Summary

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1. Introduction

Vietnam was a net importer of rice prior to 1989 but it has recently become one of the world's largest rice exporters. The Mekong delta contributed significantly this great achievement, although it occupies approximately 55% of the total area under rice cultivation nationally, and more than 56% and 90% of the nation's total rice production and export volume, respectively. However, a vast majority of the Mekong delta rice farmers (65%) own relatively small rice land (less than 1 ha). Small in scale and lacking vertical coordination may lead to more than 90% of rice growers selling their output to assemblers at farm gate soon after harvest. This issue creates unstable income for farmers and erratic quality from rice provided by innumerable individual farmers. In efforts of the government of Vietnam to solve this problem, contract farming has been promoted for use in agriculture and particularly in the rice sector since 2002. However, several fundamental questions are raised such as (1) can farmers with small farm derive their livelihood from rice cultivation? (2) How are contract arrangements operated in the Mekong delta? (3) Can contract farming generate high profitability for rice farmers in the Mekong delta? (4) What factors can affect to farmers' adoption of rice contract farming?

This thesis aims to examine the performance of rice-farming profitability by farm size in the Mekong delta, (2) to investigate the current situation of rice contract farming and constraints of its enforcement, (3) to explore motivational factors affecting rice farmers' adoption of contract farming and its profitability. The household surveys for data collection were conducted in the Mekong delta through September 2015 to September 2017. Quantitative and qualitative methods were used to analyze the data.

The structure of the thesis is organized as follows. Chapter 1 provides major characteristics of Vietnamese rice sector with a focus on rice production and marketing in the Mekong delta and states the objectives of the thesis. In chapter 2 we mainly review previous studies on contract farming such as definition of contract farming, type of contract, models of contract farming, advantages and disadvantages of contract farming, impacts of contract farming on participants, motivation for contract farming and contract enforcement. We also review development history of contract farming in the Mekong delta and earlier studies on rice contract farming the Delta. In chapter 3 we focus on rice marketing and profitability by farm size in Vietnam's central Mekong delta. Chapter 4 investigates current situation of rice contract farming and its enforcement in the Mekong delta. In chapter 5 we explore farmers' motivations for contract farming and examines profitability in rice crop through contract scheme. In the last chapter we provide conclusions. The following section we present and discuss main results of chapters 3, 4 and 5. The last section draws some key conclusions.

2. Results and discussion

2.1 Rice-farming profitability by farm size in the central Mekong delta (chapter 3)

The Vietnamese government has made policy that it retains 1.75 million ha of rice land area in the Mekong delta or equivalent to 3.8 million ha of rice grown area that must be maintained. Thus, land used for rice cultivation is likely to be prohibited from the rice land to other crops or other functions. This situation lends itself to the formation of two major questions. First, can rice cultivation generate a high income for the rice-farming household? Second, can small-farm households derive their livelihood from rice farming? In fact, a vast majority of the Mekong delta rice farmers (65%) own relatively small rice land (up to 1 ha) (GSO, 2012).

To answer those questions we conducted household surveys to collect primary data in Can Tho

city located in the central Mekong delta of Vietnam in September 2017. The structured questionnaire used included various questions on household and farm characteristics, agricultural assets, cost associated with paddy production (e.g. labor, fertilizer, pesticide, etc.), sales, source of inputs and sources of income. We interviewed 96 paddy farmers who were randomly selected from two communes of the district. The collected data was categorized into three distinct groups, namely, S-farm (rice farm up to one ha), M-farm (rice farm above 1 to 3 ha) and L-farm (rice farm above 3 ha). We mainly employed one-way ANOVA and chi-square test to analyze the collected data. Profitability performance of paddy production was measured by average variable cost, selling price, average return obtained by one kilogram and average rate of return by employing a simple cost-benefit analysis. The earning capacity of paddy household was estimated on monthly average paddy and household incomes per capita. We also used regression analysis (OLS) to measure a part of profitability performance (selling price) as a function of characteristics of household, sales and a farm size variable. By including these characteristics, we can control for the observable differences among the three groups including education, social participation, type of purchaser, type of varieties, period of sales and distance to the nearest miller; however, this model did not take into account unobservable characteristics such as intelligence and hard-working attitude. The effect of farm size on selling price can be measured by the coefficient of variable for farm size in the OLS regression model (Imbens, 2004; Wooldridge, 2002). The linear regression models can be written as follows:

$$Y = \alpha + \beta X_i + \varepsilon$$

Where Y denotes the selling price. Xi is a vector of observable variables as mentioned above.

Results show that rice production still plays a dominant role in income source of rice-farming households in the Mekong delta. It found that most rice-farming households are commercially oriented; they sell almost all of their output in bulk immediately after harvest, which may cause over supply during the peak harvest in comparison with traders' limited capacity of storage and milling. Most farmers sell their output as standing crop, yet some large farmers tend to sell their output after harvest because they need cash soon for their living expense and repaying input costs. Rice cultivation in the Mekong delta is profitable for both small and large farm scales. However, rice farmers with small farm size are unlikely to maintain and operate rice farms for their livelihood on a long-term basis, while the medium and large-scale farmers seem to obtain larger rice income and are capable of maintaining their rice farming activity. The results suggest that selling price for large-scale farm households was higher than that of the small and medium scale groups, which imply that high rice income for farmers in the Mekong delta is likely as a result of higher selling price. The finding show that a farmer with available storage can store the paddy and manage selling time to avoid periods when there is a glut in the paddy market that is, during the harvest season, which may lead to them receiving higher selling prices.

The possible recommendation from this study may be that farmers with small-scale farm should participate in or establish a group of farmers to enhance their negotiating power as well as reduce the collection cost of rice for purchasers particularly those purchasing large quantities of rice. They should be supported to establish storage facility at farm, which can help them to control the time of selling rice after harvested. In such case, they also need some financial support to mitigate the immediate needs for cash.

2.2 Current situation of rice contract farming and its enforcement in the Mekong delta (chapter 4)

Contract farming in the agricultural sector in general and in the rice sector in particular has been encouraged and promoted by the government of Vietnam since 2002. Although the Vietnamese government focuses on expending practice of rice contract farming, contract enforcement has been relatively weak. Rice contract violation between two parties has been observed in the delta. There were many cases of rice contract violation reported in the beside few successful operation of contract schemes. Consequently, although the local government at all levels have strongly promoted its expansion, the uptake of contract farming in the rice sector is still small in the Mekong delta, accounting for less than 10% of the delta's paddy planted area (GSO, 2017).

To investigate current situation of contract-farming operation in the Mekong delra, a structured questionnaire was administered to 107 rice contract farmers who were randomly selected from a

list provided by the heads of cooperatives and hamlets to collect data on household demography, farm status, and characteristics of rice contract farming. In-depth interviews were conducted with heads of cooperatives and officials in charge of rice contract farming to understand constraints of contract enforcement. The field surveys were conducted in September 2015 in Dong Thap and An Giang provinces; both provinces were chosen for their diversified systems of rice contract farming schemes in the Mekong delta. The collected data were classified into two groups, including a group of farmers with an enforced contract and another group with an unenforced contract. A quantitative method was applied to analyze the characteristics of households, arrangements and implementation of contracts. Besides, the qualitative analysis was also employed to examine elements affecting the enforcement of a contract.

The results from the investigation indicate that there are four types of rice contract farming including (i) marketing contract signed directly between agribusiness firm and farmers, (ii) intermediate marketing contract signed through a cooperative, (iii) a direct contract of resource provision and marketing, and (iv) intermediate contract of resource provision and marketing. The second and fourth types of contract (contracts conducted through a cooperative) account for approximately 80% and the rest of contracts was direct contract (contract carried out directly between farmers and contract firms). The enforcement of rice contract farming is relatively weak in the Mekong delta; violation of contract is likely to be high. It explored three major constraints that cause nonfulfillment of contract such as a disagreement on paddy price between farmers and firm, a distrust on measurement of paddy quality and an imbalance of low collecting capacity of the contract firms at farm gate and the huge volume of paddy at harvest time. The use of a written contract as well as a direct contract between contract firms and farmers had a positive effect on the contract enforcement. Investment in contract farmers (supplying seed and making field visit by field staff) could enhance the contract enforcement.

Our findings suggest that contract firms should provide farmers inputs in advance, technical instruction and delivery of paddy crop in conjunction with paddy purchases in order to encourage them to participate in contract farming.

2.3 Motivation for contract farming and impact of contract farming rice farmers' profitability in the Mekong delta (chapter 5)

Growing concern is also reflected in studies on contract farming conducted in Vietnam, such as those by Oanh et al. (2016), Wang et al. (2014), Saenger et al. (2013), and Tuan (2012); however, these authors mainly focused on industrial and vegetable crops and the dairy sector. However, there is little evidence of study on contract farming in the rice sector carried out in Vietnam. Indeed, it is hard to find any existing study related to factors motivating rice farmers' participation in contract farming and its impact on profitability in rice crop although it has been promoted to use since the 2000s. We attempt to examine motivational factors affecting farmers' participation and profitability of rice cultivation with contract farming in the Mekong delta.

To explore farmers' motivation for contracting and estimate the effect of contract farming on rice-farming profitability we investigated two different schemes of contract farming carried out by agribusiness firms in the Mekong delta. The first contract scheme is led an agrichemical and rice export firm. The second contract scheme is conducted by rice specialized enterprises.

The first contract scheme was investigated in Chau Thanh district of An Giang province as the study site in September 2016. The household survey focuses on the cost and return of rice cultivation with contract farming and farmers' motivations for starting to contract, and major problems faced by farmers when operating contract scheme. The questionnaire was used to gather major information such as demographic characteristics, farm size, relative importance of contracting motivations, and assessment of contract operation, variable production costs and returns of rice farming. The important motivations for contracting and the degree of satisfaction with contract were assessed by using a series of five-point Likert scales. We conducted oral interview with 161 rice farmers in which 52 respondents who had never contracted the firm, 58 farmers had participated with the firm, and 51 farmers who abandoned contract scheme.

The second contract scheme was investigated in Co Do district of Can Tho city in September 2017. However, this survey mainly focused on profitability of rice farming with and without contract scheme. Data collection was focused on Co Do district, known as the largest rice-producing region

of Can Tho city in terms of area and production, where contract farming is conducted by business firms and rice production is the most prevalent among other districts. Similar to the survey for the first scheme, a structured questionnaire was used to collect household demography, farm characteristics, assets, rice production and sales, production costs, inputs supply, income sources, and contractual details. The total sample numbered 166 rice growers, of which 96 farmers who had never participated in contract farming, while the remaining farmers who had participated. Noticeably, both groups of respondents reside and practice rice farming under the same geographic setting, which ensures that their natural conditions, traffic infrastructure, and cultural status are homogeneous. We also interviewed the two contract companies to gather information on their rice business.

With regards to data analysis, a simple cost-return analysis was used to estimate the profitability of rice cultivation in the current study. The profitability was focused on not only estimating return and average rate of return on investment but also calculating variable cost and output price. The effect of participation in contract farming can be measured by the coefficients of variables for contract farming in the OLS regression model (Imbens, 2004; Wooldridge, 2002). This regression approach was applied in earlier studies by Maertens and Velde (2017), Wang et al. (2014) and Miyata et al. (2009). The linear regression models can be written as follows:

$$Y_i = \varphi_i + \alpha C_i + \beta X_i + \varepsilon_i$$

Where Yi denotes the outcome variables as mentioned above. Ci is a dummy variable for participation in contract farming. Xi is a vector of continuous variables (age, education of household head, farming experience, household size, rice planted area) and dummy variables (social participation, owning boat, owning storage, sale after harvest and use of variety). By including these observable factors, we can control for the observable differences between the two groups, which may influence the dependent variables (Maertens and Velde, 2017; Krause and Machek, 2018; Miyata et al., 2009). However, unobservable factors such as industrious and skillful characteristics of sampled farmers were not considered in the study.

Exploratory factor analysis (EFA) was applied to explore factors affecting farmers' participation in the firm's contract scheme by using principal component analysis (PCA) to extract factors and varimax method to rotate them.

Regarding results, we find that contract-farming schemes have positive impact on profitability of rice farming in the Mekong delta. In fact, analysis of costs and returns indicated no significant differences in average variable costs between contract and non-contract farmers. However, the contract group received significantly greater prices and average returns, which suggest that contract arrangements magnify income. The study identified three motivations for contracting. First, contract farmers want to access to better market outlet. Second, they want to gain support benefits. Third, they expect improved production. These results reflect that a range of factors motivates farmers to participate in contract scheme. Contracting motivations reflect issues with weakness in input and output markets, the poor performance of production, and limited access to public extension service. The finding shows that three major factors affecting farmers' decision to keep contracting such as "accustomed to independent way", "risk under contract" and "lack of trust on the firm". It was explored major reasons, which lead farmers to abandon contracting such as dependence on the firm, distrust on measuring moisture content of paddy, unreasonable price and imbalance of the firm's paddy collecting capacity and a large amount of farmers' paddy at harvest time

The possible policy implication from the findings is that contract farming may not be feasible for all rice farmers and business firms. As a result of the fact that some firms cannot provide certain inputs (e.g., seed, agrochemicals) and technical guidance to their contract farmers owing to their limitations of human and financial resources. Some farmers are likely not to engage in a contract scheme because they may have more outlet choices that can sometimes enable them to achieve a higher selling price.

3. General conclusions

Rice production in the Mekong delta is profitable. However, small-scale rice farmers are less likely to maintain and operate their rice farms for the livelihood on a long-term basis, while the medium and large-scale farmers seemingly obtain higher rice income and are able to maintain their rice

farming activity.

The enforcement of rice contract farming is relatively weak in the Mekong delta; violation of contract is likely to be high. Investment in contract farmers, including supplying seed and making field visit by field staff could enhance the contract enforcement.

Contract-farming schemes have positive impact on profitability of rice farming in the Mekong delta. Three motivations for farmers to contract have been explored such as access to better market outlet, gaining support benefits and expecting improved production. There are three main factors affecting farmers' decision to not participate in contract scheme ("accustomed to independent way", "risk under contract" and "lack of trust on the firm"). It was explored that dependence on the firm, distrust on estimating moisture content of paddy, unreasonable price offered and imbalance of the firm's paddy collection and a huge amount of farmers' paddy at harvest time are considered important reasons why farmers abandon contract scheme.

References

GSO (General Statistics Office), Results of the 2011 rural, agriculture and fishery census, Statistical Publishing House, 2012

GSO (General Statistics Office). 2017. Summary report of the 2016 rural, agriculture and fishery census. Statistical Publishing House, Hanoi, Vietnam.

GSO (General Statistics Office). 2017. Summary report of the 2016 rural, agriculture and fishery census. Statistical Publishing House, Hanoi, Vietnam.

Imbens, G.W. 2004. Nonparametric estimation of average treatment effects under exogeneity: A review. The Review of Economics and Statistics 86(1): 4-29.

Maertens, M., Velde, K.V. 2017. Contract farming in staple food chains: the case of rice in Bennin, World Development, 95: 73-87

Miyata, S., N. Minot and D. Hu. 2009. Impact of contract farming on income: Linking small farmers, packers, and supermarkets in China. World Development, 37(11): 1781-1790.

Oanh, L.T.K., B.T. Nga and P. Lebailly. 2016. Tea production between contract and noncontract farmers in Phu Tho province, Vietnam. Scholars Journal of Agriculture and Veterinary Sciences 3(2): 117-122.

Saenger, C., M. Qaim, M. Torero and A. Viceisza. 2013. Contract farming and smallholder incentives to produce high quality: experimental evidence from the Vietnamese dairy sector. Agricultural Economics 44(3): 297-308.

Tuan, N.P. 2012. Contract farming and its impact on income and livelihoods for small-scale farmers: case study in Vietnam. J. of Agribusiness and Rural Development 4(26): 147-166.

Wang, H., P. Moustier and N.T.T. Loc. 2014. Economic impact of direct marketing and contracts: The case of safe vegetable chains in northern Vietnam. Food Policy 47: 13-23.

Wooldridge, J.M. 2002. Econometric analysis of cross section and panel data. The MIT Press.