). The buyers in the supermarket channel are significantly more likely to provide credit access to farmers: certified seed (22%), pesticides (23%), agricultural chemical (25%), and credits (23%). In each category of credit access, only about 2% of traditional channel farmers report that they obtain such credits from their buyers.

4.8 Discussion and summary

Several studies have examined differences and similarities between farmers in the traditional and modern market channels by focusing on specific variables related to household, farm and marketing characteristics. However, the previous studies provide no clear patterns with respect to these variables. This study contributes to this body of literature by comparing these variables in the context of chili farmers selling to the traditional channel and those selling to the supermarket channel. The aim is to understand the type of farmers supplying chilies to supermarket and traditional channels. The results suggest several salient differences between the two groups of farmers.

With respect to household characteristics, the survey shows that households participating in the supermarket channels have higher levels of human capital compared to households in the traditional channel: higher education levels of household heads and spouses, and higher literacy levels of household heads. Higher levels of education and

literacy can improve managerial and negotiation skills of small farmers to deal supermarket buyers (Boselie et al., 2003). As reported in this chapter, supermarket channels have better managerial skills indicated by a significantly higher share keeping of written records on chili prices received, quantity sold, and the amounts and dates of pesticide applications.

The results of household characteristics also indicate that supermarket farmers are younger than traditional channel farmers. Younger farmers are more willing to adopt new technology that may help them to adapt to specific requirement posed by modern markets quickly (Sharma et al., 2009). The fact that supermarket farmers have better access to asphalt roads compared to traditional channel farmers indicates that they may have better opportunities to participate in supermarket channels as supermarket buyers are very sensitive to transaction costs (Barrett et al., 2011; Hernández et al., 2007; Rao and Qaim, 2011).

Apart from household characteristics, access to physical capital is very important in helping small farmers to fulfill supermarket procurements (Reardon et al., 2005). By examining current and lagged household assets the study finds similarities and differences with respect to some variables. Some studies find significant differences in land size between farmers in the traditional and supermarket channels (Natawidjaja et al., 2007; Neven et al., 2009; Rao and Qaim, 2011; Schipmann and Qaim, 2010). No significant difference between the two groups of farmers regarding current and lagged values of land size. However, supermarket farmers are more active in land rental markets as indicated by a significantly higher share of rented land compared to traditional channel farmers. No differences in irrigated land between farmers in the two groups are found. This is also true in the case of land allocated for chili cultivation.

Regarding non-land assets, in 2005 the differences between the two channel samples only emerge in motorbike ownerships and storage houses. In 2010, the storage house ownership still differs among the farmers, but in this period mobile phone ownership, and mist blower ownership also differ between farmers in the two groups. A significantly higher share of supermarket farmers have invested in chili production activities, particularly for non-land assets (storage room, irrigation equipment and spraying equipment). The findings of the farm and household assets suggest that non-land assets have important role in facilitating farmers participation in supermarket channels compared to land assets.

Supply consistency is a typical supermarket requirement (Hernández et al., 2007; Reardon et al., 2005). To fulfill volume consistency, the majority of chili farmers in the supermarket channels grow chilies in more than one season per year suggesting that they are much more specialized in chili production than traditional channel farmers. The fact that supermarket farmers are more specialized in chili production is also shown by the significant difference in land dedicated to chili production in 2010. While only a few of the traditional channel farmers do multiple production cycles. Although the size of land is not significant between farmers in the two groups, supermarket farmers have a higher land area allocated for chili cultivation, particularly in the first dry season (around April) and the second dry season (around July). A higher share of supermarket farmers has increased area planted with chilies over the five year period. This information can explain the significant difference of chili production between farmers in the supermarket and traditional channels.

The fact that supermarket farmers are much more specialized in chili production can also be demonstrated by the contribution of chili income to household income. This chapter demonstrates that the contribution of income from chili production for

supermarket farmers is higher compared to traditional channel farmers. Over the five year period, the majority of supermarket farmers (90%) state that income from chili production has become more important as share of household income.

Besides volume consistency, supermarkets also emphasize the importance of quality aspects (Hernández et al., 2007; Reardon et al., 2005). A higher share of supermarket farmers report that the quality standard of chili that buyers demand has increased over the five years. To fulfill quality requirements, supermarket farmers engage in sorting their chilies. Additionally, increasing the use of specific inputs is also important in improving the quality of chilies. Over the five years, a significantly higher share of farmers in the supermarket channel have increased the use of inputs for chili production, particularly hybrid seeds, chemical fertilizers, pesticides, herbicides, and fungicides compared to those in the traditional channel. Improving quality aspects may facilitate supermarket farmers to get higher prices. This chapter shows that supermarket farmers receive significantly higher prices than traditional channel farmers suggesting that farmers are paid for the additional investments in inputs and time for sorting chilies.

Information about chili production methods is needed to help farmers to improve the quality of their products. For supermarket farmers, farmer groups and extension workers are important sources of information about chili production methods. While for traditional channel farmers, other farmers/relatives/neighbors and traders are important sources of information about chili production methods.

Farmer groups also have an important role in linking chili farmers to supermarket channels. More than a half of chili farmers participate in supermarket channels through farmer groups. The rest participate in supermarket channels through traders. Only a few farmers in the supermarket channel sell directly to supermarkets. The important role of farmer groups in linking small farmers to supermarket channels

has been shown by authors such as Kaganzi et al. (2009) and Moustier et al. (2010). In this study, farmer groups organize their members to supply chilies consistently to supermarkets as well as providing information about specific guidelines of chilies required by supermarkets. The requirements include color, size, length and variety of chilies.

This chapter used descriptive analysis to understand the types of farmers selling to supermarket and traditional channels. The results can help to inform the kinds of constraints and opportunities associated with supermarket participation (Chapter 5), market relationships with their buyers (Chapter 6 and 7) and farmer attitudes regarding preferred buyer attributes (Chapter 8). The following chapters use explanatory analysis to better understand constraints and opportunities of small farmers' participation in the supermarket channel, market relationships between farmers and buyers, and farmer attitudes when they choose preferred buyers.

5. Determinant factors of chili farmers' participation in supermarket channels and the impact on household income

5.1 Introduction

As discussed previously, the rapid increase of supermarkets presents small farmers with new opportunities to participate in supermarket channels, with the potential to earn greater farm income relative to those selling in traditional channels. However, small farmers also face numerous, well-documented constraints, including access to capital, quality seeds and other inputs. Appropriate training and the crop specific knowledge required to meet the product specifications posed by supermarkets are additional hurdles (Boselie et al., 2003; Dries et al., 2009; Kaganzi et al., 2009; Reardon et.al., 2009; Weatherspoon and Reardon, 2003). Given this situation, researchers and policymakers raise to two fundamental questions: 1) whether small farmers can participate in the emerging supermarket channel and 2) whether the participation has a positive impact on the net income of small farmers. This chapter presents empirical results in relation to these two critical questions.

Chowdhury et al. (2005) and Natawidjaja et al. (2007) report that supermarkets in Indonesia increasingly source HVAPs from local farmers (via specialized wholesalers). Supermarkets generally pay higher prices for farmers' products relative to traditional channels (Chowdhury et al., 2005; Hernández et al., 2007; Natawidjaja et al., 2007; Neven et al., 2009; Rao and Qaim, 2011). However, similar to the experience in many developing countries, strict quality standards and new procurements systems are posed by the leading chains of supermarkets in Indonesia (e.g., Carrefour and Giant) which might exclude small farmers from participating.

Supermarkets require farmers to supply them with higher quality products and demand consistent quality. For example, in the case of a vegetable supply chain for

tomatoes in West Java Province, supermarkets want specific quality: bright red, big in size, in a plastic box, and with a very low damage rate (Natawidjaja et al., 2007). To fulfill such requirements, farmers require significant investments, i.e., in production practices, post harvest technologies, and in management practices (Reardon et al., 2004). Given the majority of farmers in Indonesia are small farmers with land holdings of less than 0.5 ha (Statistic Agency, 2004); it is difficult for them to invest in these aspects. They often do not have the savings or access to credit needed to make these investments. In order to link small farmers to supermarket channels it is useful to understand what type of constraints impede them from taking advantage of supermarket growth.

Some initial studies have been done to identify the opportunities and constraints faced by small farmers in supplying to modern market channels (Hernández et al., 2007; Natawidjaja et al., 2007; Neven et al., 2009; Rao and Qaim, 2011; Schipmann and Qaim, 2010). While participation in supermarket channels is often associated with higher income, the studies demonstrate no clear conclusion regarding the constraints. For example, land size and irrigated land are the main factors which help explain farmers' participation in supermarket channels of kale in Kenya (Neven et al., 2009) and tomatoes in Indonesia (Natawidjaja et al., 2007). However, land size is not a significant factor for supermarket participation in Guatemala (Hernández et al., 2007). Hence, there is a need to better understand what conditions must exist to help small farmers link successfully to supermarket channels and whether the participation can improve their livelihood.

In this chapter, a probit model is utilized to estimate supermarket participation; an ordinary least square method estimates household income; and a treatment effect model examines the possibility of selectivity bias in the sample. To avoid an

endogeneity problem, lagged household and farm assets are utilized in the analysis. The next section explains the number of respondents used in this chapter, followed by discussion of results and conclusions.

5.2 Empirical models

As explained in Chapter 3, a probit model is utilized for the regression determining market channel choice between the traditional channel and the supermarket channel. In this model, the dependent variable (z) takes the value of one for farmers selling through the supermarket channel and zero for farmers selling through the traditional channel (see Hernández et al., 2007; Neven et al., 2009; Rao and Qaim, 2011). It is assumed that z is a linear function of explanatory variables (w) and an error tem (u). Hence the linear function of a probit model is expressed as follows.

$$z_j = w_j \gamma + u_j \tag{5.1}$$

where subscript j indicates the respondent household, and it is assumed that u has zero mean and variance σ^2.

This study intends to capture farmers' incentives and capacities as independent variables in the channel selection model. The capacity variables are the following farm assets: land size ownership (ha), irrigated land (dummy variable, 1= own irrigated land; 0=no), motor bike ownership (units), water pump ownership (units), mist blower ownership (units), power tiller ownership (units), and storage house ownership (units). This study uses the 2005 situation for asset variables which reflects household assets over the five years before the survey. In this study, all the supermarket channel suppliers became supermarket suppliers after 2005. By using the 2005 assets, this study aims to avoid the endogeneity problem since current household assets can be influenced by supermarket channel participation (Neven et al., 2009). This study also incorporate

labor supply for chili production: the proportion of productive adults (the proportion of adults between 15 and 65 years) and non-productive adults (the proportion of adults over 65 years) in the household and number of household members (persons) as a capacity variable. This is because participation in modern markets is somewhat more labor intensive, given the higher quality that farmers are expected to meet compared to farmers selling to traditional channels (Miyata et al., 2009). Each of these capacity variables is hypothesized to have positive effects on supermarket channel participation, except for the variable of non-productive adults in the household which is expected to have a negative impact.

The incentives variables entered into the empirical model refer to the opportunity to reduce transaction costs. The transaction costs variables include distance from house to asphalt road (km) and access to communication assets (dummy variable of mobile phone ownership, 1 = yes own has at least one mobile, 0 = no). This study selects the variable of distance from house to asphalt road as a proxy of distance to output and input markets. Respondents who live further from asphalt road spend more time and costs when they sell their produce or buy inputs compared to those who living relatively close to asphalt road. Hence, the variable of distance from house to asphalt road is expected to have a negative influence impact on channel participation (Alene et al., 2008). Mobile phone ownership may increase access to either input or output market information and is expected to reduce information costs.

Demographic variables are also included in the model: education, farming time and age. Education of head of household (years of school) may increase access to financial capital (Neven et al., 2009). Farming time (numbers of years of growing chilies) and age (years) are considered as factors affecting market channel choice (Woldie and Nuppenau, 2009). The younger respondents are more likely to participate

in the supermarket channel as they tend to be more enterprising, make decisions more quickly and are more willing to try new technologies (Sharma et al., 2009). The empirical model for the channel selection model used in this study is

Channel choice = *f* (household member, age of household head, education of household head, proportion of adults between 15 and 65 years, proportion of adults over 65 years, land ownership in 2005, irrigated land ownership in 2005, motor bike ownership in 2005, water pump ownership in 2005, mist blower ownership in 2005, power tiller ownership in 2005, storage house ownership in 2005, farming time, mobile phone ownership, distance to asphalt road)

For the impact model, per capita net household income is utilized as the dependent variable. The main reason for using net household income is the fact that chili farmers may reallocate labor and land from other activities to participate in supermarket channels. Hence, focusing only on the income from chilies may overstate the impact on household well-being. Additionally, as this study is interested in whether supermarket participants are "better-off", per capita income (net) is a better measure of household welfare. Following previous literature (Miyata et al., 2009; Rao and Qaim, 2011), the income equation is expressed as

$$y_j = x_j \beta + \delta z_j + \varepsilon_j \tag{5.2}$$

where y is per capita net household income, j is respondent household, and x is a vector of exogenous variables including the variables of incentives and capacities, and demographic characteristics as outlined above except for one variable; distance from house to asphalt road is treated as an identification variable (explained further below in the estimation procedure stage). z is a dummy variable indicating supermarket participation.

Initially, the income equation is estimated by using ordinary least square (OLS) method. However, as explained previously, OLS does not provide a satisfactory solution to measuring participation effects on income unless we can guarantee there is

no selectivity bias (Maddala, 1983). Hence, as outlined in Chapter 2 and 3, this study uses a treatment effects model.

The treatment effects model consists of two equations: the outcome equation (income equation as in equation 5.2) and the selection equation, containing unobserved or latent variable z^* (whether or not the farmers participate in supermarket channel). Specifically,

$$y_j = x_j\beta + \delta z_j + \varepsilon_j$$
$$z_j^* = w_j\gamma + u_j \qquad\qquad (5.3)$$

where the observed decision in selection equation is

$$z_j = \begin{cases} 1, & if\ z_j^* > 0 \\ 0, & otherwise \end{cases}$$

In the treatment effect model, the IMR (Inverse Mills Ratio) is calculated in order to control for the conditional probability of a farmer being in a particular channel (Hernández et al., 2007; Miyata et al., 2009). The IMR is calculated for each farmer from the channel choice equation. Then, it is incorporated as one of among explanatory variables in the income equation to produce the coefficient of "athrho" (the arc-hyperbolic tangent of ρ). This coefficient is used to specify the existence of selection bias exist in the model.

This study adapted the estimation procedures from Miyata et al. (2009). A probit model estimates the channel choice equation. An ordinary least square (OLS) model estimates net household income, while a treatment effects model is used to address the possibility of selectivity bias. This study uses maximum likelihood estimation where all parameters in the channel choice equation (selection equation) and net household income equation (outcome equation) are estimated simultaneously. The variable of distance from house to asphalt road is treated as an identification variable as this

variable should not have an independent effect on income. The correlation between the variables of 'distance from house to asphalt road' and 'per capita net household income' is relatively low (-0.05) and not significant at the $\alpha = 0.05$ level. Thus this variable is available in the selection equation and not found in the outcome equation.

5.3 Sample and its description

As discussed in Chapter 3, the sample includes 485 households selling chilies to traditional channels and 112 households selling chilies into supermarket channels. However, as highlighted in Chapter 4, there are 18 households who indicate that they have negative household income in 2010: 15 households from the traditional channel and three households from the supermarket channel sample. Respondents with negative income values are outliers in the data. Additionally, in order to provide a better interpretation of the results, this chapter uses log-form equation in which the dependent variable (per capita net household income) is in logarithmic form. The logarithmic form also allows more similar variability of the data in a particular variable (in this case the per capita net household income) to be produced. In households with a negative net income, the log of the negative number is undefined; hence, log per capita income appears as a missing variable and is not included in the regression. Hence, the households who have negative income were dropped in the analysis in this chapter. Thus the samples in this chapter consist of 470 respondents in the traditional channel sample and 109 respondents in the supermarket channel sample.

Table 5.1 summarizes descriptive statistics for the incentives, capacities and demographic variables used in the analysis after removing the 18 households with negative incomes. They are very similar to the original samples as outlined in Chapter 4 (the sample before the 18 households with negative incomes were dropped).

Supermarket farmers have a higher education level and younger on average compared to farmers selling to traditional markets. Respondents in the traditional channel have more numbers of years of growing chilies and are living relatively further from asphalt road. No significant differences are found in terms of lagged household and farm assets between the two groups, except for motor bike and storage space ownership. Farmers trading with supermarkets have larger motor bikes and storage space.

Table 5.1 Description of variables used in the participation and income regressions

Variable	Traditional channel (n=470)		Supermarket channel (n=109)		Signifi-cance[1]
	Mean	Std. Dev.	Mean	Std. Dev.	
Household member (person/s)	4.55	1.57	4.34	1.44	1.29
Age of household head (years)	46.26	11.19	43.86	10.19	1.95*
Education of household head (years)	6.46	2.91	7.96	3.17	-4.73***
Proportion of adults between 15 and 65 years (%)	69.10	19.57	66.56	18.86	1.42
Proportion of adults over 65 years (%)	2.40	8.57	3.92	11.00	-1.74*
Farming time (years)	9.42	6.70	6.6	5.05	3.84***
Land ownership in 2005 (ha)	0.42	0.62	0.41	1.03	0.09
Irrigated land ownership in 2005 (1=yes 0=no)	0.47	0.50	0.54	0.50	1.13
Mobile phone ownership in 2005 (unit)	0.54	0.91	0.64	0.99	-1.06
Motor bike ownership in 2005 (unit)	0.42	0.64	0.56	0.70	-1.99**
Water pump ownership in 2005 (unit)	0.25	0.72	0.28	0.49	-0.43
Mist blower ownership in 2005 (unit)	0.96	1.00	0.97	0.92	-0.08
Power tiller ownership in 2005 (unit)	0.01	0.12	0.03	0.21	-0.83
Storage house ownership in 2005 (unit)	0.15	0.36	0.28	0.51	-2.93**
Distance from house to asphalt road (km)	0.29	0.63	0.11	0.15	2.81***

Note: [1]Based on t-test: significant at the 1% level, ** significant at the 5% level, * significant at the 10% level. Std.Dev = Standard Deviation

5.4 Results

The coefficient of "athrho" (the arc-hyperbolic tangent of ρ) in the treatment effects model (TEM) indicates that the correlation between the residual in the selection and outcome equations is significant, indicating the existence of selection bias. Therefore, this study uses results from TEM method instead of probit and OLS equation

results. Table 5.2 provides treatment effects model (TEM) results, in which the channel choice equation and net household income equation are estimated simultaneously

5.4.1 Determinants of market channel choice

The years of formal education, the distance from house to the asphalt road, the numbers of years of growing chilies and storage house ownership are all statistically significant in the channel equation. The sign on the education variable is positive, suggesting higher levels of education is associated with supermarket participation. Rao and Qaim (2011) suggest two explanations for education levels influencing modern market adoption. First, more education may facilitate the speed of adjustment to new market requirements as farmers are more confident adjusting to new information. Second, farmers with more schooling are likely to be more innovative.

A negative relationship is found between distance to road and supermarket participation. As travel time and transport costs increase, farmers are more likely to sell their chilies to traditional channel. Specialized traders working with modern channels tend to be especially sensitive to distance related transactions costs, seeking out producers closer to paved roads and with their own transport (Hernández et al., 2007; Reardon, et al. 2009).

Unexpectedly, the variable of farming time has a negative coefficient. This means farmers having more numbers of years of growing chilies are less likely to participate in the supermarket channel. This is perhaps because to participate in the supermarket channels, farmers need to change traditional cultivation practices. Farmers who have more numbers of years of growing chilies might be reluctant to change their cultivation practices. The negative relationships between years of doing farming and

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adoption of new technologies have been shown by Kebede et al. (1990) and Wozniak (1987).

Table 5.2 Determinants of farmer' participation and the impact on household income

Variable	Dependent variable: channel (1=supermarket 0=traditional)			Dependent variable: net income per capita (log)		
	Coefficients	SE	[|Z| > z]	Coefficients	SE	[|Z| > z]
Household member (person/s)	-0.031	0.048	0.522	-0.193	0.027	0.000***
Age of household head (years)	-0.005	0.008	0.486	0.000	0.004	0.997
Education of household head (years)	0.066	0.023	0.004***	0.036	0.014	0.012**
Proportion of adult between 15 and 65 years (%)	-0.003	0.004	0.512	-0.001	0.002	0.764
Proportion of adult over 65 years (%)	0.009	0.008	0.272	-0.007	0.005	0.177
Land ownership in 2005 (ha)	0.023	0.091	0.798	0.205	0.059	0.001***
Irrigated land ownership in 2005 (1=yes 0=no)	0.085	0.141	0.547	0.023	0.081	0.776
Mobile phone ownership in 2005 (unit)	-0.076	0.080	0.343	0.170	0.046	0.000***
Motor bike ownership in 2005 (unit)	0.164	0.108	0.130	0.171	0.066	0.010**
Water pump ownership in 2005 (unit)	-0.110	0.096	0.253	0.120	0.058	0.037**
Mist blower ownership in 2005 (unit)	0.028	0.072	0.697	0.136	0.041	0.001**
Power tiller ownership in 2005 (unit)	-0.143	0.424	0.737	0.378	0.264	0.152
Storage house ownership in 2005 (unit)	0.376	0.165	0.023**	0.405	0.108	0.000***
Farming time (years)	-0.043	0.012	0.000***	0.019	0.006	0.004***
Distance from house to asphalt road (km)	-0.544	0.222	0.014**			
Channel (1=supermarket; 0=traditional)				0.560	0.267	0.036**
Constant	-0.542	0.462	0.241	1.206	0.269	0.000***
Athrho				-0.314	0.173	0.070*
test independent equation: LR Chi-squared(1)				2.35		

Notes: *** Significant at the 1% level; ** significant at the 5% level; * significant at the 10% level. SE is standard error. Likelihood is -988.68 and Wald chi squared is 281.70

Households with their own storage houses are more likely to participate in supermarket channels. A storage houses is a small building around farmers' houses used to store harvested chilies before sold to traders. Since the chili crop is a perishable commodity, farmers store chilies in the storage houses only a few days (generally 1-2 days). By storing in these building, farmers can maintain the quality of chilies (e.g., freshness, color); hence are more able to provide supermarkets with high quality products and reduce risks related to chili quality.

5.4.2 Impacts of supermarket participation on income

This study utilizes net per capita income which is calculated by dividing net household income by household size. As expected, farm size and all the asset variables except power tiller ownership have positive impacts on per capita income. Likewise, mobile phone ownership, education, and farming time have significant positive effects on per capita income. Household size has the expected negative impact as additional household members reduce per capita income.

The coefficient of the channel variable is statistically significant in the income equation even after controlling for education, farm size, farming time, and various assets. As explained previously, this study utilizes a semi-log function, in which per capita net household income (dependent variable) is in logarithmic form. Supermarket participation is a dummy variable in the model; hence, the interpretation of the coefficient of the channel variable (δ) with the base natural log ($e = 2.718$) is equal to $(e^{\delta} - 1)100$ (Hardy, 1993). Therefore, with a 0.56 coefficient of channel variable means the per capita income of supermarket participants is 75% higher than that of traditional participants. The findings are in line with results from previous studies in

which participation in modern markets is associated with higher household income (Miyata et al., 2009; Rao and Qaim, 2011)

5.5. Discussion and summary

The expansion of supermarkets in Indonesia has provided new market opportunities for small farmers with the potential to increase their household income. However, the procurement of specific quality standards posed by supermarkets has been challenging for small farmers as they face several constraints such as access to capital, access to main roads, and farm inputs. An emerging literature has analyzed the main constraints faced by small farmers to participate in supermarket channels (Hernández et al., 2007; Natawidjaja et al., 2007; Neven et al., 2009; Rao and Qaim, 2011; Schipmann and Qaim, 2010). Understanding the constraints and opportunities is important in order to help more small farmers to take advantage from the supermarket expansions.

This chapter contributes to the emerging literature in relation to two critical issues in emerging modern channels as outlined in the introduction: factors influencing participation in modern channels and household income. The two issues are addressed by utilizing three different methods: a probit model for the channel choice equation, standard OLS regression for net household income equation, and treatment effects model. The results from the treatment effect model confirm selectivity bias problems in the sample. Hence, this chapter uses the results from the treatment effect model.

Regarding the first issue in this chapter, it is shown that important determinants of supermarket participation include demographic variables (education and farming time) and the variable of incentive for farmers (distance to asphalt roads) and capacity (storage house ownership) of farmers. The fact that education is positive and significant in the channel choice decision suggests that better educated farmers are more likely to

participate in the supermarket channels. This is plausible, because supermarket buyers establish more formal transactions with small farmers through formal and informal contractual arrangements in order to ensure that their suppliers can fulfill the specific requirements. Better educated farmers are expected have a better understanding of the specific requirements and details specify in their contracts compared to farmers who have low levels of education. This result supports Rao and Qaim's (2011) suggestion that education levels can facilitate the speed of adjustments to new market situations. Education can also enhance managerial and technical skills that will be useful for farmers to deal with supermarket buyers (Blandon et al., 2009). The results highlight the importance of education in giving farmers the capacity and willingness to enter the supermarket channel, though training and extension advice may have similar effects.

Years of doing farming is expected to have positive influence on the decision of technology adoption, selling to supermarket channels (Rao and Qaim, 2011). However, although in this chapter, it is shown that farming time is significant in explaining supermarket participation, the sign is negative. In this case, the more numbers of years of growing chilies that farmers have, the less likely they will sell chilies to supermarket channels. This may be because in order to fulfill the specific standards required by the supermarkets, farmers need to adjust their traditional practices, particularly in production and post-harvesting technology. They need to produce chilies consistently and follow all the necessary product-specific guidelines posed by supermarkets, including color, variety and length. Farmers who have more numbers of years of producing chilies are less likely to be willing to change their traditional practices and follow the strict standards and new procurement systems required by supermarkets. Years of doing farming as a negative influence on adoption of new technologies is consistent with Kebede et al. (1990) and Wozniak (1987).

An incentive variable, distance to asphalt road, is found to be one important factor influencing supermarket participation. As expected, distance to the nearest asphalt roads has a negative and significant impact on farmers' decision to participate in the supermarket channels. Chili farmers living in remote locations tend to sell to traditional channels. According to Barret et al. (2011), farmers with greater difficulties in accessing road infrastructure are less likely to be included in modern market channels as transaction costs to collect their products and the costs to supervise them with appropriate technical assistances increase. This is supported by Hernández et al. (2007) and Reardon et al. (2009) who confirm that supermarket buyers are sensitive to distance related transactions costs. Thus supermarket buyers tend to source chilies from producers who live relatively close to asphalt road. The fact that distance to asphalt road is a significant determinant of participation in supermarket channels suggests the importance of infrastructure in reducing the transaction costs in agricultural marketing.

The variable of storage house ownership is the only capacity variable that influence the probability of chili farmers participating in the supermarket channels. Since supermarkets have more demanding requirements in terms of quality standards in particular cosmetic appearance such as color, length and size (Neven et al., 2009), storage places are important for chili farmers. Storage places help farmers to ensure the quality of chilies before selling to supermarket buyers.

The second issue of this chapter focuses on the impact of supermarket participation on household income. Feder et al., (1985) point out that farmers will only adopt an innovation (in this case the supermarket channel) if it is profitable for them. In this case, the effect of the adoption on their income should be positive. The model in this chapter reveals that participation in supermarket channels is associated with

increases in per capita income, even after controlling for possible selectivity bias and the resources reallocated away from other activities.

The estimation results show that participation in the supermarket channels lead to gains in per capita household income of a magnitude of 75% higher than farmers in the traditional channels. This is a substantial effect, demonstrating that supermarket participation can improve the income of small farmers. This result is consistent with previous literature that has analyzed the impacts of modern market participation on household income. Using similar methods, Miyata et al. (2009) show that in the case of apple and green onion crops in China, participation of small farmers in modern marketing channels (through contracts) raise farmers' incomes. Likewise, in the case of vegetables in Kenya, Rao and Qaim (2011) find a positive impact of supermarket participation on household income.

The other coefficients in the income equation show that lag of land size and farm assets except power tiller have the expected positive impact on per capita income. Land size and farm asset variables allow producers to better manage risk and improve productivity. Lag of motor bike ownership is associated positively with per capita income. Given less reliable roads and transportation infrastructure in Indonesia, motor bike ownership are more important than other transport forms for small farmers. In remote areas, most villages are only accessible on foot or motor bike; hence, having a motor bike allows farmers to ride on gravel roads which potentially increases their access to output and input markets timely and less costly. Mobile phone ownership is determinant of per capita income. Mobile phone ownership enhances access to timely price information, reduces search costs, assists in the organization of input logistics and improves market delivery; hence, it is not surprising that it is associated with increase per capita income in this study.

The results of this chapter provide evidence with respect to the constraints and income opportunities resulting from supermarket participation. As explained above, these results suggest that facilitating participation in supermarket channels could be a useful strategy for helping farmers raise their income. Farm size, irrigated land and various assets except storage house are not significant determinants of participation in supermarket channels. This suggests that small and resource-poor farmers will not necessarily be "leave off" of the growing supermarket channel. It seems that education, and skills are more important barriers to participation in supermarket channels than farm size and farm assets.

6. Examining the quality of relationships between farmers and buyers in the traditional and supermarket channels

6.1 Introduction

For more than two decades, the level and the role of relationship quality have been a topic of interest in the marketing literature (Bejou et al., 1996; Bradach and Eccles, 1989; Crosby, et al 1990; Dwyer et al., 1987; Garbarino and Johnson, 1999; Geyskens, et al., 1999; Hawes et al., 1989; Kwon and Suh, 2004; Moorman et al., 1986; Morgan and Hunt, 1994; Smith, 1998b). It has been shown that establishing and improving relationship quality between exchange partners contribute to lower transaction costs, reduce uncertainties, create exchange partner loyalty, promote competitive advantage and increase profitability.

In the marketing literature, relationship quality has been conceptualized in many ways. For example, Smith (1998a, p.78) refers to relationship quality as "an overall assessment of the strength of a relationship and the extent to which it meets the needs and expectations of the parties based on a history of successful or unsuccessful encounters or events". There is no consensus, however, on how to best measure the level of relationship quality. However, three variables are prominent: commitment, trust and satisfaction.

Long-term business relationships have also been the focus of agri-food relationships. Establishing and improving relationship quality between farmers and buyers provide advantages such as increase consistency between supply and demand, reduce uncertainties, and the exchanging of information with respect to current and expected market situations (Batt, 2003; Fischer and Reynolds, 2010; Giha and Leat, 2010; Gracia et al., 2010; Gyau et al., 2011). Most studies in agri-food relationships utilize selected relationship quality variables such as trust, satisfaction and commitment.

Batt (2001, 2003) operationalize relationship quality with trust concluding that small farmers are more likely to deal with trusted buyers who want to make significant investments to help farmers grow crops. The importance role of trust in the determining marketing decisions of farmers has been shown by James and Sykuta (2006). Gyau and Spiller (2007) operationalize the relationship quality with satisfaction and trust concluding that these two variables can reduce transaction costs. The three variables, trust, satisfaction and commitment have used simultaneously in examining the level of relationship quality between exchange partners (Fischer and Reynolds, 2010; Gracia et al., 2010; Gyau et al., 2011).

Recent developments of supermarkets have also increased attention on the importance of relationship quality. Supermarkets present challenges and opportunities for all actors along the chain including small farmers. One way to overcome these challenges and take advantage of the opportunities is by improving relationship quality between the actors. Fewer studies have addressed relationship quality between buyers and sellers in modern markets such as supermarkets and export markets. The few existing ones have suggested the importance of establishing trust in modern markets (Blandon et al., 2009; Lu et al., 2010a; Vieira, 2008). Supermarket and traditional channels differ significantly in market relationship practices. For example, supermarkets increasingly switch from spot market relationships to exclusive vertical coordination such as formal or informal contracts, while market relationships in traditional channels operate in spot markets relying on the price signals. These practices may have implications for the level of relationship quality between farmers and buyers.

This chapter contributes to the existing literature by comparing the perceptions of chili farmers regarding relationship quality with their buyers in the traditional and supermarket channels. For policymakers interested in poverty reduction, jobs, exports,

import substitutions, food policy, and agricultural productivity understanding producer issues and how to address them are required to improve the quality, timing and efficiency of produce for farmers to adjust to changes brought about by supermarket penetration. In this chapter, relationship quality is measured through three variables: trust, satisfaction and commitment. The next section presents the hypotheses, followed by the explanation of sample and the measurements of constructs, and the statistical analysis. The last two sections contains results and discussion, and conclusions.

6.2 Hypotheses

Trade relation practices differ between supermarket and traditional channels. This potentially influences the level of relationships between farmers and buyers. In the traditional channels, transactions between farmers and buyers are characterized by spot market trading, involving one-off transaction with no promise for repeated transactions, no prior agreement on product delivery, and no prior agreement on price (Rao and Qaim, 2011). The level of coordination between supplier and buyers is low (Peterson et al., 2001). Coordination of supply and demand with respect to quantity, quality, and timing is determined only through the price (Hobbs and Young, 2001; Minot, 2007). This type of transaction provides freedom to farmers as they can sell their produce to whoever provides the highest price (Rehber, 2007). However, farmers also face uncertainties in selling their produce. They may face uncertainties in prices that will be received/paid as prices are largely determined by the condition of supply and demand in the market. Farmers may also face uncertainty in finding buyers, particularly if their product has idiosyncratic qualities (Hobbs and Young, 2000). From the buyer's perspective, uncertainties are related to the consistency of product quality and reliability of supply from suppliers (Hobbs and Young, 2000).

In contrast, supermarkets establish closer coordination and control, including contracts with suppliers to influence the entire supply channel for certain products. Reducing the number of suppliers will potentially affect not only transaction cost savings, but also relational benefits in dealing with fewer, but closer suppliers (Hingley et al., 2006). In assisting farmers to fulfill strict supply requirements, supermarket buyers communicate regularly with farmers as well as assisting with related technical support (Rao and Qaim, 2011). There is an agreement between supermarket buyers regarding price, payment time, product specification, and consistency in supply (Rao and Qaim, 2011).

Based on the differentiations in market relationships, it is expected that chili farmers selling to the supermarket channels perceive higher levels of relationship quality from their buyers compared to chili farmers selling to the traditional channels. As explained previously, relationship quality variables include commitment, trust, and satisfaction.

Commitment

Commitment refers "exchange partner believing that an ongoing relationship with another is so important as to warrant maximum efforts at maintaining it; that is, the committed party believes the relationship is worth working on to ensure that it endures indefinitely" (Morgan and Hunt, 1994, p.23). The presence of commitment is central to successful of long-term relationships since it can reduce uncertainties (prices, quantity, and quality) and transaction costs, particularly information costs for searching the reliability and integrity of exchange partners.

Supermarkets require a high level of commitment from their suppliers (Boselie et al., 2003; Weatherspoon and Reardon, 2003). In this context, chili farmers (through the middlemen) need to commit to supply chilies consistently in terms of quality and

quantity to supermarkets. Failure to commit to deliver chilies in quantities and according to quality standards results in problems for supermarkets and consequently harms future transaction opportunities. By establishing closer relationships (through formal and informal contracts), the level of farmers' commitment may be improved (Blandon et al., 2009), while in traditional channels there is no agreement prior to or after selling (Rao and Qaim, 2011). Hence, traders in traditional channels face more problems with the level of farmers' commitment since farmers tend to sell to buyers who pay the highest prices (White et al., 2007).

H_1: Chili farmers in the supermarket channel perceive a higher level of commitment from their buyers than chili farmers in the traditional channel.

Trust

Similar to commitment, trust is considered to be the critical determinant of a good relationship. Moorman et al. (1986, p.82) refers trust as "a willingness to rely on an exchange partner in whom one has confidence" (Moorman et al., 1986, p.82). The presence of trust enables exchange partners to act without process more information than they are capable of handling (Batt, 2003).

Compared to the traditional channel, trade transactions in supermarkets are characterized by closer coordination between supermarket buyers and suppliers. Trust between exchange partners, therefore, becomes important. The ability of farmers to comply with the strict requirements of supermarkets determines the success of their relationships. Likewise, farmers are less likely to participate in modern markets if they have a lack of trust in their buyers (Blandon et al., 2009). For example, in the case of chilies, late payments by supermarket buyers cause the serious consequence of reduce cash flow for small farmers.

Blandon et al. (2009) demonstrates that vegetables farmers selling to supermarkets in Honduras have a higher level of trust in their buyers than farmers selling to traditional channels. In the case of beef in Brazil, Vieira and Trail (2008) find that frequent transactions do not always transform into trust as indicated by the low levels of trust between the beef processor and their buyers in modern markets. However, similar to Blandon et al. (2009), Lu et al. (2010a) emphasize the importance of trust in modern markets. They report that with a high level of trust, farmers tend to be more reliable and less likely to violate their promises specified in the contracts. From the perspective of buyers, a higher level of trust increases the buyers' confidence that their contract will be fulfilled by farmers (Lu, et al., 2010). Based on the literature, it is hypothesized that:

H$_2$: Chili farmers in the supermarket channel perceive a higher level of trust of their buyers than chili farmers in the traditional channel.

Satisfaction

Satisfaction of exchange partners with past outcomes reflects a positive affective state based on the outcomes obtained from the relationships (Ganesan, 1994). In the case of farmer-trader relationships, farmers' satisfaction can be measured by comparing between the trader performance and the farmer expectations (Batt, 2004). When performance exceeds expectations, satisfaction will increase. Exchange partners will be dissatisfied when the performance falls below expectations. Geyskens et al. (1999, p.224) propose that satisfaction covers two aspects: (1) economic satisfaction refers to "a channel member's positive affective response to the economic rewards that flow from the relationship with its partner, such as sales volume and margins"; (2) non-economic

satisfaction is "a channel member's positive affective response to the non-economic, psychosocial aspects of its relationship".

Specific standards of chilies posed by supermarkets (e.g., color, length, and size) require farmers to make investments in some aspects (e.g., production practices and post harvest technologies). Farmers expect that prices that are paid by supermarkets for their chilies should be higher relative to the traditional market hence can cover the investment that they made. Additionally, closer vertical coordination with supermarket buyers may lead farmers to expect that they will receive other benefits for supplying to supermarkets such as extension services, crop transportation, management advice and stable prices (Eathon and Shepherd, 2001). Receiving economic and non-economic benefits from supermarket buyers is crucial to the farmers affecting their perception of satisfaction in their relationships. Blandon et al. (2009) find that supermarket farmers have higher levels of satisfaction with their buyers than traditional channel farmers. Thus it is hypothesized that:

H_3: Chili farmers in the supermarket channel have a higher level of satisfaction with their buyers than chili farmers in the traditional channel.

6.3 Sample and measurements of constructs

In Chapter 5, the 18 households with negative incomes were removed because log income with negative number is undefined. This chapter does not use the variable of household income. Hence, all 485 respondents in the traditional channel and 112 respondents in the supermarket channel are analyzed.

Relationship quality is conceptualized through three variables: trust, satisfaction and commitment. These three variables are latent variables that cannot be measured or observed directly, but are formed from several manifest variables. A manifest variable

is a variable that can be directly measured or observed. A latent variable is formed from several manifest variables.

Commitment is measured through three manifest variables as used by Kwon and Suh (2004) and Morgan and Hunt (1994). Trust is measured through three manifest variables following Gyau and Spiller (2007). Satisfaction is measured through four manifest variables related to economic satisfaction (from the perspective of price aspect) and non-economic satisfaction - adapted from Batt (2003), Geyskens et al. (1999), and Gyau and Spiller (2007). In the questionnaire, a five-point Likert scale from one (strongly disagree) to five (strongly agree) was utilized to rate the level each manifest variable.

During the survey, all chili farmers were asked to answer each manifest variable in the relationship quality variables with respect to their main buyer. A main buyer refers to a buyer that the chili farmer considered to be the most important in terms of the larger proportion of chili quantities that the farmer sells to a buyer.

6.4 Statistical analysis

Initially factor analysis is applied to test the ability of the manifest variables to measure the latent variables. The reliability of the measurement scale of manifest variables with respect to their latent variable is tested using some tests including the KMO-MSA, Bartlett's test, and Cronbach Alpha.

In the next step, a discriminant analysis is performed in order to test the hypotheses whether there are significant differences in three relationship quality variables (commitment, trust and satisfaction) of the chili farmers that sell their produce to supermarket and traditional channels. A discriminant analysis is preferred to t-test since it allows comparing two groups in terms of group centroids, thereby taking into account the interactions between the individual variables (Ndubisi and Wah, 2005). The

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dependent variables in the discriminant analysis are the two channels: the traditional and the supermarket channels. The independent variables are the three relationship quality variables (commitment, trust and satisfaction). In order to characterize and put the interpretation of the results of the study into perspective, selected demographic variables are compared for each group (Chapter 4). These variables are factors that might contribute to evaluate the relationship quality with buyers by chili farmers such as land size, education, age, and farming time (Ósterberg and Nilsson, 2009; Gyau et al., 2009, 2011).

6.5 Results

Table 6.1 presents the factor loading from the factor analysis of the three-variables of relationship quality: commitment, trust and satisfaction. The factor loading for all manifest variables with respect to their relationship quality variables is above 0.5 except one manifest variable on trust; therefore, this manifest variable is eliminated in the analysis (Nunnaly, 1978). The values of KMO-MSA are within the accepted threshold (equal to and above 0.5) and the values of Bartlett's test of Sphericity are significant at the 5% level. With Cronbach's alpha on commitment and trust equal to and above 0.7 respectively, the variables are on the recommended threshold (Nunnally, 1978). However, satisfaction which is explored through four items has a Cronbach's alpha result of 0.65, which is below the minimum adequate value of 0.7 (Nunnally, 1978). Following the example of Batt (2003) in which he permits a variable of goal compatibility with a Cronbach's alpha result of 0.66, the satisfaction variable in this study is considered acceptable. Moreover, some studies consider any resultant value, which yields a Cronbach's alpha values above 0.6 as acceptable and sufficient for further analysis (Garbarino and Johnson, 1999; Gyau et al., 2009; Smith, 1998b).

Table 6.1 Factor analysis of relationship quality variables

Relationship quality and their manifest variables	Factor Loading
Commitment	
I would not sell to other buyers because I like being associated with my buyer.	0.718
Our relationship is something that we are very committed to.	0.820
I care about the long-term success of the relationship with my buyer.	0.819
Cronbach Alpha: 0.70 KMO: 0.65 Bartlett's test of Sphericity: 320.91***	
Trust	
My buyer always keeps his promises.	0.899
I receive payment on time.	0.899
I believe the technical and market information provided by my buyer [a].	
Cronbach Alpha: 0.76 KMO: 0.5 Bartlett's test of Sphericity: 283.34***	
Satisfaction	
The buyer offers me satisfactory prices for my chilies.	0.706
I am very satisfied with the price that my buyer offers me.	0.699
My buyer deals with me as expected.	0.667
My buyer is quick to handle my complaints.	0.722
Cronbach Alpha: 0.65 KMO: 0.69 Bartlett's test of Sphericity: 305.82***	

Note: [1]Based on Bartlett's test of Sphericity: ***Significant at the 1% level
      [a] Item deleted due to low factor loading

The data in Table 6.2 presents the means and standard deviations of the relationship quality using discriminant analysis. Compared to farmers in the traditional channel, farmers in the supermarket channel have higher means of commitment (0.35 versus -0.08) and satisfaction (0.46 versus -0.11). Means of the trust in the traditional channels is higher compared to the supermarket channel (0.01 versus -0.03).

Table 6.2   Mean and standard deviation of relationship quality in the traditional and supermarket channels

Variable	Traditional channel		Supermarket channel	
	Mean	Std. Dev.	Mean	Std. Dev.
Commitment	-0.081	1.030	0.352	0.766
Trust	0.006	0.972	-0.027	1.117
Satisfaction	-0.106	1.023	0.458	0.741

Table 6.3 provides the test of equality of means for all the variables in the analysis. There are significant differences between these two channel with respect to

commitment (p-value=0.000) and satisfaction (p-value=0.000), but no significant difference is found in the case of trust. As expected, supermarket buyers are perceived better by chili farmers in terms of commitment and satisfaction compared to buyers in the traditional channel. The farmers in the supermarket channels indicate that they are very satisfied with their buyers since the buyers always offer satisfactory price, are quick to handle farmers' complaints and deal with farmers' as expected. Consequently, the farmers wish to maintain their long-term relationships with their buyers. This is not the case for trust since it perceived lower compared to commitment and satisfaction by farmers in the modern channels. In contrast to the respondents in Lu et al. (2010a) who emphasize the important of trust in modern markets, the response of chili farmers in the supermarket channel in this study suggests that buyers are less likely to keep promises and seem less willing to provide timely payment.

Table 6.3 Tests of equality of means between traditional and supermarket channels

Variable	Wilks' Lambda	F-ratio	Significance	Standardized discriminant function
Commitment	0.971	17.595	0.000	0.377
Trust	1.000	0.098	0.754	-0.370
Satisfaction	0.951	30.372	0.000	0.808

Note: Canonical correlation coefficient = 0.244, Wilk's Lambda = 0.940, Chi square = 36.55, significance level = 0.000.

To attempt to understand the perceptions of farmers regarding relationship quality with their buyers, the household and farm characteristics are compared for each group. As indicated in Chapter 4 (Table 4.2), there is no significance difference between the land size of farmers who sell to traditional and supermarket channels. The result is similar to Gyau and Spiller (2009) who find that the firm size does not differ between exporters of fresh fruit and vegetables in Ghana who are selling to different types of buyers in Europe. This indicates that low level of relationship quality between farmers

and their buyers in the traditional channel compared to farmers who sell to supermarket buyers might not result from the fact that farmers in the traditional channel are small and therefore are not able to negotiate with their buyers.

A significant difference between education, age and farming time for the farmers who sell to traditional and supermarket channel is observed (Table 4.1 in Chapter 4). Supermarket farmers have a high level of education and a younger age compared to those selling to traditional channels. This perhaps might contribute to the better evaluation of the supermarket buyers by chili farmers compared to those selling to traditional channel. Supermarket farmers have less numbers of years of growing chilies. This is perhaps they are tend to be younger

Among the three hypotheses put forward, this study accepts two hypotheses: chili farmers selling to supermarket channels perceive higher perception of commitment and satisfaction. The other hypothesis, i.e., chili farmers in the supermarket channels perceive higher level of trust for their buyers than those in the traditional channel is rejected.

It should be noted, however, that farmers in both channels have a higher level of variability in terms of the relationship quality variables (i.e., commitment, trust and satisfaction) as shown by the high value of standard deviation in Table 6.2. A large value of standard deviation implies that the individual data points fall farther from the mean value. This indicates that farmers in both channels behave in a diverse manner in terms of their relational behavior. Discriminant analysis can be utilized to predict which group (channel) a particular respondent should belong to on the basis of its independent variables (Table 6.4). Each respondent is classified into one of the two groups based on the probability densities derived from scores of discriminant function. Table 6.4 indicates about 51% of farmers who are actually in the traditional channel is predicted

to be in the supermarket channel, while around 22% of the respondents in the supermarket channel are predicted to be in the traditional channel. Overall, by using two groups and the relationship and demographic variables, 54% of all respondents are correctly classified.

Table 6.4 Predicting results using three relationship quality variables

| Actual group | Predicted group membership | | Number of case |
	Traditional channel	Supermarket channel	
Traditional channel	236	249	485
	(48.71%)	(51.29%)	
Supermarket channel	25	87	112
	(22.32%)	(77.68%)	

Note: 54.12% of original grouped cases correctly classified.

As shown in Table 6.4, 49% of traditional channel respondents and 78% of supermarket respondents are classified correctly. Other respondents are classified incorrectly. The proportions of respondents that are classified incorrectly in the case of traditional channels are 51% and 22% in the case of supermarket farmers. In discriminant analysis, these respondents are overlap between the two groups (the traditional and supermarket channels). Given the number of overlapping respondents is relatively large (249 respondents in the traditional channel and 25 respondents in the supermarket channel or 274 out of 597 total respondents in this study); it is interesting to clarify the differences and similarities of this group with the two initial groups (the traditional and supermarket channels).

In this study, the overlapping respondents are called the group of modernizing farmers. It refers to the farmers in the traditional channel that already behave partly like supermarket farmers and farmers in the supermarket channel that behave partly like traditional channel farmers. Respondents from the traditional farmer group that are classified correctly (236 respondents out of 485 respondents in the traditional channel) are classified into the group of conventional farmers. This group behaves as traditional

farmers in nature. Respondents from the supermarket channels that are classified correctly called the group of modern farmers (87 respondents out of 112 respondents in the supermarket channel) and they behave naturally like what modern farmers should. Hence, there are three groups that can be compared. Table 6.5 provides the differences and similarities of the three groups in terms of the three relationship quality variables. To characterize the three groups, selected variables of farm and household characteristics are also presented. A Tukey's honestly significant differences (HSD) test is utilized to examine further significant differences across the groups.

Table 6.5   Three groups of chili farmers based on discriminant analysis prediction

Variables	Groups 1:conventional farmers (n=236)		Group 2: modernizing farmers (n=274)		Groups 3: modern farmers (n=87)	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Relationship quality variables						
Commitment	-0.654^a	1.09	0.373^b	0.70	0.599^{bc}	0.55
Trust	-0.022	0.90	0.022	1.06	-0.009	1.06
Satisfaction	-0.897^a	0.87	0.549^b	0.54	0.705^{bc}	0.51
Selected farm and household characteristics						
Land size	0.69	0.74	0.73	0.85	0.77	0.83
Education	6.50^a	2.74	6.64^a	3.21	7.70^b	2.99
Age	46.95^a	11.11	45.55^{ab}	11.16	43.55^{bc}	10.21
Farming time	9.91^a	7.50	8.77^a	6.35	6.70^b	5.13

Note: [abc] different letters indicate significant mean differences ($\alpha=0.05$, post hoc Tukey test)

Group 1 (conventional farmers) comprises 236 respondents (Table 6.5). It is characterized by a lack of commitment, trust and satisfaction. The means of the three variables are negative in group 1. Group 2 (modernizing farmers) consisting of 274 respondents tends to have a moderate level of commitment and satisfaction. There are 87 respondents included in group 3 (modern farmers). This group is characterized by the highest levels of satisfaction and commitment relative to the other groups.

Table 6.5 also presents selected farm and household characteristics of the three groups. The analysis suggests that land size does not differ between the groups. There are differences among the groups regarding education, age and farming time ($\alpha=0.05$). Overall, the group of modern farmers have the highest levels of education, youngest age, and least numbers of years in chili production.

6.6 Discussion and summary

An emerging literature on the agri-food relationship has demonstrated the importance of establishing and improving relationship quality between farmers and buyers. In the era of supermarkets, the relationship quality between exchange partners involved in the supermarket chains have been explored in some studies (Blandon et al., 2009; Lu et al., 2010a; Vieira, 2008). Supermarkets set modern procurement practices which differ from those used in traditional markets. In order to comply with the new procurement practices of supermarkets, changes in the relationships between farmers and supermarket buyers have become necessary. This chapter examines the quality of relationships between chili farmers and buyers from the farmers' perspective in the traditional and supermarket channels. The results reveal important differences of farmer perceptions regarding relationship quality with their buyers in the two channels.

Farmers in the traditional channels have negative commitment and satisfaction: as shown by the negative values of the means. They perceive that they do not receive reasonable prices from their buyers. They feel that their buyers do not deal with them as expected. Moreover, if farmers have complaints (e.g., regarding chili prices, grading systems), the buyers give a slow response in respect to these grievances. Such low levels of satisfaction seem to lead to low levels of commitment: i.e., if chili farmers can find alternative buyers, they exhibit little hesitation in selling their chili to the new

buyer. The implication is that where buyers want to obtain continuous and uninterrupted supply from their suppliers, they need to do more in terms of paying better prices, responding quickly and swiftly to grievances and giving guidelines on sorting and grading etc. Satisfaction can enhance the commitment of farmers to stay in long-term relationships with their buyers (Garbarino and Johnson, 1999).

In contrast, supermarket farmers have a better perception of commitment compared to farmers in the traditional channels. The level of farmers' commitment is an important aspect in the supermarket channel (Boselie et al., 2003; Weatherspoon and Reardon, 2003) since this channel needs chilies consistently with respect to volume and quality. Supermarket farmers perceive that they are more likely to establish long-term relationships with their buyers. They are less likely to sell to other buyers since they like being associated with their buyers. A high level of farmer's commitment reduces uncertainties for supermarket buyers in terms of quantity and quality of chilies.

Likewise, supermarket farmers perceive higher levels of satisfaction than traditional channel farmers. Supermarket farmers perceive that transacting with supermarket buyers provides economic and non-economic benefits to them. Economic benefits relate to the fact that supermarket buyers have offered satisfactory price for their chilies, while non-economic benefits relate to the fact that their buyers have handled farmers' complaints promptly and treated farmers as they expected during their transactions. The fact that supermarket farmers perceive higher level of satisfaction with their buyers is in line with Blandon et al. (2009).

However, supermarket farmers report that their buyers are less likely to keep promises and seem less willing to provide timely payment. As a result, they demonstrate less trust in their relationships with their buyers. Payment delay (e.g., within one week or more) that is common practice in the supermarket channels can influence farmers'

cash flow. This situation can be exacerbated when buyers provide payments longer than the time specified in their agreements. The fact that farmers in the modern markets have low level of trust with their buyers is in line with the case of a beef processor supplying to modern markets in Brazilia (Vieira and Trail, 2008) showing that frequent transactions does not always transform to trust. With a low level of trust, farmers will be more likely to violate their promises specified in the agreement with their buyers. To improve their relationship with farmers in the supermarket channel, buyers could make payments more promptly and follow through with their promises. Trust can enhance commitment (Kwon and Suh, 2004).

This study also compares selected demographic and farm characteristics of the supermarket and traditional channels that might influence farmers' perceptions. The variables are land size, education, age, and farming time. Land size does not differ between the two channels. This suggests that the perception of relationship quality between farmers and buyers in the traditional channels might not result from the differences in land size. This supports the results of Gyau and Spiller (2009) suggesting that firm size does not vary between suppliers who export fresh fruit vegetable from Ghana to different types of importers in Europe.

Supermarket farmers have significantly higher levels of education, less numbers of years of growing chilies and are younger. Younger farmers with a high education level might communicate effectively with their buyers and better understand the information provided by their buyers. Hence, they perceive relationship quality better than traditional channel farmers.

This study finds that supermarket farmers who have less numbers of years of growing chilies have better perceptions of relationship quality compared to traditional channel farmers. This is contrary to Gyau and Spiller (2009) who suggest that the longer

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the suppliers' experience in the fresh fruit vegetable business, the better their perception of relationship quality. As explained in Chapter 5, farmers who have more numbers of years of growing chilies are less likely to sell to supermarket channels since they need to change their traditional practices to supply to supermarket farmers. In other words, farmers who have less numbers of growing chilies are more likely to try new production and post-harvest practices to fulfill the entire requirements posed by supermarkets (color, variety and length). Farmers who have less numbers of years of growing chilies tend to include younger respondents. According to Sharma et al. (2009), younger farmers tend to be more enterprising, make decisions more quickly, and are more willing to try new technologies.

The results of discriminant analysis suggests that apart from the original groups that this chapter has defined (traditional and supermarket groups), there is one group of respondents whose perceptions of relationship quality with their buyers fall between these two original groups. Discriminant analysis calls these respondents an modernizing farmer group. Given there are a large number of respondents that fall in this group, it is important to consider the existence of this group. Chili farmers thus can be classified into three groups, with differing perceptions on relationship quality, particularly commitment and satisfaction. Similar to the results of the original groups, there is no significant differentiation regarding trust between these three groups suggesting that chili farmers have lack of trust with their buyers. As explained previously, buyers can improve farmers' trust by make payments more promptly, and follow through with their promises and commitments. The post hoc Tukey test also suggest that these three groups also differ regarding education, age, and farming time.

Group 1 (conventional farmers) have the least perception of satisfaction with and commitment to their buyers. Respondents in this group have the highest numbers of

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years of growing chilies, and oldest age, but low level of education. Respondents in group 1 are comfortable selling at the spot market price. Traders might improve their relationships by providing quicker responses in handling farmers' complaints and concerns, and provide satisfactory prices (e.g., price based on current market situations).

Group 2 (modernizing farmers) have moderate levels of commitment and satisfaction with their buyers. They have education level, age and years of growing chilies in between group 1 (conventional farmers) and group 3 (modern farmers). To improve their relationship with farmers, traders could provide responses to farmers' complaints in a more timely manner, follow on their commitment, and offer satisfactory prices.

Group 3 (modern farmers) perceive high levels of satisfaction and commitment. Farmers in this group have the highest levels of education, younger age, but less numbers of years in chili production. However, similar to original group of supermarket channel, respondents in this group have negative perception on trust. Hence, with respect to this group, traders still should work to improve farmers' trust.

This chapter has compared the level of relationship quality between farmers and buyers in the supermarket and traditional channels. Supermarket farmers have better perception with respect to commitment and satisfaction compared to traditional channels. Farmers in both channels perceive low levels of trust to their buyers. The results from discriminant analysis confirm a large number of farmers that have perceptions of relationship quality in between the original groups (traditional and supermarket groups). Hence, chili farmers can be classified into three groups with respect to relationship quality with their buyers: conventional farmers, modernizing farmers and modern farmers.

7. Contractual arrangements, perception of supermarket channels and factors influencing farmers' commitment

7.1 Introduction

The rapid increase of supermarkets in many developing countries has led to a transformation of the fresh produce supply chain (Reardon et al., 2009). In particular, the implementation of private standards by supermarkets and the problems faced by small farmers entering in the supermarket channels have led to closer vertical coordination in the supply chains of many food products (Swinnen, 2007; Reardon et al., 2009). A contract is one form of vertical coordination between a spot market and vertical integration (Minot, 2007). Contracts link small farmers to modern market chains and solve a number of problems faced by small farmers attempting to access modern markets such as accessing credit and output markets and information asymmetries between farmers and buyers (Minot, 2007; Reardon et al., 2009).

The literature on contracts highlights a wide variety of contractual arrangements between farmers and contractors (Bijman, 2008; Eathon and Shepherd, 2001; Farina, 2005; Henson et al., 2005; Guo et al., 2007; Lawrence et al., 1997; Schipmann and Qaim, 2011; Simmons et al., 2005). The variations include the forms/types of contracts, details/specification of contracts and the motivation of farmers to contract. Given these variations, Bauman (2000) suggests the need to examine contractual arrangements between farmers and buyers on a case by case basis.

Eathon and Shepherd (2001) propose that the success of a contractual arrangement between farmers and buyers is determined by a long-term commitment from both parties. Commitment may take the form of an informal promise or a formal promise (Fischer and Reynolds, 2010). A big price fluctuation that commonly occur in agricultural products, however, can be a major problem to farmers' commitment levels.

When market prices increase above the contracted prices, contracted farmers may sell their produce to other buyers at higher prices than their buyers had contracted. To avoid side-selling by farmers, some contractors offer price premiums above the market price (Miyata et al., 2009).

The marketing literature emphasizes the importance of non-economic variables such as trust and satisfaction as important factors influencing the exchange partners to commit to their market relationships (Garbarino and Johnson, 1999; Kwon and Suh, 2004; Morgan and Hunt, 1994). Commitment improves the sustainability of relationships since business partners are more likely to continue to work with their exchange partners (Fischer and Reynolds, 2010). This reduces transaction costs to search for alternative exchange partners and to analyze trading partners' credibility and reliability. Despite the importance of commitment in contractual arrangements between farmers and buyers, to the best of our knowledge, no study to date has explored the determinants of commitment in the contractual relationships between farmers and buyers in the supermarket era. In particular, no research has analyzed how Indonesian producers of chili can become committed to their buyers. This is important since the chili crop in Indonesia exhibits large price fluctuations, there is an increasing probability of sellers switching from one buyer to the other.

In this chapter the aim is to examine the nature of contractual relationships between farmers and buyers from the perspective of chili farmers who sell their produce through the traditional and supermarket channels. The nature of contractual arrangements covers the forms/types of contracts (oral, written, or no agreement), and details/specifications of contracts (quality, quantity, delivery time, and procedure and time for paying farmers. Second, in this chapter the aim is to understand the perceptions of farmers regarding their motivation and constraints to supply to supermarket channels.

According to literature, the motivation and constraints of small farmers to engage in contractual arrangements with modern markets vary. The motivation can include higher prices, market access, and input provision, while constraints faced by small farmers may include access to capital, farm inputs and knowledge required to meet the specific requirements of supermarkets. Third, this chapter explores factors that influence commitment in the contractual relationships between farmers and buyers in these two channels. As explained above, several factors could influence farmers' commitment to stay with their buyers, including price, socio demographic variables (e.g., education, age) and relationship quality variables (trust and commitment).

This chapter is organized as follows: the next section provides sample and statistical analysis. Next, the empirical model followed by results. The last section contains the summary and discussion.

7.2 Sample and statistical analysis

The analysis of the contractual arrangements includes the 485 respondents in the traditional channel and 112 respondents in the supermarket channel. The contractual arrangements and perception of supermarkets are analyzed using the proportions or means of the samples. The t-test and chi-square test are applied to examine whether the means and proportions of the samples selling to supermarket channels are statistically different from the samples selling to traditional channels, respectively. A regression analysis using OLS method is utilized in exploring determinants of farmers' commitment. Prior to regression analysis, a correlation analysis is conducted. This analysis is important in order to check whether different dependent variables in the regression analysis are highly correlated. The OLS method does not allow high correlations among different dependent variables since they may change erratically in

response to small changes in the regression analysis (Greene, 2008). There is no agreement regarding the values of coefficient correlations among dependent variables, but the values below 0.7 or 0.8 might be satisfied to proceed the regression analysis.

7.3 Empirical model

The first step in the regression model is to investigate the factors which influence farmers' commitment to sell to the same buyer. Some authors in the marketing literature such as Garbarino and Johnson (1999), Kwon and Suh (2004), and Morgan and Hunt (1994) view that commitment is the highest construct in the relational quality model. Hence, in this study farmers' commitment is treated as a dependent variable which influence by behavioral attributes (trust and satisfaction), absolute price (price of chilies) and selected socioeconomic and farm characteristics (land size, age, farming time, and education).

Commitment

Commitment is a central outcome variable in long-term relationships between relational exchanges. Morgan and Hunt (1994, p.23) define commitment as "an exchange partner believing that an ongoing relationship with another is so important as to warrant maximum efforts at maintaining it; that is, the committed party believes the relationship is worth working on to ensure that it endures indefinitely". Commitment ensures the strength, stability, and sustainability of a relationship (Dwyer et al., 2007; Fischer and Reynolds, 2010; Morgan and Hunt, 1994;). The likelihood to continue doing business with exchange partners increases when commitment exists (Hennig-Thurau and Klee, 1997).

Commitment has an important role in the contractual arrangements between a farmer and a buyer. A farmer needs to commit to supply a specific commodity in

quantities and at quality standards determined by the buyer (Eathon and Shepherd, 2001). The buyer also needs to commit to support the farmer's production and to purchase the commodity. To be successful the contractual arrangements between a farmer and a buyer require a long-term commitment from them. A limited commitment between the two party leads to limited duration of market relationships which may potentially jeopardize investments in crop production and other relevant assets made by the two parties.

Trust

Trust generally is viewed as an essential ingredient for successful relationships (Garbarino and Johnson, 1999). In the marketing literature, it has been defined in various ways: "a willingness to rely on an exchange partner in whom one has confidence" (Moorman et al., 1986, p.82). Dwyer et al. (1987, p. 12); and "a party's expectation that another party desires co-ordination, will fulfill obligations, and will pull weight in the relationship". It exists when trading participants feel confidence in the reliability and integrity of their exchange partners (Morgan and Hunt, 1994). Trust is a determinant of commitment because under a relationship with high level of trust, the trading partners will desire to commit themselves to such relationships (Morgan and Hunt, 1994). Authors such as Garbarino and Johnson (1999), Kwon and Suh (2004), and Wong and Sohal (2002) find a positive relationship between trust and commitment.

Trust has an important role in the contractual arrangements, particularly oral/verbal contracts. In the case of the contractual arrangements between farmers and an exporter company in Zimbabwe, Henson et al. (2005) report that their contracts are mostly verbal/oral broadly working on the basis of trust and subject to on-going renegotiation. Trust can reduce the threat of conflict between the two parties, so that the presence of trust lowers the probability that one party will act opportunistically even if

he has the opportunity to do so (Masuku et al., 2003). Low levels of trust between the contracted parties will undermine their contracts (Eathon and Shepherd, 2001). Hence, this study hypothesizes:

H_1: There is a positive relationship between the level of trust and the degree of commitment

Satisfaction

Similar to trust, satisfaction enhances the commitment of exchange partners to stay in the market relationships with their partner relationships (Ganesan, 1994). Geyskens et al. (1999, p.224) view that satisfaction should capture both the economic and non-economic aspects of the exchange. Non-economic satisfaction is "a channel member's positive affective response to the non-economic, psychosocial aspects of its relationship, in that interaction with the exchange partner are fulfilling, gratifying, and easy". If an exchange partners feel satisfied with the non-economic aspect of his relationship, they give positive value and continue to work with partners since they believe that the partner is concerned, respectful and willing to share ideas. Economic satisfaction refers to "a channel member's positive affective response to the economic rewards that flow from the relationship with its partner such as sales volume and margins". The success of relationship in economic satisfaction is considered based on economic expectation of exchange partners that can be related to price, product quality and service (Fischer and Reynolds, 2010). Hence, economic satisfaction requires a specific level of knowledge about prices and products to assess whether economic outcome meet the expectation of an exchange partner or not.

In the contractual arrangements there is a number of situations that can lead to farmer dissatisfaction. For example, a mid-season change in pricing and management's rudeness to farmers will generate dispute (Eathon and Shepherd, 2001). If such issues

are not resolved, these may result in farmers withdrawing from the contractual arrangements. In line with the literature, it is hypothesized that:

H_2: Satisfaction has a positive influence on commitment

The variables of commitment, trust, and satisfaction used in this chapter are similar to those that have already used in Chapter 6. As outlined in Chapter 6, commitment, trust and satisfaction are latent variables that cannot be measured directly. The three variables are conceptualized through several manifest variables. Commitment is conceptualized through three manifest variables as used by Kwon and Suh (2004) and Morgan and Hunt (1994). Trust is conceptualized through three manifest variables following Gyau and Spiller (2007). Satisfaction consists of four manifest variables related to general price satisfaction and non-economic satisfaction adapted from Batt (2003), Geyskens et al. (1999), and Gyau and Spiller (2007).

As indicated in Chapter 6, a principal component analysis is applied to the latent variables which the reliability of the measurement scale of manifest variables with respect to their latent variables is tested using several tests including KMO-MSA, Bartlett's test, and Cronbach Alpha. Based on Table 6.1 in Chapter 6, the values of these tests for the three relationship variables (commitment, trust, and satisfaction) are within the recommended threshold.

Price of chilies

In neoclassical economics, market price is the key coordination mechanism of exchange relationships. Market price is determined by interaction by supply and demand in the market. In the case of the chili commodity in Indonesia, chili prices are determined by a daily situation of demand and supply in the major wholesale markets.

The price information from these markets is utilized as a baseline for other traders involved in the chili supply chains including supermarket buyers.

In Indonesia, the chili crop exhibits a large price fluctuation; hence, both farmers and buyers are faced with price risk. Experience of low prices reduces the commitment of farmers to grow chilies (White et al., 2007) interrupting supply to their buyers. However, when the price increases, many buyers from outside farmers' villages visit farmers and offer higher prices to buy their chilies. Farmers are therefore aware that market prices must be higher when some traders visit them. This potentially leads to side-selling, since farmers sell their produce to buyers who offer higher prices. The chili price paid to farmers is a very important aspect because the chili crop is an important source of cash flow income for them. The variable of chili prices in this study refers to average chili prices received by farmers over the last season of the survey (IDR per kg). Based on the discussion, it is hypothesized that:

H_3: The higher the chili price (IDR/kg) offered by their buyers, the higher the farmers' commitment.

Land size

It is expected that farm size is positively associated with farmers' commitment. This is because large farmers are more likely to be able to use their size to negotiate better and special conditions with their buyers that may not be available to smaller farmers; hence, they are expected to rate higher level of commitment (Gyau et al., 2011). Caldwell et al. (1990) provide evidence that the size of firms is positively related to commitment. This study uses overall land size of farmers (ha) as a measure of firm size. It is hypothesized that:

H_4: The size of land has a positive relationship with commitment.

Respondent's age

The effect of respondents' age and commitment may be ambiguous. Österberg and Nilsson (2009) expect that the variable of age associated positively to commitment, but in the analysis they find that age does not influence commitment. Lok and Crawford (1999) find a significant relationship between age and commitment. The variable of respondent's age in this study refers to age of household head (years). Following Lok and Crawford (1999) it is hypothesized that:

H_5: There is a positive relationship between age and commitment.

Farming time

Years of doing farming might contribute to the better evaluation commitment. Gyau and Spiller (2009) report that suppliers with more experience in business might have designed a strategy to deal with their buyers in such a way that they might be satisfied and want to stay in that relationship. Lok and Crawford (1999) provide evidence that increased experience is positively related to commitment. This study uses numbers of years of growing chilies as measure farming time. This study hypothesizes that:

H_6: Farming time has a positive relationship with commitment.

Education

In the case of chili farmers, a high level of education may facilitate access farmers to market information. Hence, highly educated farmers may easily able to find other alternative buyers. DeCotiis and Summers (1987) provide evidence for a negative relationship between education and commitment. The variable of education in this study refers to years of formal education of household head. As a result, this study hypothesizes that:

H_7: Education level has a negative relationship with commitment.

7.4. Results

7.4.1 The nature of contractual arrangements

Table 7.1 shows that the majority of farmers in the traditional channel and supermarket channel report that they have oral/verbal contracts with their buyers, 87% and 94%, respectively. About 12% of traditional channel farmers state that they do not have agreement prior to sale with their buyers, whereas 5% of supermarket farmers sell their chilies without any agreement prior to sale. Written contracts are not common practices either in the supermarket channel or the traditional channel, as stated only about 1% of farmers in both channels.

Table 7.1   Contractual arrangements and the details as stated by respondents in the traditional and supermarket channels (Percentage)

Description	Traditional channel (n=485)	Supermarket channel (n=112)	Signifi-cance[1]
Oral/verbal agreement	86.60	93.75	
No agreement prior to sale	12.37	5.36	
Written agreement	1.03	0.90	
Total	100.00	100.00	4.60

Note: [1]Based on Pearson chi-square test: ***Significant at the 1 % level, ** significant at the 5% level, * significant at the 10% level.

For farmers who have either oral/verbal agreement or written agreement, details of the contractual arrangements with their buyers are obtained. As shown in Table 7.2, significant differences between the two samples in terms of the details of the agreements are found. In the traditional channel, price is the most important aspect of the contracts as indicated by 81% of respondents versus only 35% of supermarket farmers. For supermarket farmers, time of payment is the most important aspect of the contracts as reported by 73% of respondents, whereas only 50% of traditional channel farmers have this agreement.

Table 7.2　Details of contractual arrangements as stated by respondents in the traditional and supermarket channels[a]

Variable	Traditional channel (n=485)		Supermarket channel (n=112)		Signifi-cance[1]
	Mean	Std. Dev.	Mean	Std. Dev.	
Price	0.81	0.02	0.35	0.05	10.30***
Time of payment	0.50	0.50	0.73	0.45	-4.22***
Quantity	0.32	0.47	0.27	0.45	0.96
Color	0.24	0.43	0.52	0.50	-5.73***
Other inputs provided on credit	0.16	0.37	0.27	0.45	-2.72***
Sorting by color	0.09	0.29	0.53	0.50	-11.90***
Seed provided on credit	0.09	0.29	0.22	0.41	-3.62***
Sorting by size	0.05	0.23	0.35	0.48	-9.22***

Note: [1]Based on t-test: *** significant at the 1% level, ** significant at the 5% level, * significant at the 10% level. Std.Dev = standard deviation. [a]The questions were asked only for farmers who have oral or written agreements

A significantly higher shares of farmers in the supermarket channel (52%) relative to traditional channel farmers (24%) state that they have agreement in terms of color of chilies with their buyers (Table 7.2). In this case, farmers have to deliver bright color (red or green, depend on the type of chilies) to their buyers. About 53% and 35% of supermarket farmers state that grading criteria (i.e., sorting by color and size) are important aspects in the agreements with their buyers, whereas only 9% and 5% of traditional channel farmers have the agreements related to these aspects. Compared to respondents in the traditional channel, the availability of seed and other inputs provided on credits plays important roles in the supermarket channel: 22% versus 9% for seed and 27% versus 16% for other inputs.

In the literature, it is often suggested that selling to modern markets is associated with delays in payment (Henson et al., 2005; Schipmann and Qaim, 2011; Simmons et al., 2005). This is also true in the context of the chili commodity in Indonesia (Table 7.3). Farmers in the supermarket channel indicated that they had experience in payment delays which varied between within one week (68%) and more than one week (14%)

after product delivery. Payment at delivery is the most common practice in the traditional channel as indicated by 51% of the farmers.

Table 7.3 Payments and price bargaining positions as stated by respondents in the traditional and supermarket channels (Percentage)

Description	Traditional channel (n=485)	Supermarket channel (n=112)	Signifi-cance[1]
Payment methods			
At delivery	50.72	16.07	
1-7 days later	32.37	67.86	
More than week later	10.72	14.29	
Multiple payments	4.12	1.78	
Before harvest	2.06	0.00	
Total	100.00	100.00	58.74***
Price bargaining position			
I always accept the price he offers	44.54	63.39	
I usually bargain with him.	39.17	24.11	
I sometimes bargain with him	15.67	12.50	
I set the price and don't bargain.	0.62	0.00	
Total	100.00	100.00	13.71***
Change in the price bargaining position			
It has not changed	78.14	83.93	
I have more bargaining power than I used do	14.22	15.18	
I have less bargaining power than I used do	7.62	0.89	
Total	100	100	6.93**

Note: [1]Based on chi-square test: ***Significant at the 1 % level, ** significant at the 5% level, * significant at the 10% level

The majority of farmers in the supermarket and traditional channels stated they always accepted the price offered by their buyers (64%) (Table 7.3). Around 24% of supermarket farmers report that they sometimes bargain in terms of price with their buyers. About 45% of traditional channel farmers state that they always accepted the price offered by their buyers, while 39% of the farmers report that they sometimes bargain with their buyers. As shown in Table 7.3, for most respondents in the traditional and supermarket channels, the bargaining position remained unchanged over the reported five year period, 78% and 84%, respectively.

7.4.2 Perceptions of supermarket channels

Table 7.4 presents aspects that farmers perceive as the main advantages of selling to the supermarket channel. Farmers both in traditional and supermarket channels strongly identified higher price as the main advantages of selling to supermarkets, 88% and 86%, respectively. Similar results have also been reported in other studies. Guo et al., (2007) and Swinnen, (2007) for instance stated that price is the main motivation for farmers' participation to modern channels which similar to this study. As indicated in Chapter 4 (Table 4.10), supermarket farmers receive higher prices than traditional channel farmers. The higher price received by supermarket farmers can be associated with rewards for quality (Reardon et al., 2009). Farmers in the supermarket channel are more interested in sorting and grading activities compared to those in the traditional channel (see Table 4.10 in Chapter 4).

Table 7.4　The advantages and constraints of selling to supermarkets as reported by the respondents (Percentage)

Description	Traditional channel (n=485)	Supermarket Channel (n=112)	Total sample (n=597)
The advantaged of selling to supermarkets			
Higher price	87.63	85.71	87.27
Access to good seed	12.16	8.93	11.56
Getting inputs on credit	7.22	2.68	6.37
Technical assistance, learn new skill	6.19	4.46	5.86
Access to other input	3.51	2.68	3.35
Constraints for selling to supermarket channel			
Not enough experience	46.19	27.68	42.71
Low quality of product	39.98	41.07	39.70
Location far from buyers	30.31	22.32	28.81
Small farms, small quantities	26.80	30.36	27.47
Farmers has been tied down with trader	19.38	11.61	17.92
Can't supply all year (lack of irrigation)	18.14	24.11	19.26

Note: Farmers were allowed to select more than one advantage

For farmers in in the traditional and supermarket channels, access to certified seed is the second advantage (12% and 9%), while only a few of the farmers identify access to other inputs (4% and 3%), getting input on credit (7% and 3%), and technical assistance (6% and 4%) as the advantages of selling to supermarket channel.

Although selling to modern markets provides a higher price, in this study previous studies report that farmers often face several constraints including access to capital, farm inputs and knowledge required to meet the specific requirements posed by modern markets (Boselie et al., 2003; Dries et al., 2009; Reardon et al., 2009; Weatherspoon and Reardon, 2003). As shown in Table 7.4, this study also demonstrates several constraints perceived by chili farmers in both channels that might prevent them from participating in the supermarket channel. Farmers in the traditional and supermarket channels face six main constraints: not enough experience to supply to supermarkets (46% and 28%), low quality of product (39% and 41%), location far from buyer (30% and 22%), small farms (27% and 30%), lack of irrigation (18% and 24%), and farmers has been tied down to a particular trader (19% and 12%).

Table 7.5   Perceptions of respondents about what kind of government policies can improve supermarket participation (Percentage)

Description	Traditional channel (n=485)	Supermarket Channel (n=112)	Total sample (n=597)
Provide credit	53.20	50.89	52.76
Provide training in production methods	31.34	41.96	33.33
Provide training in marketing	27.01	9.82	23.79
Provide training in grades and standards	18.97	21.43	19.43
Provide information on prices and markets	13.61	17.86	14.41
Help organize farmers into groups	13.81	10.71	13.23
Improve roads in rural areas	12.58	8.04	11.73
Improve supply of horticultural seed	13.40	4.46	11.73
Improve supply of agricultural chemicals	11.34	10.71	13.23
Invest in irrigation	5.98	10.71	6.87

Note: farmers were allowed to select more than one factor

These constraints as outlined above are related to lack of knowledge regarding supply to supermarkets and limited access to supermarkets traders. This is perhaps because supermarkets require more stringent standards. Hence, as presented in Table 7.5, farmers in the traditional and supermarket channels perceive the training in production methods (31% and 42%), and grading and quality standards (19% and 21%), might help them fulfill the requirements.

7.4.3 Determinants of farmers' commitment

The correlation matrix among variables used in analyzing determinants of farmers' commitment is presented in Appendix 7. This matrix suggests that the correlations between different variables in the model are smaller than 0.7 suggesting that there is no highly correlated problem among the variables. Table 7.6 provides the parameter estimates for the determinants of commitment. The supermarket channel results are in the first two columns of the tables. The next two columns present results for farmers in the traditional channel. For supermarket and traditional channels, this study accepts three out of the seven hypotheses as formulated (H_1, H_2, and H_7).

As expected, trust and satisfaction have a positive influence on commitment for farmers in the two channels. Actual chili price does not influence the perception of chili farmers in their commitment to both channels. This finding implies that chili farmers not only consider the price that paid to them, but rather focus on whether their buyers can be trusted and satisfy them during the transactions.

For the farmers in the traditional channel, farming time has a significant and negative impact on commitment. Education has a significant and negative impact on farmers' commitment both to supermarket and traditional channels. However, the influence of education on commitment is relatively weak (significant at 10%).

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Table 7.6   Determinants of farmers' commitment in the supermarket and traditional channels

Variables	Supermarket channel		Traditional channel	
	Coefficients	p-value	Coefficients	p-value
Constant	0.519	0.171	0.219	0.324
Trust	0.123**	0.037	0.139***	0.001
Satisfaction	0.521***	0.000	0.454***	0.000
Actual chili price (IDR/kg)	0.000	0.609	0.000	0.924
Land size (ha)	0.097	0.142	-0.049	0.364
Age (years)	-0.006	0.353	0.002	0.639
Farming time (years)	-0.003	0.818	-0.016**	0.011
Education (years)	-0.033*	0.083	-0.025*	0.080
R-Square	0.407		0.272	
Adjusted R-Square	0.367		0.261	

Note: *** significant at the 1% level; ** significant at the 5% level; * significant at the 10% level

7.5 Discussion and summary

Procurement of high quality and safety standards for food products posed by modern markets requires greater investment by suppliers, particularly in new farming technologies and post-harvest handling (Reardon et al., 2009). Small farmers often face difficulties to make additional investments in production and post-harvest technology. To overcome such problems, modern markets have changed their trade relations with their suppliers from spot market relations to vertical coordination institutions.

Contracts are a common form of vertical coordination in food supply chains to address the problems faced by small farmers: lack the access to financial markets (credits), input markets (inputs), and information about production methods and market opportunities (Minot, 2007; Reardon et al., 2009). Working with contracted farmers enables modern markets to assure the consistency of volume and quality standards of products. Previous studies in the contracts show a wide variety of contractual arrangements between farmers and buyers in terms of forms/types and details/specifications of contracts. The perceptions of small farmers regarding their motivation to contract to supermarket channels also vary. This chapter provides

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empirical evidence of the contractual relationships between chili farmers and buyers in the traditional and supermarket channels with respect to the types and the details of the contracts, and the perceptions of farmers regarding their motivation and constraints to supply to supermarket channels. Given the importance of commitment in the contractual relationships, this chapter analyze factors that influence farmers' commitment.

The results indicate that oral/verbal agreements are preferred by farmers in the supermarket and traditional channels. This is because oral/verbal agreements are simpler and less costly than written agreements (Bijman, 2008). The fact that the majority of supermarket farmers have oral/verbal agreements with their buyers is similar to Henson et al. (2005) in the case of contractual arrangements between farmers and a company in Zimbabwe and Schipmann and Qaim (2011) in the case of contractual arrangements between sweet pepper farmers and their buyers from the government project.

The types and the details of the contracts differ between farmers in the traditional and supermarket channels. Price is the main aspect of the contract in the traditional channel. Chili crop exhibits large price fluctuations; hence, it is important for traditional channel farmers to ensure that their buyers will pay their chilies based on current market prices. Thus it is not surprising that a higher share of traditional channel farmers usually bargain more in terms of chili prices with their buyers than supermarket channels. In the supermarket channel, price is fixed and subject to renegotiation on a fortnightly basis. Supermarkets provide higher prices than traditional markets. This can explain why chili price is not an important aspect in the contractual arrangements between supermarket farmers and their buyers. Supermarket farmers also state that they always accept the price that their buyer offered. The majority of respondents in both

channels report that their price bargaining positions are not change over the last five years.

Grading and sorting are the most important aspects in the supermarket channel. This is because Indonesian supermarkets require specific quality standards, including chilies sorted by size and color. At the time of planting, a higher share of supermarket farmers state that they have agreements in terms of input productions in which farmer are provided with required inputs and seed under credit by their buyers. Another important aspect of the agreement in the supermarket channels is time of payment. The majority of farmers in the supermarket channel have experienced payment delays that vary between within one week and more than one week after chili delivery. Payment delays are common practice in the contractual arrangements in the case of fresh produce in Zimbabwe (Henson et al., 2005), sweet pepper in Thailand (Schipmann and Qaim, 2011), and broilers in Indonesia (Simmons et al., 2005).

The literature suggests a wide variety of farmers' perceptions regarding the advantages (motivations) to sell to modern channels (Guo et al., 2007; Schipmann and Qaim, 2011; Swinnen, 2007). This study shows that selling to supermarkets is associated with higher prices as perceived by farmers in both channels. A descriptive comparison in Chapter 4 demonstrates that supermarket farmers receives higher prices compared to traditional channel farmers, rewarding the quality differentiation. The fact that price is the main advantage suggests that economic incentive is the main motivation for farmers to participate in the supermarket channels. This finding is parallel with Guo et al. (2007) and Swinnen (2007) confirming that price is the main motivation for supermarket participation. Other advantages such as access to good seed, getting inputs on credit, technical assistance, and access to other inputs are identified as the advantages by only a few of respondents. This is perhaps because farmers can access

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such aspects from other sources. For example, the results in Chapter 4 indicate that farmers can access technical assistance from extension staff and farmer groups.

In line with previous studies reporting that farmers face several constraints to participate in the supermarket channels (e.g., Rao and Qaim, 2011; Schipmann and Qaim, 2010), this study demonstrates the existence of several major constraints that might prevent farmers from participating in the supermarket channel. The first and the second constraints include the farmers' lack of experience supplying to supermarkets and the low quality of products. Dealing with supermarkets differs to traditional markets as the transactions are more formal (Boselie et al., 2003) and requires farmers to comply with specific standards (Reardon et al., 2009). Other constraints perceived by the respondents are location far from buyers, small farms, lack of irrigation and the fact that farmers are tied down to a particular buyers. Yet what type of assistance is needed for small farmers to become capable supplying supermarkets? This study demonstrates that if governments want to help more farmers to participate in the supermarket channel, governments need to provide training in production methods, grade and standards, marketing. Apart from access to credit, farmers perceive that governments should also provide information on prices and markets, help organize farmers into groups and invest in irrigation.

The findings further suggest that to improve farmers' commitment in both channels, traders should not only focus on absolute price, but rather on trust and satisfaction variables. The fact that the variable of absolute chili price is not significant support Lu et al. (2010b) reporting that farmers are not always consider the highest possible prices in the transactions with their buyers. The result is also supported by Gyau et al. (2011) who describe how the actual price of milk does not significantly influence the relationship quality in the Germany dairy industry.

The finding that trust has a significant influence on commitment is in line with Garbarino and Johnson (1999), Kwon and Suh (2004) and Morgan and Hun (1994) who find that trust is associated positively with commitment. Hence, to improve farmers' commitment, traders should improve farmers' trust by providing payment on time and following through with their promises. Considering that respondents are small scale farmers who depend highly on chili production, payment on time is essential for providing cash money.

Satisfaction has a positive effect on farmers' commitment in both channels. The results are similar to Ganesan (1994) who suggests that satisfaction influences commitment between buyers and suppliers. Satisfaction can be improved by offering a fair price for farmers' products and providing quicker responses in handling farmers' complaints and concerns.

Age has no significant impact on farmers' commitment suggesting that perceived commitment does not result from the fact that those respondents are young or old. Similarly, land size does not have a significant impact on commitment indicating that small or big farmers are less likely to be able to use their size to negotiate better with their buyers. In contrast to the expectation, farming time has a negative impact on farmers' commitment in the traditional channel. As expected, education has a significant negative impact on commitments. Farmers with greater numbers of years of growing chilies and better education may have more market information and hence are easily able to find other alternative buyers compared to the less educated farmers and those who have less years of growing chilies. As a result, they have lower levels of commitment.

The results of this chapter provide evidence the importance of oral/verbal agreements in the contractual relationships between farmers and buyers in both

channels. While the price aspect is matter for traditional channel farmers, grading and sorting are the most important aspects for supermarket farmers. Selling to supermarkets are associated with higher prices, but several constraints exist that may prevent farmers from selling to supermarkets. Finally, this study also shows the importance of trust and satisfaction in determining farmers' commitment to stay in the market relationships with their buyers.

8. Marketing preferences of small chili farmers: an application of best-worst scaling

8.1 Introduction

The number of supermarkets in Indonesia has increased significantly since 1998 when liberalization of foreign direct investment occurred (Natawidjaja et al., 2007). These new markets have specific requirements in terms of quality, quantity and formalized transactions. An emerging body of literature aims to understand how modern retail market transformation affects small farmers. Some studies focus on identifying the determinant factors of small farmers' participation in supermarket channels (Hernández et al., 2007; Natawidjaja et al., 2007; Neven et al., 2009; Rao and Qaim, 2011; Schipmann and Qaim, 2010). In other studies, the economic impact of modern market participation has been the focus. Hernández et al. (2007), Natawidjaja et al. (2007), Neven et al. (2009) and Rao and Qaim, (2011) have shown that modern market participation is associated with higher income levels for farmers. Another group of studies focuses on the institutional arrangements of supply chains in the supermarket era (Dries et al., 2009; Farina, 2005; Henson et al., 2005). The role of intermediaries in linking individual farmers to modern food retail markets is also examined by Kaganzi et al. (2009) and Moustier et al. (2010).

Despite the existing literature, as Blandon et al. (2010) and Schipman and Qaim (2011) note, these previous studies tend to utilize observable variables such as farm and household characteristics and pay little attention to the subjective attitudes of individual farmers. These studies seem to assume that if farmers were able to, they would participate in modern market channels. At an empirical level, this is not always true. For instance, payment delay which is common in modern markets may prevent farmers from participating in modern market channels.

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Most chili farmers in Indonesia rely upon their middlemen/buyers to connect them to modern markets or traditional markets. When making a decision to sell their produce to preferred buyers, they evaluate buyer attributes. Lu et al. (2010b) argue that achieving the highest possible prices is not always the principal factor determining the decision of farmers to select their preferred buyers. Other buyer attributes such as credit arrangements, timely payment, and relational variables (e.g., trust and commitment) might be important for farmers when they choose their buyers.

This chapter explores the relative importance of buyer attributes when chili farmers in the traditional and supermarket channels choose preferred marketing channels or buyers. It is expected that they are not homogeneous in terms of their preferred buyer attributes since they have different socio economic and farm characteristics. Therefore, in this chapter, the aim is to explore whether farmers in the traditional and supermarkets can be grouped with regard to their attitudes towards buyer attributes. The next sections present model specifications and empirical procedures, results and discussion, and conclusions and implications.

8.2 Model specifications and empirical procedures

This chapter consists of a description of three steps: the selection of the key buyer attributes, the selection of a suitable method to determine the relative importance of buyer attributes to farmers, and the selection of an appropriate model to analyze the data.

8.2.1 The buyer attributes

Buyer attributes is developed from the results of the focus group discussions and a review of the literature of transaction cost economics and buyer-seller relationships.

The attributes can be categorized into four groups (Table 8.1). The first group covers the aspects of price and information access. Price is an important criterion when farmers evaluate potential buyers (Lu et al., 2010b). Information costs emerge when farmers collect information regarding prices offered by the potential buyers (Blandon et al., 2009; Lu et al., 2010b; Woldie and Nuppenau, 2009). Besides price information, farmers seek information about current market situations (e.g., supply and demand in the market) and specific information related to technical aspects during the production process. To lower their information costs, farmers prefer to sell to buyers who share such information (Lu et al., 2010b).

The second group refers to negotiation and bargaining costs. These include willingness to negotiate (e.g., in terms of price and selling place) and the opportunity to get premium prices. In the absence of a formal contract, the ability of farmers to negotiate with the buyers indicates their bargaining power (Boger et al., 2001). Negotiation about selling place might lower the transportation costs. Selling at the farm gate is cheaper than delivering to buyer locations. Meanwhile, the premium price allows a buyer to compensate for value adding activities by the farmers.

The third group is related to monitoring and enforcement costs. This group consists of relationship variables including established relationships and 'trust' aspects. Woldie and Nuppenau (2009) propose that trust can be classified as monitoring and enforcement costs since it can reduce exchange partners acting opportunistically, promoting a smooth transaction. The reputation of buyers is very important in order to increase farmers' trust and ultimately secure their future transaction. Another aspect in this group is the payment delay issue as it potentially increases the monitoring costs. Farmers have to spend time visiting their buyers in order to get their payment. Blandon et al. (2009) find that farmers prefer cash and immediate payment.

Table 8.1   Buyer attributes and the descriptions used in the BW questionnaire

Attributes	Descriptions
Information or search costs	
Price per Kg	A high price that the buyer is willing to pay you for your chilies.
Technical Assistance information	The buyer/trader provides information (e.g. extension programs) or technical assistance that can help you improve your quality and/or productivity
Shares information about market conditions	The buyers always give market information, such as price, demand, and supply e.g., over-supply causing lower prices etc.
Negotiation and bargaining costs	
Willingness to negotiate or match another buyer's price	The buyers offer bargaining in terms of price and harvest delivery
Provides price premiums	The buyer/trader is willing to negotiate a price premium for value adding (e.g., size or sorting)
Monitoring and enforcement costs	
Pays cash immediately	The buyer pays farmer cash upon receipt of his chilies. He does not have to wait to get paid for what you are selling. There is no delayed payment.
Established relationship	The farmer has previous experience working with the buyer/trader. This may involve a long term relationship; they may be a family member.
Always follows through on their commitments to buy my product	The farmer sell his chilies to a particular buyer since he can be trusted, such as he is always on time regarding payment.
Credit access	
Access to certified chili seed	In addition to providing a market for your chilies, the buyer also helps you obtain access or credit to purchase certified chili seeds.
Credit or access for input purchases	The buyer or trader helps finance inputs such as fertilizer or pesticides and allows you to pay at some later time.
Provides money for loan	The buyers provide money for farmer's capital such as to pay laborers and to buy inputs.

Source: Primary survey (2010)

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The last group is related to credit access provided by buyers. These attributes include access to certified chili seed, credit for input purchases and money for farmer's working capital.

8.2.2 Best-Worst (BW) scaling

To identify the relative importance of the 11 buyer attributes, a relatively new method, best-worst (BW) scaling, is performed. In the BW scaling, the attributes are allocated into choice sets and respondents are asked to choose both the 'best' ('most preferred') and 'worst' ('least preferable') options in each choice set

In this study the distribution of the 11 attributes into choice sets was determined by using the balance incomplete block (BIB) design as outlined in Cohen (2009). The 11 buyer attributes were arranged as indicated in Table 8.2. Given a set of 'v' attributes, 'b' number of choice sets (block), 'r' replications and 'λ' sets of pairs, a BIB design was expressed as (b, r, k, λ). According to Green (1974) there are three conditions that should be considered in the BIB design. First, each attribute appears once in each number choice. Second, each attribute appears in exactly r replications and the last is each pair of attribute appears exactly λ together. Considering these characteristics, this research used design 11, 5, 5, 1, that is, each respondent received 11 choice sets, each attribute appeared five times across all choice sets, each choice set contained five attributes and each attribute appeared once in each number choice. Each choice set was presented in each separate table in the final BW questionnaire. For example, block A was presented in the questionnaire as indicated in the Table 8.3. Likewise, the explanation of each attributes was presented in the questionnaire.

Table 8.2 Balance incomplete designs of the 11 buyer attributes

Attribute Number	Block	Attribute in each block (Design 11, 5, 5, 1)				
1. Price per kg	A	1	4	6	10	3
2. Pay cash immediately	B	2	6	7	11	4
3. Access to certified chili seed	C	3	7	8	5	6
4. Credit or access for input purchase	D	4	8	9	1	7
5. Willing to negotiate or match another buyer's price	E	6	9	10	2	8
6. Provides money for loan	F	7	10	11	3	9
7. Technical assistance	G	8	11	5	4	10
8. Established relationship	H	9	5	1	6	11
9. Always follows through on their commitments to buy my product	I	10	1	2	7	5
10. Shares information about market conditions	J	11	2	3	8	1
11. Provides price premium	K	5	3	4	9	2

Source: Primary survey (2010)

Table 8.3 An example a BW choice set as presented to respondents

Considering the five characteristics presented below, please tick one box in the left column to indicate the characteristic that is ***MOST important*** to you and please tick one box in the right column to indicate the characteristic that is ***LEAST important*** to you. Please tick only one box per column.

Most Important (tick one box)	Of these buyer characteristics, which are the most and least important to you…	Least important (tick one box)
☐	1. Price per Kg	☐
☐	4. Credit or access for input purchases	☐
☐	6. Provides money for loan	☐
☐	10. Shares information about market conditions	☐
☐	3. Access to certified chili seed	☐

Source: Primary survey (2010)

8.2.3 Sample and data analysis

The analysis of the farmers' preferences of buyers' attributes includes the 485 respondents in the traditional channel and 112 respondents in the supermarket channel. The initial analysis focused on the aggregate sample for each group (supermarket and traditional channels). The BW analysis adapted the procedures outlined in Cohen (2009) and Umberger et al. (2010). The relative importance of the 11 buyer attributes for each

group is determined using a Standardized Interval Scale (SIS). The SIS is calculated by first examining all respondents' answers to the BW tasks and summing respondents' choices for most and least important attributes to create two aggregate frequency values for each attribute: 'most' and 'least'. The aggregate frequency values are the number of times each attribute is chosen as most important and the least important. The square root of the 'most' frequency value divided by the 'worst' frequency is calculated (SQRT(B/W) for each attribute. To avoid dividing by zero, the 'worst' frequency of each attribute is added by 0.5 (Cohen, 2009). A scale is created with the attribute with the highest SQRT(B/W) becoming 100 (most important) and all other buyer attributes are scaled relative to this attribute. The results of the standardized interval in this case are interpreted as the percentages of the attributes that are to be chosen as the most important (Cohen 2009).

The latent class (LC) cluster model is performed in order to explore the heterogeneity among farmers in each sample related to the 11 buyer attributes. In the traditional sample, the 485 individual BW scores (B_{ij}-W_{ij}) for all 11 buyer attributes are utilized as indicator variables. While in the supermarket sample, the 112 individual BW scores (B_{ij}-W_{ij}) for all 11 buyer attributes are utilized as indicator variables. The score values are obtained by adding the number of times each farmer (i) indicates an attribute (j) as best (B_{ij}) and worst (W_{ij}). Then the sum of the worst in each attribute is subtracted from the sum of the best.

To predict the characteristics of each cluster, the covariates (variables that influence farmers to select the importance attributes) are included in the analysis. This study borrows the variables from the marketing decision literature as outlined in Chapter 5, including incentive, capacity, and demographic characteristics of farmers. More specifically, the covariates in this study include household member, age,

education, proportion of adult between 15 and 65 years, proportion of adult over 65 years, land size, irrigated land, mobile phone ownership, motor bike ownership, water pump ownership, mist blower ownership, power tiller ownership, storage house ownership, farming time and distance from house to asphalt road. While the results in Chapter 5 uses lagged household and farm assets, in this chapter these variables at the time of survey are used. This is because the main focus is the current perceptions of farmers regarding preferred buyer attributes. This suggests that current rather than lagged assets are most relevant. The covariates are treated as active variables in the LC cluster model. To provide further insight on the clusters an *ex post* analysis was conducted for other socio economic and demographic variables (denoted as "passive variables").

8.3 Results

8.3.1 Aggregate analysis

The aggregate BW SIS values for respondents in the traditional and supermarket channels are presented in Table 8.4. The attribute *pays cash immediately* is the most important attribute for the farmers in the traditional channel (standardized to 100%) when choosing preferred buyers, and *technical assistance* is the least important attribute (about 22% relative importance).

Scaled at 88%, the attribute *provide price premiums* can be considered as very important to traditional channel farmers, and *price per kg* is 71% as important as *pays cash immediately*. The attribute *provides money for loan* is 58%, as important as *pays cash immediately*. *Shares information about market conditions* is 48%, as important as *pays cash immediately*. Farmers in this sample rank credit aspects (*credit or access for*

input purchases and *access to certified seed*) relatively less important than other

attributes.

Table 8.4 Relative importance of the 11 buyer attributes in the traditional and
supermarket channels

Attributes	Traditional channel			Supermarket channel		
	SQRT (B/W)	SIS values	Rank-ing	SQRT (B/W)	SIS values	Rank-ing
Pays cash immediately	2.18	100.00	1	1.84	80.36	2
Provides price premiums	1.93	88.36	2	2.29	100.00	1
Price per kg	1.56	71.47	3	1.03	44.90	6
Provides money for loan	1.26	58.00	4	1.37	59.99	4
Shares information about market conditions	1.04	47.55	5	1.24	54.10	5
Established relationship	0.98	44.83	6	1.38	60.16	3
Willing to negotiate or match another buyer's price	0.79	36.10	7	0.61	26.78	9
Always follows through on their commitments to buy my product	0.78	35.87	8	0.94	40.96	7
Credit or access for input purchases	0.62	28.61	9	0.69	30.24	8
Access to certified chili seed	0.56	25.59	10	0.36	15.73	11
Technical Assistance	0.49	22.46	11	0.53	23.32	10

Farmers in the supermarket channel perceive *provide price premiums* as the

most important attribute when choosing preferred buyers as indicated by its SIS value of

100. *Pays cash immediately* is the second most important and is 80% as important as

provides price premiums. The buyer attribute *established relationship* is the third most

important to the supermarket channel sample, but its SIS value is only 60%. This

suggests that although it is one of the most important buyer attributes its relative

importance is substantially lower than the buyer providing price premiums. However,

compared to farmers in the traditional sample, supermarket farmers are much more

interested in establishing long-term relationships with their buyers. The attributes,

provides money for loan and *shares information about market conditions* have SIS

values of 60 and 54 respectively, which means these two attributes are nearly as

important to the supermarket sample as the attribute *established relationship*. Similar to traditional farmers, supermarket farmers perceive technical assistance and credit aspects related to inputs to be of low importance.

As outlined above, the SIS values suggest some differences in traditional channel farmers' and supermarket farmers' preferences for buyer attributes. To attempt to understand these preferences the household and farm characteristics are compared for each group. As outlined in Chapter 4 (Table 4.1), compared to farmers in the traditional channel, farmers in the supermarket sample have significantly higher levels of education, less numbers of years of growing chilies and are younger. More interesting is the significant differences in farm assets and production characteristics. On average, the supermarket sample has significantly more area planted with chilies (Table 4.2 in Chapter 4), and not surprisingly higher production of chilies. A higher share of farmers in the supermarket sample have expanded their area planted in chilies (Table 4.6 in Chapter 4), plant more than one variety of chilies (Table 4.5 in Chapter 4) and grow chilies in more than one season (Table 4.5 in Chapter 4). Additionally, for 90% of supermarket farmers, chili production has become a more important share of household income over the five year period (Table 4.7 in Chapter 4). This information, and the fact that a higher share of farmers in the supermarket sample have invested in assets specifically for chili production (e.g., mist blowers and storage houses) (Table 4.4 in Chapter 4) suggest that it is important for these farmers to have market access. Thus it is not surprising that the supermarket sample perceive the attributes *established relationship* and *shares information about market conditions* as important factors when choosing marketing channels/buyers.

The significantly higher share of supermarket producers relative to traditional producers who invest time to sort chilies based on color and quality (55% versus 16%),

size (40% versus 8%) and who remove small or bad chilies (93% versus 80%) is also interesting (Table 4.10 in Chapter 4). Due to the specific requirement of supermarkets in terms of quality aspects, it is not surprising that the majority of farmers in the supermarket channel engage in sorting their chilies. Hence, it is not surprising that supermarket farmers view the attribute *provide price premiums* as the most important attribute. However, considering that 61% and 80% of farmers in the traditional channel have removed debris or foreign material and small or bad chilies, it is not surprising that the attribute *provides price premiums* is the second most importance attribute. This suggests that it is important to the farmers that they be rewarded for investing time into quality differentiation.

A significantly higher share of producers in the traditional market channel (66%) sold to more than one buyer over the past five years (Table 4.10 in Chapter 4). Yet, 56% of farmers in the supermarket channel also indicated they sold to more than one buyer in the last five years and roughly one-third sold to more than one buyer in the past year. Thus considering the high importance of the attribute *pays cash immediately* it appears that supermarket producers might also choose to supply traditional markets when they need cash urgently. In addition to traders, farmers obtain information on chili production from other sources (Table 4.8 in Chapter 4). Other farmers, relatives and neighbors and extension workers are important sources of production information for both groups, thus it is not surprising that the buyer attribute *provides technical assistance* is of relatively low importance.

8.3.2 Producers' heterogeneity

The aggregate analysis for each sample group as presented above assumes that the preferences of chili farmers related to the 11 buyer attributes are homogeneous. In

reality, this is not always the case. Different preferences might exist among individual farmers in each sample group regarding the importance of buyer attributes. The LC cluster analysis is utilized in examining the producers' heterogeneity for each sample group.

Producers' heterogeneity in the traditional channel sample

Table 8.5 provides summary for the one to four cluster solutions in the traditional channel sample. Magidson and Vermunt (2004) view that a model with a smaller BIC value is preferred to a model with a higher BIC. Based on Table 8.5, model 3 shows the smallest BIC value. Apart from the BIC criterion, all indicators (the 11 buyer attributes) in the model 3 provide a significantly contribution to the identification different classes/clusters. Due to these reasons, the 3-cluster solution was chosen for the traditional channel sample.

Table 8.5 Summary of the LC cluster analysis in the traditional channel sample

	No. of cluster	LL	BIC(LL)	Npar	Classification error
Model1	1-Cluster	-11167.73	23034.27	113	0.00
Model2	2-Cluster	-11020.17	22906.11	140	0.10
Model3	3-Cluster	-10918.23	22869.21	167	0.11
Model4	4-Cluster	-10918.46	23036.65	194	0.11

Note: LL = Log-likelihood; BIC = Baynesian information criterion; Npar: number of parameters

The SIS values of the three clusters in the traditional channel sample are presented in Table 8.6. Table 8.7 presents the significance of the active variables that determine the relative importance of the buyer attribute choices. The ex-post ANOVA results of the passive variables are indicated in Table 8.8.

As shown in Table 8.6, cluster 1 consisting of 30% of total respondents in the traditional channel sample perceives getting a higher *price per kg* as the most important attribute (standardized to 100%) when choosing preferred buyers. Scaled at 92%, the attribute of *pay cash immediately* is the second most important for respondents in this

cluster and *provide price premiums* is 75%, as important as *price per kg*. Respondents in this cluster prefer buyers who can provide financing and input credit as they perceive the attributes of *provides money for loan*, *credit or access to input purchase* and *access to certified chili seed* among the top six attributes. Cluster 1 producers are rather short-term oriented. They give relatively low importance to the attributes *commitment* and *established relationship*. In such situations, farmers in cluster 1 would switch to other buyers if they thought they could gain more financial profit such as getting higher price per kg.

Cluster 2 is the largest cluster in the traditional channel sample (42% of respondents). The buyer attributes of most importance to cluster 2 are to some degree similar to the aggregate sample in the traditional channel. The most important attribute in cluster 2 is *pays cash immediately* and it is denoted as 100 followed by the attributes of *provides price premiums* (about 84% relative importance) and *price per kg* (about 76% relative importance). Compared to cluster 1, respondents in cluster 2 are more likely to engage in long-term relationships with their buyers, indicating with the highest SIS value in the attribute of *established relationship* (63%). Similar to aggregate sample in the traditional channel sample, respondents in cluster 2 are less interested in the attributes of *access to certified chili seed* (7% as important as *pays cash immediately*) and *credit or access for input purchase* (7% as important as *pays cash immediately*).

Table 8.6. Relative importance of the 11 buyer attributes of the three clusters in the traditional channel sample

Attributes	Cluster 1 (30%)			Cluster 2 (42%)			Cluster 3 (28%)		
	SQRT (B/W)	SIS value	Rank-ing	SQRT (B/W)	SIS value	Rank-ing	SQRT (B/W)	SIS value	Rank-ing
Price per kg	2.86	100.00	1	2.16	75.52	3	0.62	20.47	10
Pays cash immediately	2.64	92.14	2	2.86	100.00	1	1.34	44.65	3
Provides price premiums	2.15	75.06	3	2.42	84.43	2	1.29	42.74	4
Provides money for loan	1.59	55.44	4	0.71	24.71	8	3.01	100.00	1
Credit or access for input purchases	0.98	34.12	5	0.20	7.03	11	1.24	41.33	5
Access to certified chili seed	0.84	29.50	6	0.21	7.42	10	0.91	30.65	7
Shares information about market conditions	0.82	28.76	7	1.53	53.47	5	0.71	23.66	8
Willing to negotiate or match another buyer's price	0.73	25.59	8	1.44	50.25	6	0.31	10.27	11
Technical Assistance	0.55	19.22	9	0.35	12.13	9	0.65	21.44	9
Always follows through on their commitments to buy my product	0.33	11.36	10	1.25	43.64	7	1.04	34.49	6
Established relationship	0.21	7.21	11	1.81	63.17	4	1.84	61.25	2

Cluster 3 constitutes about 28% of the total respondents in the traditional channel sample. Farmers in this cluster perceive *provide money for loan* as the most important attribute and it is recorded as 100. Similar to cluster 2, this cluster seems to also be concerned about long-term relationship orientations. The attribute of *established relationship* is the second most important to respondents in this cluster (61% as importance as *provides money for loan*). There is a massive drop in preference between the first and the second attributes (from 100% to 61%). This indicates that although the attribute of *established relationship* is one of the most important buyers' attributes, its relative importance is substantially lower than buyer providing money for loan. The attributes of *pays cash immediately*, *provides price premiums* and *credit or access for input purchases* are among the top five attributes for respondents in cluster 3. In contrast to cluster 1 and 2, farmers in cluster 3 give the lowest prominence to the attribute of getting *higher price per kg*.

The active and inactive covariates suggest that the clusters do not differ significantly with regard to socio economic and socio demographic dimensions. Among the active covariates in Table 8.7, only the variable of irrigated land differs significantly between the three clusters. Respondents in cluster 2 and 3 have larger irrigated land compared to respondents in cluster 1. Hence, cluster 2 and 3 can supply chili consistently throughout the year even in the dry season. Thus it is not surprisingly if they are more likely to engage in long-term business relationships with their buyers.

Table 8.7 Mean of active covariates of the three clusters in the traditional channel sample

Covariates	Cluster 1 (30%)	Cluster 2 (42%)	Cluster 3 (28%)	Wald Test	Signi-ficance
Household member (person/s)	4.34	4.56	4.76	2.44	0.30
Age of household head (years)	48.39	45.58	44.93	3.13	0.21
Education of household head (years)	6.23	6.66	6.39	0.64	0.73
Proportion of adult between 15 and 65 years (%)	73.53	69.39	63.73	3.42	0.18
Proportion of adult over 65 years (%)	1.99	2.25	3.07	0.63	0.73
Land size (ha)	0.75	0.72	0.63	0.53	0.77
Irrigated land (ha)	0.17	0.31	0.33	11.79	0.00***
Mobile phone ownership (unit)	1.11	1.25	1.17	0.68	0.71
Motor bike ownership (unit)	0.67	0.63	0.59	0.70	0.70
Water pump ownership (unit)	0.35	0.28	0.21	1.94	0.38
Mist blower ownership (unit)	1.13	1.13	1.09	0.14	0.93
Power tiller ownership (unit)	0.02	0.01	0.01	0.06	0.97
Storage house ownership (unit)	0.16	0.24	0.16	2.18	0.34
Farming time (years)	10.38	9.05	8.93	0.46	0.79
Distance from house to asphalt road (km)	0.29	0.27	0.35	1.87	0.39

The ex-post ANOVA which is followed by Tukey's tests for inactive covariates suggests significant differences across the three clusters in terms of main source of information (production methods, and prices and markets) and number of buyers who farmers sold with (Table 8.8). Apart from traders, farmers in the three clusters obtain such information from other farmers, extension workers, farmers group and input companies. Hence, similar to the aggregate sample of traditional channel sample, farmers in all clusters give a low rank to the attribute of *technical assistance*. However, compared to cluster 1, farmers in cluster 2 and 3 access more information from extension workers, suggesting the important roles of the extension office for these farmers. Cluster 3 have the lowest share of producers who sold to more than one buyer over the past five years and in the past year, thus it is not surprising that they perceive the attribute *established relationship* as the second most important.

Table 8.8 Means of passive covariates in each cluster in the traditional channel sample

Characteristics	Cluster 1 (49%)	Cluster 2 (34%)	Cluster 3 (17%)	Signifi -cance
Production characteristics				
Chili production become more important as share of household income in the last five years (% yes)	70.55	67.45	73.23	0.65
Production of chilies (ton)	2.40	2.55	3.13	1.28
Productivity of chilies (ton/ha)	9.88	9.91	10.37	0.09
Grow chilies more than one season in a year (% yes)	23.29	18.4	22.84	0.79
Planted only one variety of chili (% yes)	84.93	86.32	85.83	0.07
Expanded the area planted in chilies over the last five years (% yes)	28.77	31.13	33.86	1.24
Sorting (%yes)				
Remove debris or foreign materials	67.81	57.08	59.84	2.15
Remove small or bad chili	82.88	78.77	80.31	0.46
Sort into different groups by size	7.53	7.55	9.44	0.23
Sort into different groups by color	11.64	15.09	17.32	0.91
Sort into different groups by quality	14.38	14.62	21.26	1.56
Main information source about chili production methods (% yes)				
Traders	28.77^a	41.51^{bc}	35.43^{ab}	3.08**
Extension workers	30.82^a	42.92^b	44.09^b	3.41**
Farmer groups	11.64	11.32	14.96	0.53
Farmers/relatives/neighbours	93.15	94.81	93.70	0.23
Companies	9.58	6.60	7.09	0.58
Main information source about chili prices and markets (% yes)				
Traders	99.32	99.53	98.43	0.61
Extension workers	1.00^a	2.83^{ab}	6.30^b	3.65**
Farmer groups	3.42	4.24	2.36	0.42
Farmers/relatives/neighbors	49.32^a	63.21^b	50.39^a	4.40**
Companies	0.00	0.00	0.00	
Number of buyers				
Sold to more than one buyer in the last 5 years (% yes)	71.92^b	68.87^b	55.12^a	4.96**
Sold to more than one buyer in the last year (% yes)	36.30^b	36.32^b	24.41^a	3.01*

Note: [1]Based on F-test: * significant at the 10% level, ** significant at the 5% level, *** significant at the 1% level. [abc] different letters indicate significant mean differences (α=0.05, post hoc Tukey test)

Producers' heterogeneity in the supermarket channel sample

The summary from the one to four cluster solutions for the supermarket channel sample are presented in Table 8.9. The two cluster solution shows the smallest BIC value. However, some indicators (the 11 buyer attributes) are not found to be statistically significant even at $\rho < 0.1$. After comparing the parameters of the indicators between the two and three cluster solutions, the three cluster solution was chosen. This is because all the indicators in the three cluster solution provide a significantly contribution to the identification different classes/clusters ($\rho < 0.01$).

Table 8.9 Summary of the LC cluster analysis in the supermarket channel sample

No. of cluster		LL	BIC(LL)	Npar	Classification error
Model1	1-Cluster	-2564.80	5625.04	105	0.00
Model2	2-Cluster	-2486.36	5595.56	132	0.04
Model3	3-Cluster	-2431.23	5612.70	159	0.04
Model4	4-Cluster	-2381.89	5641.41	186	0.01

Note: LL = Log-likelihood; BIC = Baynesian information criterion; Npar: number of parameters; Class.Err: Classification error

Table 8.10 shows that *provides money for loan* is the most important attribute when farmers in cluster 1 of the supermarket channel sample choose preferred buyers and it is denoted as 100. The attribute of *pays cash immediately* has SIS value of 99%, which means this attribute is nearly as important to the respondents in cluster 1 as the attribute of *provides money for loan.* Then, there is a massive drop between the second and third most important attributes in which farmers perceive 55% relative importance of the attribute *provides price premium*, indicating that the relative important of this attribute is considerably lower than the attribute *providing money for loan.* The attributes of *higher price per kg* and *credit or access for input purchases* are perceived as the five most important attributes. This suggests that respondents in this cluster give high importance to monetary returns. They might switch to other buyers/marketing

channels immediately if they could obtain higher financial profit. It is not surprising that they value the attribute of *established relationship* only 32%, as important as provides money for loan.

Respondents in cluster 2 of the supermarket channel sample rank the attribute *provides price premiums* as the most important attribute (standardized to 100%). Other buyer attributes are perceived very low, less than 30% relative importance to *provides price premiums*. This suggests that rewarding of quality differentiation is the main consideration to respondents in this cluster when they choose buyers to sell to. The attributes of *share information about market condition*, *pay cash immediately*, and *price per kg* constitute only about 26%, 24% and 15% compared to the attribute *provides price premiums*. The attribute of *established relationship* is perceived as the fifth most important attribute in cluster 2, but its SIS value is only about 12% as important as *provides price premiums*. Hence, respondents in cluster 2 would switch to other buyers if buyers does not provide rewards for quality differentiation by farmers.

Cluster 3 is the smallest cluster, consisting of about 17% of the total respondents in the supermarket channel sample. In contrast to cluster 1 and 2, respondents in cluster 3 rate *established relationship* as the most important attribute (standardized to 100%). The attributes of *provides price premiums* and *share information about market condition*s are the second and third most important attributes, but their SIS values only 57% and 54%, respectively. *Commitment* is the fourth important attribute perceived to be about 40%, as important as *established relationship*. Given that farmers in cluster 3 give a high ranking to the attributes of *established relationship* and *commitment*, they are rather long-term orientated.

Table 8.10   Relative importance of the 11 buyer attributes of the three clusters in the supermarket channel sample

Attributes	Cluster 1 (49%)			Cluster 2 (34%)			Cluster 3 (17%)		
	SQRT (B/W)	SIS value	Rank-ing	SQRT (B/W)	SIS value	Rank-ing	SQRT (B/W)	SIS value	Rank-ing
Provides money for loan	2.79	100.00	1	0.58	4.38	8	1.32	31.46	5
Pays cash immediately	2.77	99.38	2	3.23	24.24	3	0.28	6.57	11
Provides price premiums	1.55	55.43	3	13.34	100.00	1	2.37	56.59	2
Price per kg	1.02	36.47	4	2.00	14.99	4	0.44	10.59	8
Credit or access for input purchases	0.99	35.67	5	0.11	0.79	10	1.27	30.27	6
Established relationship	0.89	31.81	6	1.57	11.80	5	4.20	100.00	1
Technical Assistance	0.70	24.96	7	0.19	1.43	9	0.70	16.65	7
Always follows through on their commitments to buy my product	0.68	24.40	8	1.06	7.94	7	1.69	40.18	4
Shares information about market conditions	0.58	20.78	9	3.44	25.80	2	2.26	53.78	3
Access to certified chili seed	0.52	18.71	10	0.00	0.00	11	0.31	7.45	10
Willing to negotiate or match another buyer's price	0.39	13.92	11	1.37	10.27	6	0.32	7.59	9

Table 8.11 provides the significance of the active covariates in the LC cluster analysis. The ex-post ANOVA which is followed by Tukey's tests for inactive covariates is presented in Table 8.12.

The statistically significant active covariates are: proportion of adult over 16 years, land size, irrigated land, mist blower ownership, and storage house ownership. Cluster 2 is characterized by having the largest proportion of adult over 65 years living in the houses relative to cluster 1 and 3 and mist blower ownership. Members in cluster 2 have the highest irrigated land. Hence, it is not surprising that they have the largest chili production and productivity as indicated by the passive covariates in Table 8.12. Cluster 3 does not have member over 65 five years living in the house. Larger farmers who own more storage house tend to prevail in cluster 3. However, this cluster has the smallest area of irrigated land, resulting low levels of chili productivity. Cluster 1 has the smallest land size, and storage house ownership, while other significant covariates in this cluster lay between cluster 2 and 3. The majority of farmers in all clusters have sorted their chilies. Hence, farmers place the attribute of *providing price premium* as the top three important factors when they choose the buyers.

Table 8.11 Mean of active covariates of the three clusters in the supermarket channel
sample

Covariates	Cluster 1 (49%)	Cluster 2 (34%)	Cluster 3 (17%)	Wald Test	Signi-ficance
Household member (person/s)	4.39	4.38	4.10	1.10	0.58
Age of household head (years)	46.67	41.71	40.01	3.52	0.17
Education of household head (years)	7.02	8.86	8.92	4.51	0.11
Proportion of adult between 15 and 65 years (%)	67.96	67.08	61.46	3.29	0.19
Proportion of adult over 65 years (%)	4.62	4.89	0.00	5.93	0.05**
Land size (ha)	0.73	0.78	1.01	6.17	0.05**
Irrigated land (ha)	0.31	0.46	0.05	9.20	0.01**
Mobile phone ownership (unit)	1.35	1.92	1.37	1.68	0.43
Motor bike ownership (unit)	0.57	0.97	0.68	1.16	0.56
Water pump ownership (unit)	0.29	0.3 4	0.32	3.61	0.16
Mist blower ownership (unit)	1.04	1.92	1.15	8.16	0.02**
Power tiller ownership (unit)	0.00	0.03	0.10	1.87	0.39
Storage house ownership (unit)	0.25	0.52	0.63	5.08	0.08*
Farming time (years)	6.42	6.56	8.01	0.45	0.80
Distance from house to asphalt road (km)	0.13	0.10	0.10	0.12	0.94

In all clusters, extension workers and farmer groups have important roles in providing the information about chili production methods (Table 8.12). However, there are no farmers obtaining information about chili prices and market situations from extension workers. While farmer groups are also the main information sources of chili prices and market situations for all clusters. The majority of farmers in cluster 2 sold to more than one buyer over the five year period and in the year before the survey. Thus it is not surprising that they perceive the attribute *established relationship* only 12%, as important as *provides price premiums*.

Table 8.12 Means of passive covariates in each cluster in the supermarket channel sample

Characteristics	Cluster 1 (49%)	Cluster 2 (34%)	Cluster 3 (17%)	Signi-ficance
Production characteristics				
Chili production become more important as share of household income in the last five years (% yes)	94.6	86.49	78.94	2.07
Production of chilies (ton)	2.67[a]	6.70[bc]	5.16[ab]	3.8**
Productivity of chilies (ton/ha)	8.29[a]	13.90[b]	8.05[a]	9.25***
Grow chilies more than one season in a year (% yes)	55.36	45.95	68.42	1.29
Planted only one variety of chili (% yes)	55.36[a]	84.78[b]	68.42[ab]	4.28**
Expanded the area planted in chilies over the last five years of survey (% yes)	35.71	51.36	26.32	1.97
Sorting (% yes)				
Remove debris or foreign materials	71.43	70.27	52.63	1.22
Remove small or bad chili	92.86	91.89	94.74	0.08
Sort into different groups by size	44.64	35.14	36.84	0.46
Sort into different groups by color	71.43[b]	29.73[a]	52.63[ab]	8.85***
Sort into different groups by quality	57.14	59.46	42.11	0.83
Main information source about chili production methods (% yes)				
Traders	3.57[b]	10.81[a]	15.79[b]	1.73
Extension workers	67.86[b]	40.54[a]	73.68[b]	4.62**
Farmer groups	71.43	24.32	63.16	12.31***
Farmers/relatives/neighbors	66.07	81.08	68.42	1.28
Companies	19.64	18.91	31.58	0.69
Main information source about chili prices and markets (% yes)				
Traders	100.00	97.29	100.00	1.01
Extension workers	0.00	0.00	0.00	
Farmer groups	42.86[b]	18.92[a]	47.37[b]	3.59**
Farmers/relatives/neighbors	28.57	35.13	31.58	0.22
Companies	0.00	0.00	0.00	
Number of buyers				
Sold to more than one buyer in the last 5 years (% yes)	50.00[a]	75.67[b]	36.84[a]	5.03***
Sold to more than one buyer in the last year (% yes)	23.21[a]	48.64[b]	15.78[a]	4.83***

Note: [1]Based on F-test: * significant at the 10% level, ** significant at the 5% level, *** significant at the 1% level. [abc] different letters indicate significant mean differences (α=0.05, post hoc Tukey test)

8.4 Discussion and summary

Several studies analyze factors influencing farmers' participation in modern markets by focusing only on observable variables such as household and farm characteristic (Hernández et al., 2007; Natawidjaja et al., 2007; Neven et al., 2009; Rao and Qaim, 2011; Schipmann and Qaim, 2010). This study contributes to this body of literature by incorporating the subjective attitudes of individual farmers when they choose marketing channels or buyers. The farmers' preferences towards a particular buyer/marketing channel are measured through the 11 attributes which belong to the buyer/marketing channel. A relatively new method, the BW scaling experiment, is utilized in order to examine the relative importance 11 buyer attributes. This method allows the researcher to construct an individual level ranking in a relatively easy structure (Cohen, 2009). The heterogeneity of respondents in each sample group in their ratings of the 11 buyer attributes is also examined using the LC cluster model.

The aggregate analysis in each sample group (the traditional and supermarket channels) shows that receiving *cash immediately* and obtaining *price premiums* for value adding (sorting) are among the two most important buyer attributes for farmers in both channels. The fact that the attribute of *pays cash immediately* is among the most important buyer attribute indicates that the farmers prefer cash and immediate payment, which is typical of a spot market transaction (Blandon et al., 2010). Quality aspects are included among the supermarket requirements (Hernández et al., 2007; Reardon et al., 2005), hence, supermarket farmers have invested time to sort chilies based on color, quality, size and removed bad or small chilies. They can potentially obtain higher prices for graded products (Reardon et al., 2009). However, the study also finds that the majority of traditional farmers have also invested their time to remove bad or small

chilies. This can explain why farmers in both channels perceive the attribute price *premiums* for value adding as among the important buyer attribute.

Compared to farmers in the traditional channel, supermarket farmers place a higher level of importance on having an *established relationship* with their buyer. This is because they have invested area and farm assets for chili production (storage room, irrigation equipment and spraying equipment) over the five period. They also have multiple production cycles of chilies during a year and are specialized more in chili production than traditional channel farmers. In such situation, it is become important for supermarket farmers to have and secure market access by establishing long-term market relationships with their preferred buyers.

Farmers in both channels perceive the attributes of *input provision* and *technical assistance* as least important - indicating they are more interested in self determination. They want to make sure that they are not being cheated by their buyers and the easiest way that is not to enter into any credit relationships with the traders. The fact that the attribute *input provision* and *technical assistance* are perceived relatively less important for supermarket farmers is contrary to Schipmann and Qaim (2011) who found better access to inputs and technical assistance as the main reasons for farmers entering into modern market channels.

The aggregate analysis as outlined above implies that if buyers want to obtain continuous and uninterrupted supplies from their producers, they will need to do more in terms of providing price premiums for higher quality products and other incentives such as paying cash upon delivery. Moreover, when dealing with supermarket farmers, buyers should consider establishing long-term relationships.

The LC cluster analysis confirms heterogeneity among chili farmers in each sample group. The findings are in line with Umberger et al. (2010) confirming

heterogeneity among potato farmers in Indonesia. In this study, there are three clusters in each sample group. Among the active covariate, only the variable of irrigated land influences the likelihood of respondents to belong to a certain cluster of the traditional channel sample. More irrigated land allows farmers to produce consistently around the year (Hernández et al., 2007). Members in cluster 1 have the lowest irrigated land compared to other clusters of traditional channel sample. They prefer to transact with buyers who offer *higher price per kg*, *payment at delivery*, *premium prices*, *money for loan* and *credit* or *access for input purchase*. Since they have limited irrigated land to supply consistently, they place the attribute of e*stablished long-term relationships* as the least important compared to other attributes. Thus considering the relatively high importance placed on price attributes (including incentive for sorting) and credit aspects, it is likely that the members of cluster 1 would need price incentives and assurances of premiums, and credit access in order to encourage them to coordinate with their buyers more closely.

Members in cluster 2 prefer to transact with buyers who can provide *payment at delivery*, *premium prices*, *higher price per kg*, *long-term relationships*, and *information about market condition,* while members in cluster 3 of the traditional channel have a relatively higher utility for buyers who will provide *money for loan*, *long-term relationships*, *payment at delivery*, *price premiums* and *credit or access for input purchase*. It seems that members in cluster 2 and 3 of the traditional channel sample are more likely to engage in the long-term business relationships with their buyers as they place the attributes of *established relationship* among the top five attributes. This implies that when dealing with members in cluster 2 and 3 of the traditional channel sample, buyers should not only pay attention to financial aspects (e.g., *payment at*

delivery, *premium prices*), but also should consider *establishing long-term relationships*.

Likewise, this study also finds three different clusters for the supermarket channel sample. The results indicate that there are some variables influencing the likelihood of respondents to belong to a certain cluster of the supermarket channel sample: land size, irrigated land, mist blower and storage house ownerships. Member in cluster 1 appears to be the most constrained group with respect to these variables compared to two other cluster of the supermarket channel sample. As a result, they give the high importance of the attribute related to financial aspects such as *money for loan*, *payment at delivery*, *premium prices*, *higher price per kg* and *credit aspects*. They sought buyers who can provide them with these attributes. If the buyers could not provide them with these attributes, they tend to switch to other buyers, particularly when they need cash money urgently. In such situation, supermarket buyers are always in danger of losing delivery quantities from respondents in cluster 1.

Cluster 2 of supermarket channel sample values *price premiums* for value adding more than any other buyer attributes and they place relatively little value on having *access to credit or certified seed* compared to other cluster. It seems that *price premiums* for value adding (sorting) are likely to encourage the members of cluster 2 to stay with their buyers. In contrast to cluster 1 and 2, members in cluster 3 of supermarket channel sample describe *established long-term relationship* as the most important attribute. Members of cluster 3 rank the attributes of *pay cash immediately* and *willingness to negotiate on price* as relatively less important than other attributes. Hence, members in cluster 3 seem more likely to stay with their current buyers (supermarket buyers).

The results are expected to enhance producers' participation in modern retail channels. Supermarket buyers should make an effort to keep current supermarket farmers to supply to supermarkets. In the long run, if supermarket buyers or government are interested in increasing chili farmers' participation in supermarket channels, cluster 2 and 3 of the traditional channel sample should be a target group as they are more likely to establish long-term relationship with their buyers and obtain price premiums for value adding. The later indicates that they are more likely to sort their chilies prior to sales. As explained previously, supermarkets are often associated with higher product quality. Additionally, understanding the food security and poverty reduction implications of modern retail participation by small holders is also important to the policy community. The results suggest the importance of tailoring extension and related program initiatives to best suit the needs of different groups of farmers.

9. Discussion and summary

9.1 Introduction

Supermarkets are transforming the food supply chain in Indonesia. New procurement practices posed by the leading supermarket chains affect all actors in the supply chains including small farmers. On average, more than a half of farmers in Indonesia had a land holding of 0.5 ha or less (Statistic Agency, 2004). Within the emerging food policy agenda in the supermarket era, small farmers are one group of actors of particular interest to researchers and policymakers (Timmer, 2009). This is because small farmers are more often associated with rural poverty, and have limited access to capital, knowledge, and information for supplying their products to supermarkets (Boselie et al., 2003; Dries et al., 2009; Kaganzi et al., 2009; Reardon et.al., 2009; Timmer, 2009; Weatherspoon and Reardon, 2003). Land size constraints result in difficulties for small farmers to participate in supermarket channels. However, small farmers who can meet supermarket requirements receive higher prices compared to those supplying to traditional markets that can potentially increase their incomes (Hernández et al., 2007; Neven et al., 2009; Rao and Qaim, 2011). Given this situation, there is increasingly attention on promoting small farmers' participation in supermarket channels.

An emerging literature focuses on the constraints small farmers must overcome to participate in supermarket channels (Hernández et al., 2007; Natawidjaja et al., 2007; Neven et al., 2009; Rao and Qaim, 2011; Schipmann and Qaim, 2010), the income effect of participation (Hernández et al., 2007; Natawidjaja et al., 2007; Neven et al., 2009; Rao and Qaim, 2011), and the contractual arrangements and the role of middlemen in linking farmers to supermarkets (Dries et al., 2009; Farina, 2005; Henson et al., 2005; Moustier et al., 2010; Kaganzi et al., 2009).

This thesis contributes to this body of literature by addressing four important gaps. First, few previous studies examine contractual arrangements between farmers and supermarket buyers in Indonesia. Contracts between farmers and buyers vary among industries and countries (e.g., Bijman*,* 2008; Guo et al.*,* 2007; Schipmann and Qaim, 2011; Simmons et al.*,* 2005). Hence, it is important to examine contractual arrangements on a case by case basis in order to understand the nature of contractual arrangements between small farmers and their buyers.

Second, studies around the world analyzing modern food channels have paid little attention to the subjective attitudes of farmers in marketing decisions. They seem to assume that all farmers would sell to supermarkets if they have the capacity. However, this is not always the case at an empirical level (Blandon et al., 2010; Schipman and Qaim, 2011).

Third, previous studies in the modern market area have paid little attention to the importance of relationship quality between farmers and buyers. Improving relationship quality between exchange partners can reduce transaction costs (Batt 2003; Fischer and Reynolds 2010; Giha and Leat, 2010; Gracia et al., 2010).

Finally, some studies that examine the constraints of supermarket participation still utilize current household and farm assets in analyzing factors influencing farmers' participation in supermarket channels (Rao and Qaim, 2011; Schipmann and Qaim, 2010). Using only current assets can potentially lead to endogeneity problems (Hernández et al., 2007; Neven et al., 2009).

This thesis fills these gaps in the context of small farmers producing chili crops in Indonesia that focuses on: (1) the determinant factors of chili farmers' participation in supermarket channels and their impact of the participation on household income; (2) the perception of chili farmers regarding the quality of relationships with their buyers in the

traditional and supermarket channels; (3) the nature of contractual arrangements between chili farmers and their buyers, and determinants of farmers' commitment in the two channels; and (4) the importance of buyer attributes and determinant factors that influence farmers when choosing preferred buyers. To better understand these four issues, it is important to understand similarities and differences between farmers in the traditional and supermarket channels with respect to selected variables of household, farm, and marketing characteristics.

This final chapter summarizes and discusses the main findings. The policy implications of the study are addressed, and the limitations of this research and directions for future research are presented.

9.2 Challenges and opportunities of supermarket participation

The rise of supermarket numbers in many developing countries including Indonesia has presented considerable opportunities and challenges (constraints) for small farmers. Participation in supermarket channels can be associated with higher prices, higher returns, higher yields, more access to various inputs, credit, and technical assistance, and more stability in volume and market certainty (Rao and Qaim, 2011; Reardon et al., 2009). On the other hand, there are several challenges that small farmers have to overcome in order to participate to supermarket channels. The challenges related to the fact that supermarkets have impose new procurement practices: they need to set their own standards including strict requirements of products in terms of product quality and consistency; establish their own supply chains and preferred suppliers; and more formal transactions through formal or informal contracts are required (Reardon et al., 2007). To overcome the challenges farmers need substantial investment in capital and in new practices and management. The decisions of small farmers to participate in supermarket channels depend largely on the challenges and opportunities.

Chapter 5 provides evidence regarding the opportunities for and constraints faced by chili farmers from selling to supermarket channels. Following the previous literature, this study utilizes the variables of incentive for and capacity of farmers for selling to supermarkets, and their demographic characteristics. An important aspect of analysis in Chapter 5 is the use of lagged household assets as an independent variable in analyzing factors influencing supermarket participation and impact of the participation on household income. The use of lagged household assets provides more robust results since it can overcome endogeneity problems. Current assets owned by household can be influenced by supermarket participation.

The decisions of chili farmers to participate in the supermarket channels or stay supply to traditional can be considered as decisions of technology adoption of output marketing. Thus the probit model is fit to be performed. The OLS regression is utilized to measure income effects. Because results from treatment effects model confirmed a selection bias for supermarket farmers, this study utilizes the results from the treatment effects model in explaining supermarket participation and its impact on household income instead of using the results from probit and OLS regression.

The results show that there are several constraints faced by small farmers who participate in the supermarket channel. However, in contrast to much of the previous literature, the constraints are related to level of education, infrastructure and storage space ownership, rather than farm size, irrigated land or other household and farm assets. The fact that these latter assets are not significant is contrary to much of the literature on this topic that shows the importance of farm assets such as farm size (Rao and Qaim, 2011; Neven et al., 2009) and irrigated land (Hernández et al., 2007; Neven et al., 2009) as significant factors that influence supermarket participation. This is perhaps because small farmers who have landholding of less than 0.5 ha dominate

Indonesian agriculture (Chapter 4). As outlined in Chapter 4, the land size between farmers in the two channels do not vary much. Similarly, there is no difference in terms of irrigated land or other household and farm assets between supermarket farmers and traditional channel farmers. The findings demonstrate that small farmers with limited access to physical capital are not currently being squeezed out of supermarket channels.

This study suggests the importance of education in giving the ability of small farmers to participate in the supermarket channel. Results in Chapter 4 suggest that supermarket farmers have better education levels than traditional channel farmers. As noted by Rao and Qaim (2011) and Balandon et al. (2009) a better education level can facilitate farmers to adjust to new market situations and enhance managerial and technical skills. To participate in supermarket channels, chili farmers need to adopt new procurement practices posed by supermarkets. They need to send chilies that are consistent in terms of volume, color, length and variety to supermarket buyers. Thus they need adjust their production and post-harvest practice to meet supermarket requirements. More formal transaction in the supermarket channels also require farmers to better understand details of agreements in their formal or informal contracts. It seems that better educated farmers can adjust to new market situations better than farmers who have a low level of education.

Distance to the nearest asphalt road is one of the constraints preventing chili farmers from participating in supermarket channels. Supermarket farmers live relatively closer to an asphalt road than farmers in the traditional channels (Chapter 4). Living closer to asphalt road may reduce the transportation costs to farmers and buyers. Since supermarket buyers are concerned about reducing transactions costs, they tend to transact with farmers living near asphalt roads (Barrett et al., 2011; Hernández et al., 2007; Reardon et al., 2009). Additionally, farmers living near asphalt roads have better

access to output and input markets, reducing their transaction costs in accessing these markets.

Another constraint faced by chili farmers who wish to participate in the supermarket channel is storage house ownership. A significantly higher share of farmers in the supermarket channel have invested in storage room in the last five years compared to those in the traditional channel (Chapter 4). Since chili crops are perishable, storage rooms are important assets for chili farmers to ensure the quality of chilies prior to selling to their buyers. Thus storage facilities can improve the market performance of chili farmers.

The fact that the constraints faced by chili farmers to participate in the supermarket channel are related to education (knowledge) and access infrastructure is also confirmed by the results in Chapter 7. Lack of experience in dealing with supermarket buyers, low quality of products, and location far from supermarket buyers further are among the top three constraints perceived by small farmers to participate in the supermarket channels.

Impact analysis conducted has shown that participation in the supermarket channels generates a higher per capita household income than traditional channels even after controlling for various household, farm asset and demographic characteristics. Farmers selling via supermarket channels gain per capita income of 75% higher than farmers selling via traditional channels. The results are line with studies that have analyzed the impact of modern channel participation on household income in the case of other commodity in the fresh fruit and vegetable sector (Miyata et al., 2009; Rao and Qaim, 2011).

The higher incomes generated by supermarket farmers might be associated with the higher prices that they receive. The results in Chapter 4 demonstrate that

supermarket farmers benefit from higher price per kg relative to traditional farmers. This finding supports Miyata et al.'s (2009) findings in the case of green onion farmers and Rao and Qaim's (2011) research in the case of vegetable farmers in Kenya. It is likely that these higher prices receives by supermarket famers reflect the higher quality of chilies. Results in Chapter 4 suggest that a significantly higher share of supermarket farmers have sorted and graded their chilies based on size, color, and quality. They also have removed small and bad chilies before sending the chilies to supermarket buyers. Additionally, supermarket farmers also benefit from higher yields of chilies compared to traditional channel farmers, presumably due to the technical assistance and specialized inputs provided by their buyers. Chapter 4 shows that significantly more supermarket buyers (i.e., farmer groups and traders) are likely to provide technical assistance in chili production methods and credit access to farmers participating in the supermarket chain. Thus the differences in household income between traditional and supermarket channels might be due to differences both in price and yield.

Thus consistent with the expectation that participation in supermarket channels provides opportunities for small chili farmers to increase their household income, receive higher price and yield, and improve access to technical assistance and inputs. The findings also suggest that small and resource-poor farmers might participate in the supermarket channels since the main barriers of supermarket participation related to education, the availability of infrastructure (roads), and storage house ownerships rather than farm size, irrigated land and other household assets.

9.3 Relationship quality in the traditional and supermarket channels

In traditional channels, transactions between farmers and buyers are often characterized by low levels of coordination which involve one-off transactions with no

promise for repeated transactions, and no prior agreements on product delivery or price (Rao and Qaim, 2011; Peterson et al., 2001). In traditional markets, market prices determine supply and demand. Market prices are subject to large fluctuations which results in difficulties for farmers and buyers to ensure that supply and demand are balanced. In contrast, the new procurement practices introduced by supermarkets have shifted trade relationships from spot market transactions to exclusive vertical coordination such as formal or informal contracts. Agreements are made between farmers and supermarket buyers including volume, quality, payment time, and prices (Rao and Qaim, 2010). By establishing closer trade relationships, farmers and supermarket buyers benefit in reducing transaction costs as well as securing their long-term relationships.

These differences of trade relationship practices between traditional and supermarket channels as outlined above might have implications for the level of relationship quality between farmers and buyers. Chapter 6 compares the perceptions of chili farmers in the two channels with respect to three relationship quality variables: trust, satisfaction and commitment.

Factor analysis and discriminant analysis are performed in examining the perceptions of farmers regarding the three relationship quality variables. The analyses are conducted into two steps. First, considering that trust, satisfaction, and commitment are latent variables that cannot be measured directly, this study utilizes several manifest variables, those that can be measured directly by respondents, to measure the latent variables. Factor analysis is used to test the ability of manifest variables to measure the latent variables. Second, discriminant analysis is used to compare the perceptions of farmers with respect to the latent variables. Compared to t-test, the discriminant analysis

allows researchers to take into account the interactions between the three relationship variables.

Results demonstrate that supermarket buyers are perceived more positively by chili farmers with respect to satisfaction and commitment than buyers in the traditional channels. Supermarket farmers perceive that their buyers are more likely to meet their expectation during the transaction, to be quick to respond to farmers' complaints, and to offer a satisfactory price. As shown in Chapter 4, supermarket farmers receive higher prices for their chilies than traditional channel farmers reflecting quality differentiation. Such prices mechanisms result in satisfaction for chili farmers since their buyers have compensated them for time that they have invested in sorting and grading. The importance of giving price premiums for quality differentiation has also been shown in Chapter 8 as farmers in both channels rate much higher the attribute of *getting price premiums* from their buyers among the most important attribute. Moreover, results in Chapter 7 also support the importance to satisfy farmers in terms of price. Farmers who are satisfied with price mechanisms offered by their buyers are more likely to stay and maintain their trade relationships.

As a result of a stronger intention to maintain trade relationships with their buyers, supermarket farmers are less likely to sell their chilies to other buyers compared to those in the traditional channels. They care about the long-term success of their relationships and are willing to commit with their buyers. The fact that they have high levels of commitment is relevant in the supermarket channels since supermarket buyers require farmers' commitment to supply chilies consistently with respect to quality and quantity. High levels of commitment reduce uncertainties faced by supermarket buyers about the quantity and the quality of chilies they will receive. Unable to maintain a

consistent volume and quality might harm their relationships and might exclude chili farmers from participating in the supermarket channel.

However, contrary to expectations, supermarket farmers have negative perceptions regarding trust. It seems that they have bad experiences with their buyers during their transactions in the aspects of payment time and the way supermarket buyers keep their promises. Chili farmers perceive that their buyers are less likely to provide timely payment as well as to keep their promises. Considering chili farmers are small-scale farmers, timely payments are essential in giving them the capacity to care for their households and the necessary inputs for chili production. The results in Chapter 4 also demonstrate that chili production contributes significantly to farmers' income, particularly for those in the supermarket channel. The importance of providing timely payment has also been shown in Chapter 8. In this chapter, the attribute *pays cash immediately* is perceived as the second important attribute by supermarket farmers when choosing preferred buyers.

Traditional channel farmers report that they have bad experiences during transactions with their buyers. This is indicated by the negative value of commitment and satisfaction, and the low value of trust they allocate in the survey. They feel that their buyers do not meet their expectations during their transactions in terms of the chili prices that they received, the ways their buyers dealt with them and the slow responses in respect to farmers' grievances. Chili farmers also feel that their buyers often break their promises and provide late payments. In fact, the attribute *pays cash immediately* is perceived as the most important attribute by traditional channel farmers (Chapter 8). Due to these issues, it is not surprising that traditional channel farmers have low levels of commitment to their buyers. It seems that they will switch in selling chilies to new buyers if they can find new buyers. This is similar to the results of White et al. (2007)

and Mustafa et al. (2006) confirming that chili farmers in Indonesia often complain about trader exploitation regarding lower price and little premium for quality. These studies also report that chili farmers have limited commitment to provide consistent supplies, particularly due to big price fluctuation issues.

A number of factors might influence the perceptions of farmers in the two channels with respect to the quality of relationships with their buyers. Using descriptive results in Chapter 4, this study compared selected demographic and farm characteristics that might influence their perceptions: land size, education, age, and farming time. The results in Chapter 4 indicate that land size does not differ between farmers in the two channels suggesting that farmers' perception of relationship quality may not result in farm size differences. The variables of education and age differ between the two sample groups. Farmers in the supermarket channel have better education levels, less numbers of years of growing chilies, and are younger (Chapter 4). Younger farmers with better education levels might have effective communication with their buyers and better understanding about the specific requirements needed by supermarket buyers. Thus they perceive higher levels of relationship quality with their current buyers. While, less farming time having by supermarket farmers might be related to the fact that older farmers who have more numbers of years of growing chilies are less willing to change their production practices and to innovate for the newly-arrived practices required in the supermarket channel.

Chapter 6 also shows that chili farmers in each channel are heterogeneous rather than homogeneous. About a half of the farmers who were originally placed in the traditional channel group are incorrectly classified in terms of relationship quality variables, while around a fifth of farmers originally placed in the supermarket channel are incorrectly classified. In discriminant analysis the misclassified farmers are

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classified into modernizing farmers that behave in between the original groups (traditional and supermarket channels). According to this result, chili farmers can be classified into three groups: group 1 (conventional farmers), group 2 (modernizing farmers), and group 3 (modern farmers).

Group 1 consisted of farmers who have the lowest levels of education, oldest age and more numbers of years of growing chilies than the other groups. Group 3 are predominantly farmers who have the highest level of education, the youngest age and the least numbers of years of growing chilies, while group 2 consists of farmers with age, education, and farming time in between group 1 and 3. The three groups have different perceptions regarding relationship quality with their buyers. Group 3 are more likely to engage in long-term relationships with their current buyers, and have high levels of satisfaction. However, members in group 3 perceive low levels of trust. Members in group 1 report low levels of trust, satisfaction and commitment. Meanwhile, group 2 has moderate levels of satisfaction and commitment, but not trust.

This thesis demonstrates that supermarket farmers have a higher level of perceived satisfaction and commitment than traditional channel farmers. Further analysis also indicates that chili farmers can also be classified into three groups with different perceptions of relationship quality. Buyers should consider the heterogeneity in perceptions when dealing with the groups.

9.4 Contractual arrangements and farmers' commitment

The combination of modernized procurement systems of supermarkets and the problems faced by small farmers to participate in supermarket channels have forced supermarkets to establish closer relationships with farmers. A contract is a common vertical coordination suggested by researchers in linking farmers to modern channels. The forms of contractual arrangements between farmers and buyers vary among

marketing channels, agricultural industries and regions (Bijman, 2008; Dolan and Humprey 2000; Farina 2005; Henson et al. 2005; Guo et al., 2007; Lawrence et al., 1997; Schipmann and Qaim 2011; Simmons et al., 2005). For this reason, this study has compared contractual arrangements between chili farmers and buyers in the traditional and supermarket channels (Chapter 7). The comparison of means and proportions with respect to selected variables in the contractual arrangements between farmers in the traditional and supermarket channels are employed using a standard t-test and chi-square test.

The results show that the majority of chili farmers in the two channels have oral/verbal agreements in order to coordinate the supply of chilies with their buyers. This is perhaps because oral agreements are simpler and less costly compared to written agreements. Due to the high expectations for chili quality, the most important aspects in the agreements between farmers and buyers in the supermarket channel include grading and sorting, particularly the color and size of chilies. Depending on the types of chilies, supermarket buyers require bright color: bright red for red chilies and bright green for green chilies. Farmers also need to sort their chilies by size since supermarkets require chilies with uniform sizes. No rotten or bad chilies are accepted in the supermarket channel. Because of these practices, the supermarket farmers are more likely to sort, grade, and package their chilies compared to traditional channel farmers (Chapter 4).

Another important aspect in the agreement between chili farmers and buyers in the supermarket channels regarding input access. To fulfill specific requirements posed by supermarkets, a significantly higher share of supermarket farmers state that supermarket buyers agree to provide inputs and certified chili seed on credit.

In line with the findings in the literature (e.g., Henson et al., 2005; Dries et al., 2009; Schipmann and Qaim, 2011), this study also finds that selling to supermarkets is

associated with delays in payments which vary between less than one week to more than one week after product delivery. A significantly higher number of supermarket farmers report that they have agreements with their partners regarding the schedule of payments than in the traditional chain. This perhaps because they want to make sure that their buyers provide timely payments since as small farmers delay in payments might influence the cash flow of the farm household as well as their ability to provide sufficient inputs for chili production itself.

Compared to traditional channel farmers, a lower number of farmers in the supermarket channel have price agreements with their buyers. Since large price fluctuations occur in Indonesian chili markets, supermarkets set price fortnightly based on chili prices in wholesale markets. Thus in the supermarket channels, prices are relatively stable (at least during two weeks) compared to traditional markets in which prices change all the time. Given this situation, it is not surprising that the price aspect is not important in the agreement between farmers and supermarket buyers.

The perceptions of farmers regarding supermarket channels are also explored in Chapter 7. Farmers in both channels strongly perceive that getting higher prices is the main advantage of selling to supermarket channels. Only a few farmers in the traditional and supermarket channels perceive that access to certified chili seed, input on credit, and technical assistance are advantages of selling to supermarkets. As explained in Chapter 4, farmers can obtain technical assistance about chili production methods from other sources such as farmers groups, extension offices, and other farmers/neighbors/relatives. Chili farmers in Indonesia are less likely to depend on their buyers regarding inputs in chili production. The results in Chapter 8 confirms that chili farmers are much more interested in self determination and do not want to have any credit relationships with their buyers. Credits from their buyers might result in

dependency since farmers have to sell their chilies to buyers who have provided input to them.

Chapter 7 also examines the perceptions of chili farmers regarding the main constraints of selling to supermarkets. Farmers also perceive several constraints exist that can prevent them from participating in the supermarket channels, including not enough experience to supply to supermarket channels, low quality of products, location far from supermarket buyers, small farms, lack of assets to supply all year (e.g., irrigation), and farmers have been tied down with a particular buyers. It seems that the constraints are similar to as explained in Chapter 5 in which it is not access to farm and household capital that can prevent chili farmers from participating in the supermarket channel. Rather, the constraints arise from the knowledge of farmers regarding meeting supermarket requirements (lack of experience and low quality of products) and access to infrastructure (location of farmers far from supermarket buyers). While providing credit is important, farmers perceive training aspects (i.e., training in production methods, marketing, and grades and standards) are the most important for facilitating participation in supermarket channels.

As reported by Eathon and Shepherd (2001), a long-term commitment is key in the success of contractual agreements between farmers and buyers. Hence, Chapter 7 explores factors determining the levels of farmers' commitment to stay with their current buyers/marketing channels.

According to neo classical economics, the variable of market price is the most important factor in transactions between producers and their buyers. Producers sell their produce to buyers who can offer the best prices, while the marketing literature emphasizes the importance of relation variables (e.g., trust and commitment) in determining the levels of commitment of an exchange partner to stay with their current

buyers. This study incorporates both the variables of absolute chili prices and relational variables (trust and commitment) as determinant factors influencing farmers' commitment. The relational variables are the same as extrapolated in Chapter 6. Household and farm characteristics that are available in Chapter 4 are also incorporated as control variables including land size, age, farming time, and education. The OLS method is performed to examine the impacts of these variables on farmers' levels of commitment.

The results from OLS regression demonstrate that trust and satisfaction have a significant influence on farmers' commitment to both channels, while the actual chili price, age, and land size have no influence. This finding implies that chili farmers in both channels not only consider the actual prices paid by their buyers, but also value buyers who can be trusted and those who can satisfy them during the transaction. The quality of relationships with their buyers are important factors in the trade relationships between farmers and buyers in both channels.

9.5 Marketing preferences of small chili farmers

While Chapter 5 deals with observable variables such as household characteristics, infrastructure constraints and various household assets in analyzing constraints faced by small farmers entry to supermarket channels, Chapter 8 incorporates the subjective attitude of chili farmers regarding their marketing preferences. Failure to include the subjective attitudes of farmers' preferences in marketing decisions might lead to wrong conclusions about the constraints faced by small farmers when adopting supermarket channels. For example, Blandon et al. (2010) demonstrates that the likelihood of farmers to participate in supermarket channels is not only determined by observable factors. In this study, many vegetable farmers who have

relatively similar socioeconomic characteristics have different perceptions with respect to marketing channels. Farmers who are able to participate in supermarket channels decide not to do so due to several issues such as payment delays and strict quality standards.

Other authors also argue that farmers do not always consider getting the highest prices when they transact with a particular buyer. On an empirical level, aspects such as access to credit, technical assistance, the ability to negotiate, relational variables (trust and commitment) are also important for farmers when they decide to sell their products (Boger et al., 2010; Lu et al., 2010b; Woldie and Nuppenau, 2009). To ascertain the constraints that small farmers have to contend with in supplying to supermarkets more comprehensively, it is important to incorporate subjective attitudes of small farmers in the analysis.

Researchers have been trying to find what buyer/marketing attributes most influence farmers' perception of marketing channels/buyers. This is a complex task since the perceived quality of the marketing channels/buyers is based on many attributes that might influence farmers in the process of their choices. Researchers usually use factors that can reduce transaction costs such as selling place, price structure, quantity demanded, input provisions, the ability to bargain, the perceptions of relationship quality with their buyers such as commitment and trust (Blandon et al., 2010; Masakure and Henson 2005; Schipman and Qaim, 2011; Umberger et al., 2010).

Following the literature, this study utilizes factors related to transaction cost reduction. Specifically, a farmer's preference with respect to particular buyer/marketing channel is examined through the 11 buyer attributes which belong to the buyer/marketing channel. The 11 buyer attributes were evaluated by chili farmers during the survey. The analyses are conducted into two steps. First, an aggregate

analysis is performed by applying the BW method in examining the relative importance of buyer attributes in each sample group (traditional and supermarket channels). Second, for each sample group, this study uses the LC cluster model of respondents' individual BW scores and characteristics (factors related to capacity, incentive, and demographic variables) to understand the heterogeneity of farmers in their ratings of buyers attributes.

Based on aggregate analysis, research reveals some similarities and differences with respect to the attitudes of chili farmers to preferred buyer attributes between sample in the traditional and supermarket channels. Receiving *cash immediately* and getting *price premium* for quality are the two most important attributes when farmers in the two channels choose preferred buyers. Given that the majority of chili farmers are small with landholding less than 0.5 ha (Chapter 4), cash money is an important aspect. Delays in payments might have negative implications for farmers' households and the capacity of chili farmers to provide sufficient inputs for their farms. Higher shares of supermarket farmers have sorted and graded chilies (based on size, color, and quality) and have removed bad and small chilies prior to sale (Chapter 4). This study also finds a high proportion of traditional channel farmers have also sorted and removed small or bad chilies (Chapter 4). Thus it is not surprising that chili farmers in both channels perceive the attribute of *price premium for quality* as one of the most important buyer attributes.

Chili farmers in both channels also have similarities with respect to attributes of *input provisions* and *technical assistance*. They rate these attributes relatively less important compared to other buyer attributes. This indicates that they are more interested in self determination in which they do not want to be tie down by their buyers. In many cases, if farmers rely on their buyers regarding input provisions, they

have to sell their produce to their buyers. Results in Chapter 7 confirm that being tied down with a particular trader is one of constraints faced by small farmers to participate in the supermarket channel. By avoiding credit relationships with their buyers, chili farmers are free to sell their produce to buyers who can provide the best prices.

The remainder of the buyer attributes are rated differently between farmers in the two channels, but the patterns of differences are not clearly evidenced. The only obvious pattern is related to the attribute of *established relationship* with their buyers that is rated differently between farmers in the two channels. Supermarket farmers rate this attribute much higher that traditional channel farmers. This finding suggests that supermarket farmers are more likely to establish long-term relationships with their buyers. This supports the results in Chapter 6 in which supermarket farmers perceive higher levels of commitment to supply to supermarket channels compared to those in the traditional channel. Given that supermarkets require farmers' commitment to supply chilies consistently in terms of volume and quality, the likelihood of chili farmers establishing long-term relationships with their buyers provides a positive signal for supermarket buyers.

However, according to the LC cluster analysis, farmers are not homogeneous regarding their preference of the buyer attributes. The LC cluster analysis reveals three distinct groups with respect to farmers' perceptions of the 11 buyers attributes in each channel.

In the traditional channel sample, the results of the LC cluster analysis demonstrate that the variables of capacity, incentive and demographic of farmers offer only limited information about the composition of the clusters. Only one variable can be used to differentiate the clusters: irrigated land ownership. Cluster 3 has the highest irrigated land followed by cluster 2 and 1. Cluster 1 of the traditional channel sample

has a financial and short-term orientation as they rate the attributes of *price per kg*, *pay cash immediately*, *provide price premiums*, and *money for loan* as the top four important attributes. Farmers with limited irrigated land cannot supply chilies all year, particularly in the dry season. Thus they rate the attribute of *established relationships* with their buyers as much lower than the other clusters of the traditional channel sample. Members of clusters 2 and 3 of the traditional channel sample have similarities as they put the attribute of *established relationship* with their buyers among the top five of important buyer attributes. This suggests that cluster 2 and 3 of the traditional channel are more likely to engage in long-term relationships with their buyers compared to cluster 1.

In the supermarket channel sample, the results of the LC cluster model reveal that there are some variables of capacity, incentive and demographic of farmers that differ across the clusters. They include land size, irrigated land, mist blower, and storage house ownerships. Cluster 1 of the supermarket channel seems to be the most constrained group in terms of these variables. Thus it is not surprising that members in this cluster rate the attributes related to financial and credit aspects much higher than other attributes. They have a short-term orientation in which if their buyers can provide the financial or credit aspects, they tend to switch to other buyers. Cluster 2 of the supermarket channel sample values the attribute of *provide price premiums* for value adding more than other buyer attributes. It seems that they also tend to switch buyers if the buyers do not *provide price premiums*. Cluster 3 of the supermarket channel sample shows a strong intention to establish long-term relationships with their buyers as they rate this attribute as the most important. They also rate the attribute *provide price premium* for value adding, *shares information about market conditions* and *commitment*

among the top four important buyer attributes. This suggests that cluster 3 of the supermarket channel have positive attitude towards supermarket buyers.

9.6 Policy implications

The results of this study have important implications for policymakers on how to facilitate the adjustment of small farmers to a new agri-food system. In Indonesia, policymakers often perceive that supermarkets might have negative impacts on traditional markets, provide no benefit to society and are only driven by greedy capitalists. This thesis provides evidence with regard to the issues in the case of small farmers producing chilies in Indonesia. The fact that irrigated land, farm size, and household and farm assets such as vehicles and equipment are not significant in the analysis suggests that small farmers and even the resource-poor can be included in the dynamic of supermarket sector growth. The integration of small farmers into supermarket channels should be promoted by demonstrating that this can be a useful strategy for helping farmers increase income. This thesis explores some initiatives that should be focused by policymakers and traders for facilitating farmers to participate in supermarket channels.

9.6.1 Providing training and extension advice in production methods, marketing, and grades and standard.

The results show that better educated farmers are more likely to participate in the supermarket channels suggesting the importance of education in giving farmers the capacity and willingness to enter the supermarket channel, through training and extension advice. The study also shows that participants in the supermarket channel are more likely to sort and package their chilies and keep written records. This provides information on the types of skills which supermarkets and other modern-sector buyers

require, and thus the types of skills which farmers need in order to adapt to changing markets. Training in production methods, marketing, and grades and standards can help farmers to fulfill specific requirements posed by supermarkets.

9.6.2 Improving road infrastructure.

Given that distance to an asphalt road is a factor that significantly influences supermarket participation, governments should focus on infrastructure to reduce the transaction costs in agricultural marketing. Public investments in road infrastructure are required in parallel with a suite of incentives to encourage and support the supermarket buyers to source chilies from small farmers.

9.6.3 Building and improving relationship quality between farmers and supermarket buyers.

This issues are important particularly for supermarket buyers. Supermarkets need consistency of chilies, suggesting the importance of farmers' commitment to supply to supermarket channels. In order to improve farmers' commitment, buyers should focus not only on absolute price, but also on trust and satisfaction variables. However, this study shows that supermarket farmers have low levels of trust with their buyers. Hence, supermarket buyers should work to improve the level of farmers' trust by providing payment promptly and following through with their promises. Satisfaction can be improved by paying better prices and responding quickly and swiftly to grievances.

9.6.4 Providing the right incentives for supermarket farmers.

The results confirm heterogeneity among chili farmers in the supermarket channel regarding preferred buyer attributes. This suggests that although chili farmers have the capacity to supply supermarket channels, they show a high willingness to

switch to other buyers when they need cash urgently or their buyers do not provide price premiums for quality differentiation. Hence, supermarket buyers should do more in terms of providing price premiums for higher quality products and other incentives such as paying cash at product delivery. In the long run, if supermarket buyers and government are interested in increasing chili farmers' participation in supermarket channels, clusters 2 in the traditional channel should be a target group. The results in Chapter 8 demonstrate that members in cluster 2 are more likely to establish long-term relationships with their buyers and value price premiums for quality much higher compared to other clusters of the traditional channel.

9.6.5 Improving the conditions of traditional markets for fresh products.

It is important to recognize that the supermarket marketing channel is still quite small in Indonesia, at least in the case of chilies. As noted in the random sample of chili farmers in the main chili growing zones of Java, only 3% of the chili farmers reported that they sold into the supermarket channel. Other farmers may be selling to traders who sort and clean the product for resale to supermarkets, so it is possible that the actual proportion is greater than 3%. Nonetheless, this suggests that the supermarket sector has a limited ability to absorb new suppliers. Preparing a large number of farmers to sell into the supermarket channel could simply displace existing suppliers and/or reduce the price premium for higher-quality produce. Thus in addition to helping some farmers meet the growing demand by supermarkets, the government should also work to lower marketing and transaction costs in the traditional markets, where the bulk of chilies are still being marketed. This could include improving the systems for collecting and disseminating market information, establishing workable systems of grades and standards to motivate farmers to meet the quality requirements of consumers, and providing new technology through an effective research and extension system. In order

to reduce transaction costs in the traditional channels, traders need to maintain and improve the quality of relationships with chili farmers by improving the level of trust and satisfaction of farmers.

9.7 Contribution of the study

This study contributes to the emerging body of literature on how small farmers are affected by the agri-food transformation, in terms of opportunities and constraints of supermarket participation. This thesis has also examined the levels of relationship quality between farmers and buyers in the chili industry, and thus it contributes to the body of literature relationship marketing in the agribusiness area.

Specifically, this thesis contributes to the existing literature in several important ways. First, this study has assessed constraints and opportunities faced by small farmers in supermarket participation. In order to ensure a more robust outcome, lagged household and farm assets have included in Chapter 5. Lagged household and farm assets are useful to avoid the endogeneity problem.

Second, while literature in supermarket areas has paid little attention to explore the level of relationship quality between farmers and buyers, this thesis has incorporated this issue in the Chapter 6. In this Chapter, the perceptions of chili farmers with respect to the three relationship quality variables (commitment, trust, and satisfaction) have been examined. Factors influencing farmers' commitment to stay with their current buyers have also been identified in the Chapter 7.

Third, there is a little evidence among a few studies in Indonesia examining the characteristics of participant and non-participant farmers in the supermarket channels and the contractual arrangements between farmers and supermarket buyers. These issues have been outlined in the Chapter 4 and 7. Some similarities and differences appear between farmers in the traditional and supermarket channels with respect to

specific variables of household, farm and marketing characteristics (Chapter 4). Chapter 7 has highlighted differences of contractual arrangements between traditional and supermarket channels. Understanding details/aspects in contractual arrangements in supermarket channels might facilitate small farmers to overcome difficulties to supply to supermarket channels.

Finally, this thesis has incorporated the subjective attitudes of individual farmers when they choose marketing channels or buyers (Chapter 8). Hence, this study has identified both observable and non-observable constraints faced by small farmer in supermarket participation. The use of a relatively new technique, BW scaling, reduces respondents' bias in making choices of the attributes in the questionnaires and allows researchers to construct an individual-level ranking in a relatively easy structure (Cohen, 2009)

9.8 Limitations of the study and recommendation for future studies

It should be noted that the results of this study have some limitations which could stimulate future studies. First, this study is region and commodity specific, i.e., the chili commodity in Indonesia. Thus further research is required in other regions and FFV commodities to generalize the results in the context of high value agricultural commodities.

Second, this study only uses cross section data based on chili survey in Indonesia in 2010. By using a single cross-sectional data, the analysis does not allow to include changing over time in farm and household characteristics. For example, household income might vary over time due to changes in weather and in market situations. Likewise, farmers' skill might change as a result of learning-by doing and training provided by extension staff or farmer groups.

Third, this study examines the farmer-buyer relationship from the farmers' perspective. Future research should consider incorporating methods to measure the same perceptions from the buyers' perspective. Moreover, this study is not able to include a number of factors that may have a significant influence on trust and satisfaction. Authors such as Morgan and Hunt (1994), Geyskens et al. (1999) and Kwon and Suh (2004) view that trust and satisfaction are intermediate variables that influence by various factors (e.g., communication, power /dependence, and goal compatibility). Therefore, future research should incorporate these issues to provide a more complete overviews and holistic information in relation to farmer-buyer relationships in the chili supply chains.

Finally, this study only examines the relative importance of buyer attributes from the perception of farmers. Hence, future research should include the perspectives of buyers regarding farmer attributes.

References

Ali, J., Singh, S.P. and Muhammad, S. (2007). High-Value Agriculture and structural changes in the Indian meat industry: implications for agribusiness and small farmers, Journal of Food Distribution Research 38(1): 1-9.

Alvarado, I. and Charmel, K. (2002). The Rapid rise of supermarkets in Costa Rica: impact on horticultural markets, Development Policy Review 20(4): 473-485.

Arnett, D.B., German, S.D. and Hunt, S.D. (2003). The identity salience model of relationship marketing success: the case of non-profit marketing, Journal of Marketing 67:89-105.

Athanasopoulou, P. (2009). Relationship quality: a critical literature review and research agenda, European Journal of Marketing 43(5): 583-610.

Auger. (2007). Using best-worst scaling methodology to investigate consumer ethical beliefs across countries, Journal of Business Ethics 70(3): 299-326.

Balsevich, F., Berdegué, J.A., Flores, L., Mainville, D. and Reardon, T. (2003). Supermarkets and produce quality and safety standards in Latin America, American Journal Agricultural Economics 85(5): 1147–1154.

Barrett, C.B., Backe, M., Bellemare, M.F., Michelson, H.C, Narayan, S., and Walker, T.F. (2011). Smallholder participation in contract farming: comparative evidence from five countries, World Development 40(4): 715-730.

Barry, P.J., Steven, T.S. and Lajili, K. (1992). Vertical coordination, financial structure, and the changing theory of the firm, American Journal of Agricultural Economics 74(5): 1219-1225.

Batt, P.J. (2001). Building trust in the Filipino seed potato industry, Journal of International Food and Agribusiness Marketing 13(4): 23-41.

Batt, P.J. (2003). Building trust between growers and market agents, Supply Chain Management: An International Journal 8(1): 65-78.

Batt, P.J. (2004). Incorporating measures of satisfaction, trust and power-dependence into an analysis of agribusiness supply chains. in G.I. Johnson and P.J. Hofman (Eds.), Agriproduct Supply-Chain Management in Developing Countries, ACIAR Proceedings No. 119e, pp. 27-43.

Batt, P.J. (2010). A review of the trust situation in agri-food chain relationships in the Asia-Pacific with a focus on the Philippines and Australia. in Fischer, C. and Hartmann, M. (eds.), Agri-food chain relationships. CAB International, pp 105-118.

Bauman, P. (2000). Equity and efficiency in contract farming schemes: the experience of Agricultural tree crops. Working Paper, Overseas Development Institute, London, October.

Bejou, D., Wray, B. and Ingram, T.N. (1996). Determinants of relationship quality: an artificial neural network analysis, Journal of Business Research 36: 137-143.

Beckert J. (2007). The great transformation of embeddedness: Karl Polanyi and the new economic sociology, MPIfG Discussion Paper, No. 7(1), http://hdl.handle.net/10419/19938.

Bijman, J. (2008). Contract farming in developing countries: an overview, Working Paper May 2008. Wageningen University.

Black, Ken. 2010. Business statistics for contemporary decision making, sixth edition. John Wiley and Son, Inc., New Jersey.

Blandon, J., Henson, S. and Islam, T. (2009). Marketing preferences of small-scale farmers in the context of new agri-food systems: a stated choice model, Agribusiness 25(2): 251-267.

Blandon, J., Henson, S. and Islam, T. (2010). The importance of assessing marketing preferences of small-scale farmers: a latent segment approach, European Journal of Development Research 22(4): 494–509.

Boger, S., Hobbs, J.E. and Kerr, W.A. (2001). Supply chain relationships in the Polish pork sector, Supply Chain Management: An International Journal 6(2): 74-82.

Bolling, C. and Somwaru, A. (2001). US food companies access foreign markets though direct investment, Food Review, 24(3): 23-28.

Boselie, D., Henson, S. and Weatherspoon, D. (2003). Supermarket procurement practices in developing countries: redefining the roles of the public and private sectors, American Journal Agricultural Economics 85(5): 1155–1161.

Bowlig, S., Gibbon, P. and Jones, S. (2008). The economics of smallholder organic contract farming in Tropical Africa, World Development 37(6): 1094-1104.

Bradach, J.I. and Eccles, R.G. (1989). Price, authority, and trust: from ideal types to plural forms, Annual Review of Sociology 15: 97-118.

Caldwell, D.F., Chatman, J.A. and O'Reilly, C.A. (1990). Building organizational commitment: a multifirm study, Journal of Occupational Psychology 63(3): 245-261.

Chowdhury, S., Gulati, A. and Gumbira-Said, E. (2005). High value products, supermarkets and vertical arrangements in Indonesia, MTID Discussion Paper No.83. International Food Policy Research Institute, Washington, pp 1-83.

Churchill, G.A. and Iacobucci, D. (2005). Marketing Research: Methodological Foundations, Ninth Edition. Thomson, South-Western.

Cohen, E. (2009). Applying best-worst scaling to wine marketing, International Journal of Wine Business Research 21(1): 8-23.

Coulter, J. Goodland, A. and Tallontire, A. (1999). Marrying farmer cooperation and contract farming: provision in a liberalising sub-Saharan Africa. Retrieved 10 October 2012, from http://dspace.cigilibrary.org/jspui/bitstream/123456789/22718/1/Marrying%20Farmer%20Cooperation%20and%20Contract%20Farming%20for%20Service%20Provision%20in%20a%20Liberalising%20Sub%20Saharan%20Africa.pdf?1

Crosby, L.A., Evans, K.R. and Cowles, D. (1990). Relationship quality in services selling: an interpersonal influence perspective, Journal of Marketing 54(3): 68-81.

Daly, T.M., Lee, J.A. and Soutar, G.N. (2010). Conflict-handling style measurement: A best-worst scaling application, International Journal of Conflict Management 21(3): 281-308.

DeCotiis, T. and Summer, T. (1987). A path analysis of a model of the antecedents and consequences of organizational commitment, Human Relations 40(7): 445-470

Dolan, C. and Humphrey, J. (2000). Governance and trade in fresh vegetables: the impact of UK supermarkets on the African horticulture industry, Journal of Development Studies 37(2): 147 — 176.

Dries, L., Germenji, E., Noev, N. and Swinnen, J.F.M. (2009). Farmers, vertical coordination, and the restructuring of dairy supply chains in Central and Eastern Europe, World Development 37(11): 1742-1758.

Dwyer, F.R., Schurr, P.H. and Oh, S. (1987). Developing buyer-seller relationships, Journal of Marketing 51(April): 11-27.

Eathon, C. and Shepherd, A.W. (2001). Contract farming: partnerships for growth. FAO Agriculture Service Bulletin, No.145, FAO, Rome, Italy

FAO. (2011). The state of food and agriculture. FAO, Rome.

Farina, E.M.M.Q., Gutman, G.E., Lavarello, P.J., Nunes, R. and Reardon, T. (2005). Private and public milk standards in Argentina and Brazil, Food Policy 30: 302-315.

Feder, G., Just, R.E., and Zilberman, D. (1985). Adoption of agricultural innovations in developing countries: a survey, Economic Development and Cultural Change 33(2): 255-298.

Finn, A. and Louviere, J.J. (1992). Determining the appropriate response to evidence of public concern: the case of food safety, Journal of Public Policy and Marketing 11(1): 12-25.

Fischer, C. and Reynolds, N. (2010). Collaborative advantage, relational risks and sustainable relationships: a literature review and definition. in Fischer, C. and Hartmann, M. (eds.), Agri-food chain relationships. CAB International, pp 74-87.

Flynn, T.N., Louviere, J.J., Peters, T.J. and Coast, J. (2007). Best-worst scaling: what it can do for health care research and how to do it, Journal of Health Economics 27: 171-189.

Ganesan, S. (1994). Determinants of long-term orientation in buyer-seller relationships, The Journal of Marketing 58(2): 1-19.

Garbarino, E. and Johnson, M.S. (1999). The different roles of satisfaction, trust, and commitment in customer relationships, Journal of Marketing 63(April): 70-87.

Geyskens, I., Steenkamp, J.E.M. and Kumar, N. (1999). A meta-analysis of satisfaction in marketing channel relationships, Journal of Marketing Research 36(1): 223-238.

Gellynck, X. and Molnár, A. (2009), Chain governance structures: the European traditional food sector, British Food Journal 111(8): 762 – 775.

Giha, C.R. and Leat, P. (2010). Enhancing the integration of agri-food chains: challenges for UK malting barley. in Fischer, C. and Hartmann, J. (eds.), Agri-food chain relationships. CAB International, pp 135-149.

Gracia, A., Magistris, T. and Albisu, L.M. (2010). Inter-organizational relationships as determinants for competitiveness in the agri-food sector: the Spanish wheat-to-bread chain. in Fischer, C. and Hartmann, J. (eds.), Agri-food Chain Relationship. CAB International, pp 206-219.

Granovetter, M. (1985). Economic action and social structure: the problem of embeddedness, The American Journal of Sociology 91(3): 481-510

Green, P.E. (1974). On the Design of Choice Experiments Involving Multifactor Alternatives, The Journal of Consumer Research 1(2): 61-68.

Greene, W.H. (2008). Econometric analysis. Pearson Prentice Hall.

Gulati, A., Minot, N., Delgado, C. and Bora, S. (2005). Growth in high-value agriculture in Asia and the emergence of vertical links with farmers, Linking Small-Scale Producers to Markets: Old and New Challenges. The World Bank, Pusa, New Delhi.

Guo, H., Jolly, R.W. and Zhu, J. (2007). Contract farming in China: perspectives of farm households and agribusiness firms, Comparative Economic Studies 49: 285-312.

Gyau, A. and Spiller, A. (2007). Determinants of trust in the international fresh produce business between Ghana and Europe, International Business Management 1(4): 104-111.

Gyau, A. and Spiller, A. (2009). Comparison of relationship perception in the international fresh produce business, Journal of Enterprise Information Management 22(4): 441-455.

Gyau, A., Spiller, A. and Wocken, C. (2011). Price or relational behaviours? Supplier relationship management in the German dairy industry, British Food Journal 113(7): 838-852.

Hair, J.F, Anderson, R.E, Tatham, R.L and Black, W.C. 1995. Multivariate data analysis, Fourth edition. Prentice Hall, Englewood Cliffs, New Jersey.

Hardy, M.A. (1993). Regression with dummy variables, Sage University Paper, series: quantitative applications in the social science, 07-093, Newbury Park, CA: Sage.

Hartmann, M., Frohberg, K. and Fischer, C. (2010). Buildings sustainable relationships in Agri-food chains: Challenges from farm to retail. in Fischer, C. and Hartmann, M. (eds.), Agri-food chain relationships. CAB International, Oxfordshire, pp 25-44.

Hawes, J.M., Mast, K.E. and Swan, J.E. (1989). Trust earning perceptions of sellers and buyers, Journal of Personal Selling and Sales Management 9(Spring): 1-8.

Hennig-Thurau, T., and Klee, A. (1997). The Impact of customer satisfaction and relationship quality on customer retention: a critical reassessment and model development, Psychology and Marketing, 14(8), 737-764.

Henson, S., Masakure, O. and Boselie, D. (2005). Private food safety and quality standars for fresh produce exporters: the case of Hortico agrisystems, Zimbabwe, Food Policy 30: 371-384.

Hernández, R., Reardon, T. and Berdegu´e, J. (2007). Supermarkets, wholesalers, and tomato growers in Guatemala, Agricultural Economics 36: 281-290.

Hingley, M., Sodano, V. and Lindgrees, A. (2006). Differentiation strategies in vertical channels: a case study from the market for fresh produce, British Food Journal 110(1): 42-61.

Hobbs, J.E. (1996). Transaction costs and slaughter cattle procurement: processors' selection of supply channels, Agribusiness 12(6): 509-523.

Hobbs, J.E. and Young, L.M. (2000). Closer vertical co-ordination in agri-food supply chains: a conceptual framework and some preliminary evidence, Supply Chain Management: An International Journal 5(3): 131-142

Hobbs, J.E. and Young, L.M. (2001). Vertical linkages in Agri-food supply chains in Canada and the United State, (Serial online). Available from URL: http://www4.agr.gc.ca/AAFC-AAC/display-afficher.do?id=1195588847463&lang=e [accessed 8 August 2008].

Humprey, J. (2007). The supermarket revolution in developing countries: tidal wave or tough competitive struggle? Journal of Economic Geography 7: 433-450.

Huntley, J.K. (2006). Conceptualization and measurement of relationship quality: linking relationship quality to actual sales and recommendation intention, Industrial Marketing Management 35(6): 703-714.

IFAD. (2010). Rural poverty report. Retrieved 22 May 2011, from http://www.ifad.org/rpr2011/index.htm.

James Jr, H.S. and Sykuta, M.E. (2006). Farmer trust in producer- and investor-owned firms: evidence from Missouri corn and soybean producers, Agribusiness 22(1): 135-153.

Jarvelin, A and Lehtinen, U. (1996) Relationship quality in business-to-business service context. In Edvardsson, B.B., Johnston, S.W. and Sceuing, R. (Eds), QUIS 5 advancing service quality: a global perspective. Warwick Printing Company Ltd, Toronto pp, 243-254.

Johnson, R. and Wichern, D. 2007. Applied Multivariate Statistical Analysis, 6th edition, Pearson Intl. Ed.

Kaganzi, E., Ferris, S., Barham, J., Abenakyo, A., Sanginga, P. and Njuki, J. (2009). Sustaining linkages to high value markets through collective action in Uganda, Food Policy 34: 23-30.

Kebede, Y., Gunjal, K. and Coffin, G. (1990). Adoption of new technologies in Ethiopian agriculture: the case of Tegulet-Bulga District, Shoa Province, Agricultural Economics 4: 27-43.

Kennedy, G., Nantel, G. and Shetty, P. (2004). Globalization of food systems in developing countries: a synthesis of country case studies. in Globalization of food systems in developing countries: impact on food security and nutrition, FAO Rome, pp. 1-26.

Kirsten and Sartorius (2002). Linking agribusiness and small-scale farmers in developing countries: is there a new role for contract farming? Development Southern Africa 19(4):503-529.

Koutsoyiannis, A. (1977). Theory of econometrics. Second edition. Harper and Row Publishers, Inc. New York.

Kwon, I.G. and Suh, T. (2004), Factors affecting the level of trust and commitment in supply chain relationships, The Journal of Supply Chain Management: A global Review of Purchasing and Supply Spring: 4-14.

Lawrence, J.D., Rhodes, V.J., Grimes, G.A. and Hayenga, M.L. (1997). Vertical coordination in the US pork industry: status, motivations, and expectations, Agribusiness 13(1): 21-31

Lok, P. and Crawford, J. (1999). The relationship between commitment and organizational culture, subculture, leadership style and job satisfaction in organizational change and development, Leadership and Organization Development Journal 20(7): 365-373.

Louviere, J.J. (2000). Stated choice methods: Analysis and applications. Cambridge University Press, Cambridge.

Lu, H., Trienekens, J.H., Omta, S.W.F. and Feng, S. (2010a). Guanxi networks, buyer-seller relationships, and farmers' participation in modern vegetable markets in China, Journal of International Food and Agribusiness Marketing 22(1-2): 70-93.

Lu, H., Batt, P.J. and Fischer, C. (2010b). Best practice in relationship management: recommendations for farmers, processors and retailers. in Fischer, C. and Hartmann, J. (eds.), Agri-food chain relationships. CAB International, pp 237-249.

Maddala, G.S. 1983. Limited-dependent and qualitative variables in Econometrics. Cambridge University Press, Cambridge.

Magidson, J. and Vermunt, J.K. (2002). Latent class model for clustering: A comparison with K-means, Canadian Journal of Marketing Research 20: 37-44.

Marley, A.A.J. and Louviere, J.J. (2005). Some probabilistic models of best, worst, and best–worst choices, Journal of Mathematical Psychology 49: 464-480.

Masakure, O. and Henson, S. (2005). Why do small-scale producers choose to produce under contract? Lessons from non traditional vegetable exports from Zimbabwe, World Development 33(10): 1721-1733.

Masuku, M.B., Kirsten, J.F., Rooyen, C.J.V. and Perret, S. (2003). Contractual relationships between smallholder sugarcane growers and millers in the sugar industry supply chain in Swaziland, Agrekon: Agricultural Economics Research, Policy and Practice in Southern Africa 42(3): 183-199.

Maxwell, S. and Slater, R. (2003). Food policy old and new, Development Policy Review 21(5-6): 531-553.

Mighell, R.L. and Jones, L.A. (1963). Vertical coordination in agriculture. Department of Agriculture, Economic Research Service, Farm Economics Division, Washington.

Minot, N. (2007). Contract farming in developing countries: patterns, impact, and policy implications, Case study #6-3 of the program: Food policy for developing countries: the role of government in the global food system, Cornell University, Ithaca, New York.

Miyata, S., Minot, N. and Hu, D. (2009). Impact of contract farming on income: Lingking small farmers, packers, and supermarket in China, World Development 37(11): 1781-1790.

Moorman, C., Deshpande, R. and Zaitnnan, G. (1986). Factors affecting trust in market research relationships, Journal of Marketing 57(January): 81-101.

Morgan, R.M. and Hunt, S.D. (1994). The Commitment-Trust Theory of Relationship Marketing, Journal of Marketing 58(3): 20-38.

Moustier, P., Tam, P.T.G., Anh, D.T., Binh, V.T. and Loc, N.T.T. (2010). The role of farmer organizations in supplying supermarkets with quality food in Vietnam, Food Policy 35: 2010.

Mustafa, U., Ali, M., and Kuswanty, H. (2006). Indonesia. In M.Ali (ed.), Chili (Capsicum spp.) food supply chain analysis: setting research priorities in Asia, Technical Bulletin 38: 146-195. The World Vegetable Center, Taiwan

Natawidjaja, R., Reardon, T., Shetty, S., Noor, T.I., Perdana, T., Rasmikayati, E., Bachri, S. and Hernández, R. (2007). Horticultural producer and supermarket development in Indonesia. World Bank, Jakarta.

Ndubisi, N.O. and Wah, C. K. (2005). Factorial and discriminant analyses of the underpinnings of relationship marketing and customer satisfaction, International Journal of Bank Marketing 23(7): 542 – 557.

Neven, D., Odera, M.M., Reardon, T. and Wang, H. (2009). Kenyan supermarkets, emerging middle-class horticultural farmers, and employment impacts on the rural poor, World Development 37(11): 1802-1811.

Nunnally, (1978), Psychometric Theory, 2nd Edition. McGraw-Hill, New York.

Österberg , P. and Nilsson, J. (2009). Member's perception on their participation in the governance of cooperatives: the key to trust and commitment in agricultural cooperatives, Agribusiness 25(2): 181-197.

Pandin, M.L. (2009). Modern retail markets in Indonesia, Economic Review 215(March): 1-12.

Pennings, J.M.E. and Leuthold, M. (2000). The role of farmers' behavioral attitudes and heterogeneity in future contracts usage, American Journal of Agricultural Economics 82(4): 908-919.

Peterson, H.C., Wysocki, A. and Harsh, S.B. (2001). Strategic choice along the vertical coordination continuum, International Food and Agribusiness Management Review 4: 149-166.

Pingali, P. (2006). Westernization of Asian diets and the transformation of food systems: implications for research and policy, Food Policy 32: 281-298.

Poole, N., Seini, A.W. and Heh, V. (2003). Improving agri-food marketing in developing economies: contractual vegetable markets in Ghana, Development in Practice 13(5): 551-557.

Rao, E.J.O. and Qaim, M. (2011). Supermarkets, farm household income, and poverty: insights from Kenya, World Development 39(5): 784-796.

Reardon, T. and Berdegué, J.A. (2002). The Rapid rise of supermarkets in latin America: challenges and opportunities for development, Development Policy Review 20(4): 371-388.

Reardon, T. and Timmer, C.P. (2007). Transformation of markets for agricultural output in developing countries since 1950: How has thinking changed? in Evenson, R. and Pingali, P. (eds.), Handbook of Agricultural Economics, Elsevier, Amsterdan, pp 2807-2855.

Reardon, T., Barrett, C.B., Berdegué, J.A. and Swinnen, J.F.M. (2009). Agrifood industry transformation and small farmers in developing countries, World Development 37(11): 1717-1727.

Reardon, T., Berdegué, J.A., Timmer, C.A., Cabot, T., Mainville, D., Flores, L., Hernández, R., Neven, D., and Balsevich, F. (2005). Links among supermarkets, wholesalers, and small farmers in developing countries: conceptualization and emerging evidence. In future "The future of small farms": proceedings of research workshop. Wye, UK. June 26-29, 2005. IFRI, Washington.

Reardon, T., Henson, S. and Berdegué, J. (2007). Proactive fast-tracking' diffusion of supermarkets in developing countries: Implications for market institutions and trade, Journal of Economic Geography 7(4): 1-33.

Reardon, T., Timmer, C.P. and Minten, B. (2010). Supermarket revolution in Asia and emerging developing strategies to include small farmers, (Serial online). Available from URL: www.pnas.org/cgi/doi/10.1073/ pnas.1003160108.

Reardon, T., Timmer, C.P., Barrett, C.B. and Berdegué, J. (2003). The Rise of Supermarkets in Africa, Asia, and Latin America, American Journal of Agricultural Economics 85: 1140-1146.

Reardon, T., Timmer, P. and Bordegue, J. (2004). The rapid rise of supermarkets in developing countries: induces organizational, institutional, and technological change in agrifood systems, Journal of Agricultural and Development Economics 1(2): 168-183.

Regmi, A. and Dyck, J. (2001). Effects of urbanization on global food demand. In Regmi, A. (ed.), Changing structures of global food consumption and trade. ERS WRS 01-1. Economic Research Service, United States Department of Agriculture, Washington, DC.

Rehber, E. (2007). Contract farming: Theory and practice. The ICFAI University Press, Hyderabad.

Schipmann, C. and Qaim, M. (2010). Spillovers from modern supply chains to traditional markets: product innovation and adoption by smallholders, Agricultural Economics 41: 361-371.

Schipmann, C. and Qaim, M. (2011). Supply chain differentiation, contract agriculture, and farmers' marketing preferences: the case of sweet pepper in Thailand, Food Policy 36: 667-677.

Sharma, V.P., Kumar, K. and Singh, R.V. (2009). Determinants of Small-Scale Farmer inclusion in Emerging Modern Agrifood Markets: A Study of the Dairy Industry in India, Indian Institute of Management Working Paper No. 2009-02-01.

Simmons, P., Winters, P. and Patrick, I. (2005). An analysis of contract farming in East Java, Bali, and Lombok, Indonesia, Agricultural Economics 33: 513-525.

Smith, J.B. (1998a). Buyer-seller relationships: Bonds, relationship management and sex-type, Canadian Journal of Administrative Sciences 15(1): 76-92.

Smith, J.B. (1998b). Buyer–seller relationships: similarity, relationship management, and quality, Psychology and Marketing 15(1): 3-21.

Statistic Agency. (2004). Agricultural censuses. Indonesian Statistic Agency, Jakarta.

Statistic Agency. (2010). Statistics of seasonal vegetables and fruits in Indonesia. Indonesian Statistic Agency, Jakarta.

Statistic Agency. (2012). Trends of selected socio-economics indicators of Indonesia, Indonesian Statistic Agency, Jakarta.

Stringer, R., Sang, N. and Croppenstedt, A. (2009). Producers, processors, and procurement decisions: the case of vegetable supply chains in China, World Development 37(11): 1773-1780.

Swinnen, J. (2007). The dynamics of vertical coordination in agri-food suplyy chains in transition countries. in Swinnen, J. (ed.), Global supply chains, standards and the poor: How the globalization of food systems and standards affects rural development and poverty. CAB International, pp 42-58.

Timmer, C.P. (2009). Do supermarket change the food policy agenda? World Development 37(11): 1812-1819.

Umberger, W.J., Stringer, R. and Mueller, S.C. (2010). Using best-worst scaling to determine market channel choice by small farmers in Indonesia, The agricultural and applied economics association 2010 AAEA, CAES and WAEA joint annual meeting, Denver, Colorado.

Vermunt, J.K. and Magidson, J. (2002). Latent class cluster analysis. in Hagenaars, J.A. and McCutcheon, A.L. (eds.), Applied latent class analysis. Cambridge University Press, Cambridge.

Vieira, L.M. and Trail, W.B. (2008). Trust and governance of global value chains, British Food Journal 110(4-5): 460-473.

Weatherspoon, D.D. and Reardon, T. (2003). The Rise of Supermarkets in Africa: Implications for Agrifood Systems and the Rural Poor, Development Policy Review 21(3): 333-355.

White, B., Morey, P., Natawidjaja, R., and Morgan, W. (2007). Vegetable value chains in Eastern Indonesia-a focus on chili. Australian Centre for International Agricultural Research, Canberra.

Williams, F., and Monge, P. (2001). Reasoning with statistics: how to read quantitative research (5th ed.). Fort Worth, TX: Harcourt College Publishers.

Williamson, O.E. (1979). Transaction-cost economics: the governance of contractual relations, Journal of Law and Economics 22(2): 233-261.

Williamson, O.E. (1985). The economic institutions of capitalism, The Free Press, New York.

Woldie, G.A. and Nuppenau, E.A. (2009). Channel choice decision in the Ethiopian banana markets: A transaction cost economics perspective, Journal of Economic Theory 3(4): 80-90.

Wong, A. and Sohal, A. (2002). An examination of the relationship between trust, commitment and relationship quality, International Journal of Retail and Distribution Management 30: 34-50.

Wooldridge, J.M. 2009. Econometrics. Cengage Learning India Private Limited, New Delhi.

Wozniak, G.D. (1987). Human capital, information, and the early adoption of new technology, The Journal of Human Resources 22(1): 101-112.

Appendices

Appendix 1 Questionnaire for the survey

SURVEY OF CHILI GROWERS IN WEST JAVA

March 2010
IFPRI - UNIVERSITY OF ADELAIDE - ICASEPS

Objective:

The purpose of this survey is to improve our understanding of agricultural marketing patterns in Indonesia, particularly the relationship between farmers and traders/supermarkets/companies that buy chili from them.

Use of data:

The data collected as part of this survey are for research purposes ONLY.

Household-level data will not be shared with non-research organizations. .

Only summary results will be included in published report.

Household ID number

Village code	Enumerator Code	Household Code		

	Name of head family	
	Name of respondent	
	Address/location	
	Phone	
	Village	
	Sub-district	
	District	

	Date			Name	ign
	Day	Month	Year		
Interview			2010		
Field check			2010		
Check kantor			2010		
Data Entry - Start			2010		
Data Entry - Finish			2010		

Research funded by a grant from the Australian Centre for International Agricultural Research (ACIAR)

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Village codes for Garut

Code	District	Sub-district	Village
111	Garut	Wanaraja	1. Suka Menak
112			4. Warna Jaya
			5. Warna Mekar
113			
121	Garut	Bayongbong	2. Panembong
			3. Hegar Manah
122			
123			4. Sukarame
131	Garut	Pasirwangi	2. Barusari
132			3. Karya Mekar
133			5. Sirna Jaya
		Cisurupan	2. Sukatani
141	Garut		
142			4. Cisero
143			5. Cisurupan
151	Garut	Cikajang	3. Mekarjaya
152			4. Girijaya
153			5. Cikandang
161	Garut	Sukaresmi	1. Sukajaya
162			2. Mekarjaya
163			3. Cinta Damai
171	Garut	Sucinaraja	1. Tenjonegara
172			2. Sukalaksana
173			3. Cigadog
181	Garut	Lelles	1. Margaluyu
182			2. Sukarame
183			3. Jangkurang

Village codes for Tasik & Ciamis

Code	District	Sub-district	Village
211	Tasik	Leuwisari	2. Cigadhog
212			3. Ciawang
			5. Linggawangi
213			
221	Tasik	Cigalontang	2. Puspamukti
			3. Pusparaja
222			
223			5. Sirnaputra
231	Tasik	Sariwangi	3. Jayaputra
232			4 Sukaharja
233			5. Sukamulih
311	Ciamis	Panumbangan	3. Sindangbarang
312			4. Sukakerta
313			6. Golat
321	Ciamis	Sukamantri	2. Cibeureum
322			3. Sindangjaya
323			4. Mekarwangi
331	Ciamis	Cihaurbeuti	1. Sukamaju
332			2. Sukahurip
333			6. Sumberjaya
341	Ciamis	Sindangkasih	

Enumerator codes

Code	Enumerator
01	Waluyo
02	Dudi
03	Imron
04	Harso
05	Ery
06	Supre
07	Yuli
08	Atin
09	Sinta
10	Pitri
11	Dewi
12	Dedi
13	Sahara

A. CHARACTERISTICS OF MEMBERS OF THE HOUSEHOLD

	Name	What is the relationship between [name] and the head of household? 1 Head 2 Spouse 3 Son/daughter 4 Son/daughter in law 5 Grandchild 6 Parent or in-law 7 Other related 8 Other unrelated	Is [name] a male or female? 1 Male 2 Female	How old is [name]? [age at last birthday, use 0 for < 1 yr] Year	Ask these questions only for members 6 years or older			Ask tthese questions only for members 17 yrs and older		
					How many years of schooling has [name] completed? Year	Can [name] read in any language? 1 Yes 2 No	Can [name] speak Bahasa? 1 Yes 2 No	What is the marital status of [name]? 1 Single 2 Married 3Separated 4 No longer married	What are the main activities of [name]? 1. Farming/aquaculture 2. Self-employed trader 3 Self-employed - other 4. Agricultural wage labor 5. Other wage labor 6. Unemployed 7. Housework 8. Student 9. Other 10. None (for A10)	
									Main	Secondary
A1		A2	A3	A4	A5	A6	A7	A8	A9	A10
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										

Note: The household is defined as a group of people who live and eat together most of the time. Each member must live with others at least 6 months of the year.

The head of the household is defined as the member who makes most of the economic decisions.

B. HOUSING AND ASSETS

What is the approximate area of your house in square meters? _____ B1

[If house owned] What is the approximate value of your house without farmland? _____ B2a

[If house rented] What is the annual rent that you pay for your house (without farmland)? _____ B2b

What is the main source of drinking water for your household? _____ B3
- 1 Indoor tap
- 2 Outdoor private tap
- 3 Outdoor shared tap
- 4 Covered well
- 5 Collected rainwater
- 6 River, lake, pond, spring
- 7 Water collected in a tank
- 8 Aqua/bottled water

What is the main type of toilet used by your household? _____ B4
- 1 Flush toilet
- 2. Latrine with pipe
- 3 Pit latrine
- 3 Latrine over canal/pond
- 4 Public toilet
- 5 Other or none

What is the main type of lighting used by your household? _____ B5
- 1 Electric lights
- 2 Oil lamps
- 3. Candles
- 4 Others
- 5 None

What type of fuel is used by your household for cooking? _____ B6
- 1 Electricity
- 2 LPG
- 3 Biogas
- 4 Kerosene
- 5 Wood
- 6 Other

How many of each of the following items do members of your household currently own?

How many of each of the following did your household own 5 years ago?

Item	Number (current)		Number (5 years ago)	
a radio?		B7a		B7b
television?		B8a		B8b
a fan?		B9a		B9b
a bicycle?		B10a		B10b
a motorbike?		B11a		B11b
a car?		B12a		B12b
a computer?		B13a		B13b
a washing machine?		B14a		B14b
a refrigerator?		B15a		B15b
landline telephone?		B16a		B16b
a mobile phone?		B17a		B17b
internet access		B18a		B18b
a truck?		B19a		B19b
a cart?		B20a		B20b
a water pump?		B21a		B21b
a mist blower?		B22a		B22b
a power tiller?		B23a		B23b
a storage house?		B24a		B24b
cattle/buffalo?		B25a		B25b
goats/sheep?		B26a		B26b
poultry?		B27a		B27b

	Area	Unit code	Area	Unit code	
farm land?					1. Bata
	B28a	B28au	B28b	B28bu	2. Tumbak
irrigated farm land?					3. Ru
					4. M2
					5. Hectare
					6. Patok

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Category	Code	Crop
Grains	101	Rice
	102	Maize
	103	Other grains
Tubers	201	Cassava
	202	Sweet potato
	203	Other tubers
Pulses	301	Red bean
	302	Groundnuts
	303	Soybeans
	304	Other bean (mung, Bogor)
Vegetables	401	Babycorn
	402	Broccoli
	403	Cabbage
	404	Caisin
	405	Carrot
	406	Chili
	407	Chinese cabbage
	408	Cucumber
	409	Eggplant
	410	Gherkin
	411	Ginger
	412	Green bean (buncis)
	413	Leak
	414	Long bean
	415	Onion
	416	Potato
	417	Shallot
	418	Tomato
	419	Other vegetable

Category	Code	Crop
Fruit	501	Banana
	502	Mango
	503	Mangosteen
	504	Melon
	505	Papaya
	506	Strawberry
	507	Watermelon
	508	Other fruit
Other	601	Flower
	602	Other spices
	603	Other annual crops
	604	Coconut
	605	Other perrenial crops

C. AGRICULTURAL LAND

	1. Yes 2. No		Value (Rp)	Area	Area unit	
Have you **purchased** farm land over the past 5 years?	178	If yes, how much land did you buy and what was the total value?	179	180	181	1. Bata
						2. Tumbak
	C1		C2v	C2a	C2u	3. Ru
Have you **sold** farm land over the past 5 years?	182	If yes, how much land did you sell and what was the total value?	183	184	185	4. M2
						5. Hectare
	C3		C4v	C4a	C4u	6. Patok

Draw a simple map of the plots **owned or farmed** by members of the household in 2009 on the opposite page.   Then number plots and complete this form.

Plot nbr	What is the area of this plot?		What type of land is this?	What is the land tenure arrangement for this plot?	[If C8=1-6] How was this plot acquired?	What type of irrigation does this plot have in the RAINY season?	What type of irrigation does this plot have in the DRY season?	What is the distance from this plot to your house?	[If plot farmed by household, C8=1 or 7-10] What were the main two crops grown in each plot during each season of 2009?					
	Area	Unit 1. Bata	1. Irrigated	1. Owned and farmed 2. Owned and rent it out 3. Owned & pawned out 4. Owned & sharecropped out 5. Owned and not planted 6. Owned and lent out 7. Pawned from owner 8. Rented from owner 9. Sharecropped from owner 10. Borrow from owner	1 Inherited 2 Gift 3 Purchased 4 Allocated by government	1 None 2 Gravity 3 Pumped surface water 4 Pumped groundwater 5. Bucket 6. Rubber tube	1 None 2 Gravity 3 Pumped surface water 4 Pumped groundwater 5. Bucket 6. Rubber tube	Distance in meters	Dry season 1 (planting about April 2009)		Dry season 2 (planting about July 2009)		Rainy season (planting about Sept 2009)	
		2. Tumbak 3. Ru 4. M2 5. Hectare	2. Rainfed 3. Dryland						1st crop code	2nd crop code	1st crop code	2nd crop code	1st crop code	2nd crop code
C5	C6a	C6u	C7	C8	C9	C10r	C10d	C11	C12	C13	C14	C15	C16	C17
1														
2														
3														
4														
5														
6														
7														
8														
9														
10														
11														

D. CHILI PRODUCTION

Season of **2009/10**		Plot number [ENTER PLOT NUMBERS IN WHICH CHILIS WERE GROWN FROM PART C FOR EACH SEASON]	What is the area of this plot?		In what month were the chilis planted?		What type of chilies were harvested from this plot during this season?		How many chili plants were planted in this plot? Number	What was the average production cost of chili per plant? Rp per plant	Has harvest of these chilies been completed or partly completed? 1. Completed 2. Partly completed 3. Not yet started	What is the productivity of chili per plant? kg of chilis per plant
			Area	Unit codes 1. Bata 2. Tumbak 3. Ru 4. M2 5. Hectare 6. Patok	1. Jan 2. Feb 3. Mar 4. Apr 5. May 6. Jun 7. Jul 8. Aug 9. Sep 10. Oct 11. Nov 12. Dec	Write 08 or 09	1 Hot beauty 2 Hot chili 3 Biola 4 Other TW 5 Curly 6 Tanjung (local) 7 Small 8 Bendot 9 Other	1. All red 2. Mostly red 3. Half each 4. Mostly green 5. All green 6. Not yet decided				
		D2	D3	D4	D5m	D5y	D6	D7	D8	D9	D10	D11
Dry season 1 (planting about April 2009)	1											
	2											
	3											
	4											
	5											
Dry season 2 (planting about July 2009)	6											
	7											
	8											
	9											
	10											
Rainy season (planting about Sept 2008 or 2009)	11											
	12											
	13											
	14											
	15											
	16											

E. INPUT USE AND INFORMATION SOURCES

What is the ROW number in D1 for the largest chili plot in the most recent completed harvest? [_____] E1

Do you keep written records on …. — 1. Yes 2. No

Question		
… the amount of pesticides used on chilis?	[_____]	E6
… the dates of pesticide application on chilies?	[_____]	E7
… the prices received for chili sales?	[_____]	E8
… the quantities of chilies sold?	[_____]	E9

[If yes to any] Do you keep these records at least one year after being paid? [_____] E10

E2	Type of input	For the LARGEST CHILI PLOT in the most recent completed season, did you use [..]? 1 Yes 2. No	How much did you spend on […] for this plot of chilies? (Rp)	Where the [inputs] purchased in cash or on credit? **1. Cash at purchase** 2. Credit from trader 3. Credit from input dealer 4. Credit from farmer group 5. Other credit
		E3	E4	E5
1	Saved seed			
2	Non-hybrid seed			
3	Hybrid seed			
4	Chemical fertilizer			
5	Organic fertilizer			
6	insecticides			
7	Herbicides			
8	Fungicides			
9	Transport of inputs			
10	Plastic sheets			
11	Stakes			
12	Hired labor for …			
13	..seedling bed			
14	..land preparation			
15	..plastic & holes			
16	..planting			
17	..fertilization			
18	..stake and rope			
19	..weeding			
20	..spraying			
21	..harvesting			
22	Irrigation			
23	Land tax			
24	Other costs			

E11	Source of information	Over the past 5 years, what have been your main sources of information about chili production methods (up to 3)? 1. Main 2. Second 3. Third	[For these 3 sources] How would you rate the quality of the production information? 1. Good 2. OK 3. Poor	Over the past 5 years, what have been your main sources of information about chili prices & markets (up to 3)? 1. Main 2. Second 3. Third	[For these 3 sources] How would you rate the quality of the market information? 1. Good 2. OK 3. Poor
		E12	E13	E14	E15
1	Extension workers				
2	Research institute				
3	Farmer/relative/neighbor				
4	Trader				
5	Processor				
6	Input sellers				
7	Cooperative				
8	Farmer group				
9	TV				
10	Radio				
11	Newspaper/magazine/books				
12	Input companies				
13	Internet (wwww)				
14	Mobile info service				
15	Other _____				

F. CHILI MARKETING

For the chili largest plot in the most recent season for which harvvest is complete (see E1)

F1	Period	How many chili harvests did you have during the […] harvest season? number	How much chilis were harvested this time? kg	What was the grade of the chilis on the [..] harvest? 1. Superfull 2. Super 3. Medium 4. Small 5. Mix 1&2 6. Mix 2&3 7. Mix 3&4 8 Other 9 No grading	What price did you receive for these chilis? Rp/kg	Who was the main buyer of these chilis? 1. Farmer 2. Trader 3. Cooperative 4. Farmer group 5. Processor 6. Supermarket 7. Consumer 8. Other	When were you paid for the chilis? 1. Before harvest 2. At delivery 3. 1-7 days later 4. More than week later 5. Multiple payments (across categories)	Where did the sale take place? 1. On farm 2. Roadside 3. Collection place 4. Village mkt 5. Sub-dist mkt 5. District mkt 6. Wholesale market 7. Other	[If not at farm] How did you transport it there? 1. On foot 2. Bicycle 3. Motorbike 4. Car 5. Rented motorbike 6. Taxi / bus 7. Truck 8. Other	[If sale off farm & transport hired] How much did it cost to transport it? Rp
		F2	F3	F4	F5	F6	F7	F8	F9	F10
1	Early									
2	Middle									
3	Late									

In the last season you grew chilies, what quantity was kept for use as seed from the largest plot? (kg)   [ ] F11

In the last season you grew chiles, what quantity was kept for home consumption from the largest plot? (kg)   [ ] F12

What do you do after harvest to prepare the chilis for sale?

Remove debris or foreign materials	1. Yes 2. No	[ ] F13
Remove small or bad chilis	1. Yes 2. No	[ ] F14
Sort into different groups by size	1. Yes 2. No	[ ] F15
Sort into different groups by color	1. Yes 2. No	[ ] F16
Sort into different groups by quality	1. Yes 2. No	[ ] F17
Remove stems	1. Yes 2. No	[ ] F18
Put into bags or boxes	1. Yes 2. No	[ ] F19
Other _____	1. Yes 2. No	[ ] F20

What is the distance in kilometers from the house to the nearest…

...road of any type?   [ ] F21

…asphalt road?   [ ] F22

…village market?   [ ] F23

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G. CHANGES IN CHILI PRODUCTION AND MARKETING

How many years ago did your household start growing chilies? [_____] G1

Why did you decide to start growing chilies? [_____] G2
    1. Learned how to grow from my parents

    2. Friends and neighbors were growing chilies and doing well
    3. An extension worker recommended it
    4. A trader or processor encouraged me to be a supplier
    5. Other reason

		Regarding chili production by this household, has […] changed over the last five years? 1. Yes 2. No	[If yes] How has […] changed over the past five years? see codes	[if yes] What are the reasons for this change? see codes
G3		G4	G5	G6
1	Area planted with chilis			
2	Yield of chilis (kg/ha)			
3	Use of saved seed			
4	Use of non-hybrid seed			
5	Use of hybrid seed			
6	Use of chemcial fertilizer			
7	Use of organic fertilizer			
8	Use of pesticides			
9	Use of herbicides			
10	Use of fungicides			
11	Use of hired labor			
12	Average price of chilis			
13	Competition among buyers			
14	Quality standard buyers want			
15	Quality of farmer's output			

Note: Increase or decrease in use of inputs refers to quantity per hectare.

		Have you invested in any of the following for chili production in the past 5 years? 1. Yes 2. No	How much did you spend on this equipment? [Rp]
	G7	G8	G9
1	Buy or rent land for chili growing		
2	Storage room or building		
3	Water pump		
4	Irrigation well		
5	Other irrigation facilities		
6	Power tiller or tractor		
7	Spraying equipment		
8	Other farm equipment		

Codes for G5 (change)
1. Increased
2. Decreased
3. Different type
4. Increased and different type
5. Decreased and different type

Codes for G6 (reason)
1. Change in input price
2. Change in chili price
3. To increase yield
4. To increase quality
5. To increase price obtained
6. Better information
7. To meet demands of buyer
8. To reduce cost
9. Pest and Diseases
10. Climate
11. Land Quality
12. Others

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H. RELATIONSHIP WITH CHILI BUYERS

How many chili buyers have you sold to over the last 5 years? [ ] H1

How many chili buyers have you sold to over the last year? [ ] H2

How many chili buyers have you spoken to over the last year? [ ] H3

When in the chili production cycle do you usually [ ] H4
first communicate with a buyer?
1, Before planting   3, After harvest begins
2. Between planting & harvest

How do you usually communicate with your chili buyer(s)? [ ] H5
1. Mobile phone   5. Meet buyer elsewhere
2. Landline phone   6. Through intermediary person
3. Buyer comes to the farm   7. Through cooperative/group
4. Farmer goes to buyer 's place

What type agreement do you usually have with the buyer? [ ] H6
1. No agreement prior to sale   [skip to H19]
2. Oral/verbal agreement
3. Written agreement

[If H6=2 or 3] When in the chili production cycle do you usually [ ] H7
agree on the sale with the buyer?
1, Before planting   3, After harvest begins
2. Between planting & harvest

[if H6 = 2 or 3]

What is specified in the agreement with the buyer?	1. Yes 2. No	
Price	[ ]	H8
Quantity	[ ]	H9
Color	[ ]	H10
Time of payment	[ ]	H11
Sorting by size	[ ]	H12
Sorting by color	[ ]	H13
Removal of stem	[ ]	H14
Seed provided on credit	[ ]	H15
Other inputs provided on credit	[ ]	H16
Other _____	[ ]	H17

[if H6=2 or 3]
Has the level of detail in your agreements with chili buyers [ ] H18
changed over the last five years?
1. Yes, they have become more detailed
2. No change
3. Yes, they have become less detailed
4. Not applicable (e.g. first time)

Describe your bargaining position with the [ ] H19
chili buyers.
1. I always accept the price he offers
2. I sometimes bargain with him
3. I usually bargain with him.
4. I set the price and don't bargain.

Has your bargaining postion with chili buyers [ ] H20
changed over the last five years?
1. Yes, I have more bargaining power than I used to.
2. No, it hasn't changed.
3. Yes, I have less bargaining power than I used to.
4. Not applicable (e.g. first time)

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I. PERCEPTION OF THE QUALITY OF RELATIONSHIP WITH CHILI BUYERS

		Please select the response that reflects your opinion regarding the main buyer of chilis over the past year using the following scale: strongly agree, agree, neutral, disagree, strongly disagree.	1. Strongly disagree 2. Disagree 3. Neither agree nor disagree 4. Agree 5. Strongly agree
I	1	Price information from my buyer is understandable and comprehensive.	
I	2	In comparison to other buyers, I am satisfied with the price my buyer offers.	
I	3	The buyer always communicates properly if the price changes.	
I	4	I receive a good price-quality ratio.	
	5	I can cover the cost of chili production from the price I receive.	
I	6	Compared to the price I received last year, I am satisfied with the current price.	
I	7	The prices I received from my buyer are similar to the prices other farmers get.	
I	8	The chili price information from my buyer is complete and correct.	
I	9	The chili prices I receive are fair.	
I	10	I would not sell to other buyers because I like being associated with my buyer.	
I	11	The buyer offers me satisfactory prices for my chilies.	
I	12	Our relationship is something that we are very committed to.	
I	13	I am very satisfied with the price that my buyer offers me	
I	14	I care about the long-term success of the relationship with my buyer.	
I	15	My buyer deals with me as expected	
I	16	My buyer treats me fairly and equitably, giving me the same treatment as others.	
I	17	I believe the technical and market information provided by my buyer.	
I	18	I receive payment on time.	
I	19	My buyer always keeps his promises.	
I	20	My buyer is quick to handle my complaints.	

J. PERCEPTION OF MODERN CHANNEL

Do you know any farmers who have sold **any agricultural products** over the last year that ended up …

1 . Yes

2. No

3. Don't know

…being sold in supermarkets? J1

… being exported? J2

Do you know any farmers who have sold any **fruit or vegetables** that ended up being bought by a large processor? J3

[If J1 or J2 or J3 = yes] What has been their experience selling into the supermarket/export/ processing channels? J4

1. Mostly very positive

2. Generally positive

3. Some positive, some negative

4. Generally negative

5. Mostly very negative

6. Don't know

Do you think most farmers would be interested in selling into the supermarket channel? J5

1 . Yes

2. No

3. Don't know

What do you see as the main advantages of selling into the supermarket channel? (up to 2)

1. Higher price J6

2. Access to good seed

3. Access to other inputs J7

4. Getting inputs on credit

5. Technical assistance, learn new skills

6. No advantage to selling to supermarkets

7. Don't know

What factors do you think prevent farmers from selling into the modern channel? (up to 3) J8

1. Small farms, small quantities J9

2. Location far from buyers

3. Low quality of product J10

4.   Can't supply all year (lack of irrigation)

5.   Not enough experience

6.   Necessary inputs are too expensive

7.   Do not have equipment needed

8.   Buyers don't know or trust them

9.   Buyers require record keeping

10. Buyers require farmers to packge chilies

11. Buyers don't pay immediately on delivery

12. Buyer has been tied down with trader.

13. Don't know

What do you think the government could do to help more farmers sell fruis and vegetables into the modern channels? (up to 3) J11

1. Provide training in production methods

2. Provide training in grades & standards J12

3. Provide training in marketing

4. Provide information on prices and markets J13

5. Improve supply of horticultural seed

6. Improve supply of agricultural chemicals

7. Invest in irrigation

8. Help organize farmers into groups

9. Improve roads in rural areas

10. Provide credit

11. Other

12. Don't know / no opinion

K. EXPERIENCE WITH MODERN CHANNEL

Do any of your agricultural products end up in supermarkets, processor, or exporter?

1. Yes
2. No
3. Don't know

[ ] K1

[If yes]   Which crop of yours ends up in a supermarket, exporter, processor?

Crop code
(see Part C)

[ ] K2

[ ]

Does your chili buyer demand higher quality standards than buyers who don't supply modern channels?

1. Yes
2. No
3. Don't know

[ ] **K3**

Does your buyer help you in any of the following ways?
   Delivering good quality seed
   Delivering pesticides

[ ] K4
[ ] K5

   Delivering other agricultural chemicals
   Providing technical assistance
   Providing inputs on credit
   Guaranteeing the price before planting

[ ] K6
[ ] K7
[ ] K8
[ ] K9

Are your chili yields higher or lower than they would be if you worked with a buyer for the traditional market?

1. Higher
2. Same
3. Lower
4. Don't know

[ ] K10

Is the average price you get for your chilies higher or lower than it would be if you sold to a buyer in the traditional market?

1. Higher
2. Same
3. Lower
4. Don't know

[ ] K11

Have you had any problems with your chili buyer?

1. Many
2. Some
3. No

[ ] K12

[If K13=1 or 2] What were the problems? (maximum of 3)
   1. Poor quality seed provided by buyer
   2. Poor quality fertilizer provided by buyer
   3. Poor quality pesticide provided by buyer
   4. High cost of inputs provided by buyer
   5. Delays in delivery of inputs by buyer
   6. Buyer did not give promised price
   7. Delay in collecting harvest
   8. Delay in paying for harvest
   9. Manipulation of grading to pay lower price
   10. Product rejected for low quality
   11. Market price higher than fixed price
   12. Cheated by trader or supplier regarding the volume of sales

[ ] K13

[ ] K14

[ ] K15

How has your net income changed as a result of selling to a buyer supplying the modern channel compared to before?
   1. Large decrease
   2. Small decrease
   3. No change
   4. Small increase
   5. Large increase

[ ] K16

L. CASH INCOME ACTIVITIES

Income activity	Code	In the past 12 months, have members of your household received income from [activity]? 1. Yes 2. No	How many months out of the past 12 months did members of this household receive income from [activity]? Months	For each of these months that you were involved in [activity], how much gross revenue did you make from this activity? Rp/month	For each of these months, how much does your household spend in business expenses related to this activity? Rp/month	Over the past 5 years, has this activity become more or less important as a share of your income? 1. More important 2. No change 3. Less important
	L1	L2	L3	L4	L5	L6
Chili production						
Other agricultural production						
Livestock & animal product sales						
Aquaculture						
Agricultural trading						
Other trading						
Rice milling business						
Food processing business						
Other business						
Agricultural wage labor						
Non-agricultural employment						
Pension						
Remittances from family members						
Other assistance programs						
Other						

Note: In the header, the columns L3–L6 fall under the span "[------------------------ if L2 = yes ------------------------]".

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M. SHOPPING HABITS BY OUTLET

No	Type of outlet	How frequent does your household shop at a […]? 1. Every day 2. 2-6 times per week 3. Once a week 4. 2-3 times per month 5. Once a month 6. Less than once a month 7. Never	What is the distance to the nearest […]? (km) 999=don't know	If household shops at outlet (M2 = 1-6)			
				How do you normally get to the nearest […]? 1. On foot 2. Bicycle 3. Motorcycle 4. Car 5. Public transp. 6. Taxi or ojek 7. Other	How much time does it take you to get to the nearest […]? (minutes)	What are the main reasons that you buy [..] at this outlet? 1. Good prices 2. Good food quality 3. Convenient location of store 4. Wide choice of products 5. Cleanliness of store 6. Better opening hours 7. Entertainment nearby 8. Other	
						1st reason	2nd reason
M1		M2	M3	M4	M6	M6	M7
1	Hypermarket						
2	Supermarket						
3	Minimarkets/convenience store						
4	Semi-permanent stand						
5	Small shop (warung)						
6	Traditional wet market						
7	Peddler						

Note: Hypermarkets include Carrefour, Giant, Macro, & Hipermart. Supermarkets include Hero, Matahari, Asia, & Yogya.
Minimarkets include Alfa & Indomaret and modern fruit stores. Peddlers refer to street vendors operating on foot or from bicycles or pick-ups.

N1. FOOD CONSUMPTION

		Food consumption	Purchased food			Home consumption		Transfers received	
		During the past **12 months**, has your household consumed any [...]? 1. Yes 2. No	During the past month, how many times did your household purchase [...]? times	For each purchase, what is the normal value of […] bought for household consumption? Value in Rp	Where do you usually buy most of the […]? 1. Hypermarkets 2. Supermarkets 3. Minimarkets 4. Semi-perm. stand 5. Small shop (warung) 6. Traditional wet market 7. Peddlers 8. Farmers/producers	How much [..] did your household consume from your own production during the past year? Quantity kg	Frequency 1. Daily 2. Weekly 3. Monthly 4. Yearly	How much […] did you receive as gift or transfer during the past year? Quantity kg	Frequency 1. Daily 2. Weekly 3. Monthly 4. Yearly
N1		N2	N3	N4	N5	N6	N7	N8	N9
11	Rice								
12	Noodles								
13	Maize products								
14	Bread & flour products								
20	Tubers								
31	Beans/pulses								
32	Tofu/tempe								
41	Fresh milk								
42	Other dairy products								
43	Eggs								
44	Beef & lamb								
45	Poultry								
46	Fish & seafood								
47	Processed meat								
51	Cooking oil								
52	Sugar								
53	Salt & spices								
54	Coffee & tea								
55	Soda, juice, other bev.								
56	Other processed food								
57	Meals outside home								

N2. FOOD CONSUMPTION

		Food consumption	Purchased food			Home consumption		Transfers received	
		During the past **12 months**, has your household consumed any [...]? 1. Yes 2. No	During the past month, how many times did your household purchase [...]? times	For each purchase, what is the normal value of […] bought for household consumption? Value in Rp	Where do you usually buy most of the […]? 1. Hypermarkets 2. Supermarkets 3. Minimarkets 4. Semi-perm. stand 5. Small shop (warung) 6. Traditional wet market 7. Peddlers 8. Farmers/Producers	How much [..] did your household consume from your own production during the past year? Quantity kg	Frequency 1. Daily 2. Weekly 3. Monthly 4. Yearly	How much […] did you receive as gift or transfer during the past year? Quantity kg	Frequency 1. Daily 2. Weekly 3. Monthly 4. Yearly
N1		N2	N3	N4	N5	N6	N7	N8	N9
60	Chilies								
61	Shallots								
62	Garlic								
63	Leafy vegetables								
64	Long bean								
65	Green bean (buncis)								
66	Tomato								
67	Potato								
68	Carrots								
69	Other vegetables								
71	Banana								
72	Mango								
73	Papaya								
74	Mangosteen								
75	Apple								
76	Melon								
77	Other fruit								

O. OTHER

Are members of your household consuming smaller or larger quantities of [food item] on a per capita basis than five years ago?

1. Smaller quantities
2. About the same
3. Larger quantities
4. NA (never consume)

Rice	O1
Tubers	O2
Vegetables	O3
Fruit	O4
Dairy products	O5
Eggs	O6
Meat, fish, and seafood	O7
Cooking oil	O8
Sugar	O9
Soda, juice, and other beverages	O10
Other processed food	O11
Meals outside home	O12

In the last 12 months have you or anyone in your household experienced…

1. Yes 2. No

severe diarrhea?	O13
illness related to food poisoning (unsafe food)?	O14

At anytime have you or anyone in your household been diagnosed by a doctor or nurse has having any of the following?

1. Yes 2. No

diabetes ?	O15
cancer ?	O16
hypertension ?	O17
cardiovascular disease ?	O18
as being overweight or obese ?	O19
as being underweight ?	O20

1. Yes 2. No

Do you or anyone in your household smoke cigarettes daily? O21

How has the standard of living of your household changed in the last 5 years? O22

1. Improved
2. No change
3. Deterioration
4. Don't know/not applicable

[If change in well-being] What are the main reasons for the change in well-being?

1. Yes 2. No

Change in crop prices	O23
Change in crop yields	O24
Growing chilies	O25
Growing other new crops	O26
Change in livestock income	O27
Change in non-farm income	O28
Change health of family members	O29
Change level of crime in area	O30
Other	O31

P. DESIRED ATTRIBUTES OF BUYER (Male questionnaire)

What are the 3 most important aspects of the relationship with your buyer? (rank 1 to 3 next to attributes)

1	Price per Kg	1st	☐	P1
2	Pays cash immediately			
3	Access to certified chili seed			
4	Credit or access for input purchases	2nd	☐	P2
5	Willing to negotiate or match another buyer's price			
	Provides money for loan			
6		3rd	☐	P3
7	Technical Assistance			
8	Established relationship			
9	Always follows through on their commitments to buy my product			
10	Shares information about market conditions			
11	Provides price premiums			
12	Other (Please explain)			

I am going to show you some cards with characteristics of buyers. In each case there will be 5 characteristics shown, these will be different from one card to the next. Please select one attribute that is MOST important to you when considering who you sell to, and then select a characteristics that is LEAST important to you. Please select only one of each.

	A	B	C	D	E	F	G	H	I	J	K
Best											
Worst											
	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14

Are you involved in each of the following activities in chili production?

For each of the following activities in chili production, please indicate who has the main responsibility between the husband and wife?

1. Yes   1. Husband   3. Both
2. No   2. Wife

		P15	P16
1	Preparing the land		
2	Buying farm equipment		
3	Buying inputs		
4	Spreading seed		
5	Mulching		
6	Planting		
7	Installing stakes		
8	Fertilizing		
9	Spraying chemicals		
10	Weeding		
11	Watering		
12	Harvesting		
13	Transporting chili to point sale		
14	Sorting and grading		
15	Negotiating with buyer		
16	Preparing meal		

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Q. DESIRED ATTRIBUTES OF BUYER (Female questionnaire)

What are the 3 most important aspects of the relationship with your buyer? (rank 1 to 3 next to attributes)

1	Price per Kg	1st	☐	P1
2	Pays cash immediately			
3	Access to certified chili seed			
4	Credit or access for input purchases	2nd	☐	P2
5	Willing to negotiate or match another buyer's price			
	Provides money for loan			
6		3rd	☐	P3
7	Technical Assistance			
8	Established relationship			
9	Always follows through on their commitments to buy my product			
10	Shares information about market conditions			
11	Provides price premiums			
12	Other (Please explain)			

I am going to show you some cards with characteristics of buyers. In each case there will be 5 characteristics shown, these will be different from one card to the next. Please select one attribute that is MOST important to you when considering who you sell to, and then select a characteristics that is LEAST important to you. Please select only one of each.

	A	B	C	D	E	F	G	H	I	J	K
Best											
Worst											
	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14

Are you involved in each of the following activities in chili production?

For each of the following activities in chili production, please indicate who has the main responsibility between the husband and wife?

1. Yes   1. Husband   3. Both
2. No   2. Wife

		P15	P16
1	Preparing the land		
2	Buying farm equipment		
3	Buying inputs		
4	Spreading seed		
5	Mulching		
6	Planting		
7	Installing stakes		
8	Fertilizing		
9	Spraying chemicals		
10	Weeding		
11	Watering		
12	Harvesting		
13	Transporting chili to point sale		
14	Sorting and grading		
15	Negotiating with buyer		
16	Preparing meal		

Appendix 2. Best-worst cards (Part P and Q in the questionnaire)

We would now like to ask you 11 questions regarding the importance of several buyers/trader characteristics/attributes that might be important to you when choosing who you sell your chilies to.

The buyer characteristics that we would like you to consider are explained below:

1. Price per Kg:
Price means a high price that the buyer is willing to pay you for your chilies. It is the price per kilogram that the buyer pays you for your chilies.

2. Pays cash immediately on your delivery:
The buyer pays you cash upon receipt of your chilies. You do not have to wait to get paid for what you are selling. There is no delayed payment.

3. Provides access to certified chili seed:
In addition to providing a market for your chilies, the buyer also helps you obtain access or credit to purchase certified chili seeds.

4. Provides access or credit for input purchases:
The buyer or trader helps finance inputs such as fertilizer or pesticides and allows you to pay at some later time.

5. Willing to negotiate or match another buyer's price
The buyers offer bargaining in terms of price and harvest delivery.

6. Provides money for loan:
The buyers provide money for farmer's capital such as to pay labors and to buy inputs.

7. Provide information or technical Assistance:
The buyer/trader provides information (e.g., extension programs) or technical assistance that can help you improve your quality and/or productivity

8. Established relationship:
You have previous experience working with the buyer/trader. This may involve a long term relationship, they may be a family member.

9. Always follows through on their commitments to buy my product
You sell your chilies to a particular buyer since he can be trusted, such as he is always on time regarding payment.

10. Shares information about market conditions (e.g price, demand, supply)
The buyers always give market information, such as price, demand, and supply e.g. over-supply causing lower prices etc.

11. Opportunity for price premiums for value adding:
The buyer/trader is willing to negotiate a price premium for value adding (e.g. size or sorting)

The following example illustrates how to answer each question if you thought that "Established relationship" was the most important attribute and "Provides price premiums" was the least important attribute. This is only an example. Please answer questions A-G based on your personal preferences.

EXAMPLE ONLY:

Most important (tick one box)	Of these, which are the most and least important to choose a …	Least important (tick one box)
☐	11. Provides price premiums	✓
☐	4. Credit or access for input purchases	☐
☐	3. Access to certified chili seed	☐
✓	8. Established relationship	☐
☐	1. Price per kg	☐
☐	2. Pays cash immediately	☐

END EXAMPLE

QUESTION A

For each of the following questions (A-K), ***check only one attribute as the MOST important*** (left hand side) and also ***check only one attribute as the LEAST important*** (right hand side)*.*

A. Considering the five characteristics presented below, please tick one box in the left column to indicate the characteristic that is ***MOST important*** to you and please tick one box in the right column to indicate the characteristic that is ***LEAST important*** to you. Please tick only one box per column.

Question
  A

Most Important (tick one box)	Of these buyer characteristics, which are the Most and Least important to you…	Least important (tick one box)
☐	1. Price per Kg	☐
☐	4. Credit or access for input purchases	☐
☐	6. Provides money for loan	☐
☐	10.Shares information about market conditions	☐
☐	3. Access to certified chili seed	☐

B. Considering the following five characteristics presented below, please tick one box in the left column to indicate the characteristic that is ***MOST important*** to you and please tick one box in the right column to indicate the characteristic that is ***LEAST important*** to you. Please tick only one box per column.

Question
  B

Most important (tick one box)	Of these, which are the most and least important to choose a …	Least important (tick one box)
☐	2. Pays cash immediately	☐
☐	6. Provides money for loan	☐
☐	7. Technical Assistance	☐
☐	11.Provides price premiums	☐
☐	4. Credit or access for input purchases	☐

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C. Considering the following five characteristics presented below, please tick one box in the left column to indicate the characteristic that is *MOST important* to you and please tick one box in the right column to indicate the characteristic that is *LEAST important* to you. Please tick only one box per column.

Question C

Most important (tick one box)	Of these, which are the most and least important to choose a …	Least important (tick one box)
☐	3. Access to certified chili seed	☐
☐	7. Technical Assistance	☐
☐	8. Established relationship	☐
☐	5. Willing to negotiate or match another buyer's price	☐
☐	6. Provides money for loan	☐

D. Considering the following five characteristics presented below, please tick one box in the left column to indicate the characteristic that is *MOST important* to you and please tick one box in the right column to indicate the characteristic that is *LEAST important* to you. Please tick only one box per column.

Question D

Most important (tick one box)	Of these, which are the most and least important to choose a …	Least important (tick one box)
☐	4. Credit or access for input purchases	☐
☐	8. Established relationship	☐
☐	9. Always follows through on their commitments to buy my product	☐
☐	1. Price per Kg	☐
☐	7. Technical Assistance	☐

E. Considering the following five characteristics presented below, please tick one box in the left column to indicate the characteristic that is ***MOST important*** to you and please tick one box in the right column to indicate the characteristic that is ***LEAST important*** to you. Please tick only one box per column.

Question E

Most important (tick one box)	Of these, which are the most and least important to choose a …	Least important (tick one box)
☐	6. Provides money for loan	☐
☐	9. Always follows through on their commitments to buy my product	☐
☐	10. Shares information about market conditions	☐
☐	2. Pays cash immediately	☐
☐	8. Established relationship	☐

F. Considering the following five characteristics presented below, please tick one box in the left column to indicate the characteristic that is ***MOST important*** to you and please tick one box in the right column to indicate the characteristic that is ***LEAST important*** to you. Please tick only one box per column.

Question F

Most important (tick one box)	Of these, which are the most and least important to choose a …	Least important (tick one box)
☐	7. Technical Assistance	☐
☐	10. Shares information about market conditions	☐
☐	11. Provides price premiums	☐
☐	3. Access to certified chili seed	☐
☐	9. Always follows through on their commitments to buy my product	☐

G. Considering the following five characteristics presented below, please tick one box in the left column to indicate the characteristic that is ***MOST important*** to you and please tick one box in the right column to indicate the characteristic that is ***LEAST important*** to you. Please tick only one box per column.

Question G

Most important (tick one box)	Of these, which are the most and least important to choose a …	Least important (tick one box)
☐	8. Established relationship	☐
☐	11.Provides price premiums	☐
☐	5. Willing to negotiate or match another buyer's price	☐
☐	4. Credit or access for input purchases	☐
☐	10.Shares information about market conditions	☐

H. Considering the following five characteristics presented below, please tick one box in the left column to indicate the characteristic that is ***MOST important*** to you and please tick one box in the right column to indicate the characteristic that is ***LEAST important*** to you. Please tick only one box per column.

Question H

Most important (tick one box)	Of these, which are the most and least important to choose a …	Least important (tick one box)
☐	9. Always follows through on their commitments to buy my product	☐
☐	5. Willing to negotiate or match another buyer's price	☐
☐	1. Price per Kg	☐
☐	6. Provides money for loan	☐
☐	11. Provides price premiums	☐

I. Considering the following five characteristics presented below, please tick one box in the left column to indicate the characteristic that is **MOST important** to you and please tick one box in the right column to indicate the characteristic that is **LEAST important** to you. Please tick only one box per column.

Question I

Most important (tick one box)	Of these, which are the most and least important to choose a …	Least important (tick one box)
☐	10. Shares information about market conditions	☐
☐	1. Price per Kg	☐
☐	2. Pays cash immediately	☐
☐	7. Technical Assistance	☐
☐	5. Willing to negotiate or match another buyer's price	☐

J. Considering the following five characteristics presented below, please tick one box in the left column to indicate the characteristic that is **MOST important** to you and please tick one box in the right column to indicate the characteristic that is **LEAST important** to you. Please tick only one box per column.

Question J

Most important (tick one box)	Of these, which are the most and least important to choose a …	Least important (tick one box)
☐	11. Provides price premiums	☐
☐	2. Pays cash immediately	☐
☐	3. Access to certified chili seed	☐
☐	8. Established relationship	☐
☐	1. Price per Kg	☐

K. Considering the following five characteristics presented below, please tick one box in the left column to indicate the characteristic that is ***MOST important*** to you and please tick one box in the right column to indicate the characteristic that is ***LEAST important*** to you. Please tick only one box per column.

Question K

Most important (tick one box)	Of these, which are the most and least important to choose a …	Least important (tick one box)
☐	5. Willing to negotiate or match another buyer's price	☐
☐	3. Access to certified chili seed	☐
☐	4. Credit or access for input purchases	☐
☐	9. Always follows through on their commitments to buy my product	☐
☐	2. Pays cash immediately	☐

Appendix 3. Selection of sub-district in Garut District

Sub-districts	Average chili production in 2004-2008 (Ton)	Cumulative	Sub-district to select								
			Select	1	2	3	4	5	6	7	8
Cikajang	9,959	9,959	Select	1							
Wanaraja	7,766	17,724	Select		2						
Talegong	6,934	24,658	Select			3					
Caringin	4,044	28,702									
Cilawu	4,032	32,734									
Bayongbong	4,004	36,738	Select				4				
Cisewu	3,950	40,688									
Cisurupan	3,324	44,012	Select					5			
Leles	2,882	46,894									
Cigedug	2,600	49,495									
Pangatikan	2,595	52,090									
Pasirwangi	2,577	54,667	Select						6		
Banyuresmi	2,010	56,677									
Samarang	1,990	58,667									
Tarogong Kaler	1,815	60,482									
Bungbulang	1,787	62,269									
Sucinaraja	1,519	63,788	Select							7	
Cibatu	1,509	65,297									
Karangpawitan	1,394	66,691									
Pamulihan	1,130	67,821									
Sukawening	1,114	68,935									
Cibalong	1,106	70,041									
Malangbong	1,090	71,131									
Kadungora	1,000	72,131									
Sukaresmi	855	72,987	Select								8
Karangtengah	732	73,719									
Banjarwangi	613	74,332									
Peundeuy	581	74,913									
Tarogong Kidul	566	75,479									
Leuwigoong	364	75,843									
Cisompet	355	76,198									
Pakenjeng	336	76,534									
Singajaya	327	76,861									
Mekarmukti	323	77,184									
Cikelet	304	77,488									
Garut Kota	283	77,771									
Cibiuk	279	78,050									
Cihurip	278	78,328									
Bl. Limbangan	208	78,536									
Selaawi	134	78,670									
Kersamanah	69	78,739									
Pameungpeuk	38	78,777									
Total production	78,777										

Note: Sub-districts to be selected are eight, total production is 78,777 ton, interval is 9,847 ton, random starting point is 3,635 ton

Appendix 4. Selection of sub-district in Tasikmalaya District

Sub-districts	Average chili production in 2004-2008 (Ton)	Cumulative	Sub-districts to select					
			Select	1	2	3	4	5
Taraju	4,278	4,278						
Cigalontang	4,221	8,500	Select	1				
Cisayong	1,888	10,388						
Padakembang	1,789	12,177						
Leuwisari	1,744	13,922	Select		2			
Sodonghilir	1,473	15,395						
Sukahening	1,073	16,468						
Salawu	910	17,377						
Sukaratu	870	18,247						
Puspahiang	813	19,059						
Ciawi	734	19,793						
Bojonggambir	715	20,508						
Sariwangi	537	21,044	Select			3		
Kadipaten	511	21,556						
Pancatengah	443	21,999						
Singaparna	288	22,287						
Jatiwaras	282	22,569						
Salopa	279	22,848						
Cibalong	278	23,126						
Bantarkalong	272	23,398						
Cikatomas	245	23,643						
Mangunreja	183	23,826						
Sukarame	133	23,959						
Parungponteng	132	24,091						
Tanjungjaya	92	24,183						
Bajongasih	90	24,272						
Jamanis	77	24,350						
Cipatujah	74	24,424						
Culamega	70	24,494						
Rajapolah	55	24,548						
Pagerageung	43	24,592						
Karangnunggal	37	24,628						
Gunungtanjung	31	24,660						
Sukaraja	25	24,685						
Cikalong	21	24,707						
Sukaresik	21	24,727						
Manonjaya	14	24,741						
Karangjaya	12	24,753						
Cineam	5	24,759						
Total production	23,512							

Note: Sub-districts to be selected are three, total production is 23,512 ton, interval is 7,837 ton, random starting point is 5,144 ton

Appendix 5. Selection of sub-district in Tasikmalaya District

Sub-districts	Average chili production in 2004-2008 (Ton)	Cumulative	Sub-district to select					
			Select	1	2	3	4	5
Sukamantri	1,073	1,073	Select	1				
Panumbangan	443	1,515	Select		2			
Panjalu	359	1,875						
Cihaurbeuti	244	2,118	Select			3		
Padaherang	87	2,206						
Pamarican	87	2,293						
Sindangkasih	87	2,380						
Parigi	63	2,442						
Sadananya	51	2,493						
Panawangan	42	2,536						
Mangunjaya	42	2,577						
Pangandaran	36	2,613						
Cipaku	36	2,649						
Cikoneng	32	2,682						
Kawali	31	2,713						
Codolog	26	2,739						
Rancah	26	2,765						
Cigugur	22	2,786						
Tambaksari	21	2,808						
Cijeungjing	19	2,827						
Purwadadi	17	2,844						
Ciamis	17	2,861						
Banjarsari	16	2,877						
Lumbung	16	2,893						
Lakbok	15	2,908						
Rajadesa	11	2,920						
Langkaplancar	7	2,926						
Kalipucang	4	2,930						
Cijulang	4	2,934						
Cisaga	4	2,937						
Sukadana	2	2,940						
Cimaragas	1	2,940						
Cimerak	0	2,940						
Sidamulih	0	2,940						
Jatinagara	0	2,940						
Beregbeg	0	2,940						
Total production	2,940							

Note: Sub-districts to be selected are three, total production is 2,940 ton, interval is 980 ton, random starting point is 102 ton

Appendix 6. List of villages in the survey

No	Districts	Sub-districts	Villages
1	Garut	1. Wanaraja	1. Sukamenak
			2. Wanajaya
			3. Wana Mekar
		2. Sucinaraja	1. Tenjonegara
			2. Sukalaksana
			3. Cigadog
		3. Cikajang	1. Mekarjaya
			2. Girijaya
			3. Cikandang
		4. Cirusupan	1. Sukatani
			2. Cisero
			3. Cisurupan
		5. Pasir wangi	1. Barusari
			2. Karyamekar
			3. Sinarjaya
		6. Sukaresmi	1. Sukajaya
			2. Mekarjaya
			3. Cintadamai
		7. Bayongbong	1. Panembong
			2. Hegarmanah
			3. Sukaramai
		8. Leles	1. Jangkurang
			2. Margaluyu
			3. Sukarame
2	Tasikmalaya	1. Leuwisari	1. Cigadog
			2. Ciawang
			3. Linggawangi
		2. Sariwangi	1. Jayaputra
			2. Sukaraharja
			3. Sukamulih
		3. Cigalontang	1. Puspamukti
			2. Pusparaja
			3. Sinarmulya
3	Ciamis	Panumbangan	1. Sindang Barang
			2. Sukakerta
			3. Golat
		Cihaurbeuti	1. Sukamaju
			2. Sukahurip
			3. Sukasetia
		Sukamantri	1. Cibeureum
			2. Sindanglaya
			3. Mekarwangi

Appendix 7. Correlation coefficients among variables in analyzing determinants of farmers' commitment with their buyers

	1	2	3	4	5	6	7	8
1. Commitment	1.00							
2. Trust	0.26	1.00						
3. Satisfaction	0.51	0.26	1.00					
4. Actual chili price	0.05	0.08	0.04	1.00				
5. Land size	0.00	0.05	0.04	0.09	1.00			
6. Age	-0.03	0.07	-0.06	-0.05	0.19	1.00		
7. Farming time	-0.15	-0.04	-0.10	-0.07	0.18	0.30	1.00	
8. Education	-0.05	-0.01	0.01	0.11	-0.02	-0.23	-0.14	1.00