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I. Introduction

Rice is a traditional plant of Vietnam and is presently the most important plant in the country. Rice land occupies 44 percent of the agricultural land, with the cultivated rice area comprising 61 percent of the farming area, and 80 percent of Vietnamese farmers are rice farmers (Bong 2011). In Vietnam, everyone eats rice every day, whether they have low or high incomes, and whether they live in rural or urban areas, making rice the most crucial food of the Vietnamese people.

Due to the importance of rice, in the past the Vietnamese government always prioritized rice development as a central objective of rural development and invested heavily in setting up infrastructure, especially irrigation systems, to facilitate this. During the past 30 years in many regions of Vietnam, soil was improved to create fertile areas for growing rice, especially in the Mekong Delta. Additionally, the government turned its attention toward investing in science and technology, as well as agricultural extension for rice productionfor farmers. Over the past 20 years, Vietnam's rice production has reached impressive levels, ending food shortages. Beginning in 1989, Vietnam exported about one million tons of white rice. From 1990 to 2010, its rice production increased from 19 to 40 tons of rice, and its rice exports increased from 1.6 million tons to 6.7 million tons of white rice per year, even though between 2000 and 2010, the land area devote to rice production was reduced by 380,000 hectares (Bong 2011). The average rice yield in the country increased from 3.18 tons per hectare in 1990 to 5.3 tons per hectare in 2010 (Bong 2011). Since 2002, Vietnam's average rice yield has been the highest of any ASEAN country, with over half a million hectares achieving a yield of more than seven tons per hectare in the first crop of the annual rice cycle, which is the highest rice yield in the world at present (Bong 2011).

Although those achievements are remarkable, paradoxically, the rice farmers are still some of the poorest people in the country, with an excessively low standard of living; moreover, the rice growing regions are still underdeveloped (Bong 2011). These problems have received considerable attention from policy makers at various levels, including high level leaders, as they try to promote policies to improvethe lives of the farmers who have contributed so much in terms of food production for both national use and to export to the rest of the world.

This paper presents a case study of attempted agricultural intensification and diversification in a village in the Mekong Delta of Vietnam, focusing on thepositive and negative impacts of Vietnam's agrarian policies since "Doi Moi" as they have played out in the study village. The ultimate goals of the paperare to inform Vietnamese policy makers and other development practitioners about the benefits and constraints faced by farmers in implementing this agrarian policy and to suggest the need for further work by Vietnamese policy makers.

II. Background on Vietnam's Agricultural Policy Since Doi Moi

Vietnam's "Doi Moi"economic reform policy began in earnest in April 1981 with the Vietnamese government's Contract 100 Policy. Under Contract 100, the state did not specify that farming households had long term use rights to specific parcels of land. Products continued to be distributed to households according to the number of days they worked for the cooperatives

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(Kerkvliet 1995). In 1988, the state implemented a new policy, Contract 10, which put in place long term land use rights of 10 to 15 years duration. In addition, Contract 10 freed prices of rice and agricultural inputs, privatized the distribution of inputs, reduce land tax and provide farmers with more freedom of choice in the crops they grew. After 1989, farmers were no longer required to sell a contracted amount of rice to the state, and both internal and external trade was liberalized (Jamal and Jansen 2000:25). As Vietnam experienced the economic liberalization of the 1980s, its agricultural development policy shifted from collectivism to the de-collectivization of agriculture, i.e. the farm household was defined as an "economic unit of production" with the authority to operate (Werner 2002). Since that time, the means of production in rural areas has almost completely reverted to the household through the restructuring of agriculture. Arable land, formerly belonging to agricultural cooperatives, has been allocated to individual farm households with long-term "land-use rights." Other foci are rural industrialization and the modernization of agriculture (i.e. introducing advanced agricultural machinery, technology, and management techniques to develop production and consolidate and improve production relations). This process can be divided into two periods: "before renovation" (i.e. mechanization + large-scale collective = great agricultural production) and "in renovation" (i.e. including the mechanization of agriculture, irrigation, building rural infrastructure and the transition of the rural economic structure to include rural industry and services as well as agriculture) (Cuc 2003). In the 1980s, the irrigation system was improved in the Mekong Delta and particularly in the study village Thoi Lai. Finally, in 1988 the complete version of the Doi Moi policy emerged, resulting in the first rice surplus in 1989 as well as the first rice exports from Vietnam in September 1989.

The direction of the Doi Moi policy was clearly reflected in the government's new slogan: "Rich people, a strong nation and an equal, democratic and civilized society" (Đảng CSVN 2006). The implication of this slogan was the government's intention to change its approach to development. The new policy was intended to establish a market economy in Vietnam and actively integrate Vietnam into the world economy, while maintaining the country's socialist political orientation (Khai 2001). The country's new economic approach introduced privatization and refocused the economy from a state-planned to a market economy. As a result of Doi Moi (literally, "renovation policy"), in general, the country switched from a closed economy to a more open economy, accepting foreign investment as well as promoting exports of Vietnamese products. In terms of agricultural policy, apart from the promotion of rice exports, the government also attempted to re-organize the socio-economic system of the nation in order to intensify rice production. Beginning in 1988, the means of production were either auctioned back to individual farming households or given back to their former owners. This recognition of private ownership of the means of production created another incentive for farmers to invest in the acquisition of farm equipment for rice intensification; during the same period, rapid agricultural diversification occurred in the central plain of the Mekong Delta (Le Coq et al. 2005). Diversification efforts focused on available market opportunities (Xuan 2002:115). In 2000, the government issued an official authorization to further restructure agricultural production in the suitable ecosystems of the country to improve income of farmers (Xuan 2002:115).

Table 1 : Selected Agrarian Policies of Vietnam, by year

Policy	Year Implemented	Description of Main Goals
Agricultural Collectivization	1976	Farm collectivization in the Southern Vietnam and using high yielding rice varieties to increase rice production
Irrigation System Improvement	1980-1990	Expanding the rice land areas from increasing the numbers of rice crop within a rice field in a year round
Contract 100	April 1981	Renovation of agriculture and rural area concerning allocation of rice to group and laborer.
New Land Law	Passed in 1987; enforced in1988	Farmers granted long term "land use right".
Contract 10	April 1988	Renovation of agriculture management, allocation of land to farming families.
Intensification& Diversification	1988	The means of production were either auctioned back to individual farming households or given back to their former owners. This created incentive for farmers to intensify rice crops, during the same period, rapid agricultural diversification took place in the Mekong Delta.
Active Land Law	1993	The Government allocated land to households and individuals for their long use with 5 rights: conversing, transferring, renting, inheriting and mortgaging.
Rural Development	2000s	Government Banks provided loans to farmers to fund investment in high-tech agriculture and agricultural business.

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Restructure agricultural production	2000	Restructure agricultural production in the suitable ecosystems of the country to improve income of farmers
The Decree No.80 of the Central Government	2002	The farming contract was determined by the Decree No.80 of the Central Government in 2002, which covers the purchase of agricultural or rice products by state companies.
Land Law	2003	The 2003 Land Law is a legal basis for the development and establishment of the real estate market. A landowner has 10 rights of land use, including exchange, transference (i.e. selling and buying), rent, re-rent, inheritance, offering/giving of land use rights, mortgage, guarantee, contribution of land use rights and receipt of compensation for land use rights when the government reclaims land.

Sources : Kono, 2001; Xuan, 2002; Cuc, 2003; Le Coq et al. 2005;and Dung et al., 2009

III. Research Methodology

I conducted the data collection for this study in Thoi Thuan hamlet, located in Thoi Lai district, about 30 km away from the main regional city of the Mekong Delta -- Cantho City. The study hamlet has 455 households, and about 47 percent of households are farm households (Tuyen 2011). An agricultural area of 98 hectares occupies about 80 percent of the total land of the hamlet (Tuyen 2011). Farm households hold an average of about 0.6 hectares of land (Tuyen 2011). Households in this hamlet have an average of five members, and there is an average of three earners per household (Tuyen 2011). The main source of income for farmers of Thoi Thuan is intensive rice production and their average farm household net income is 36 million dong (1978 USD) in 2009[1] (Key Informants Interview 2010). The hamlet has a long history of ethnically Khmer people living together with Kinh people, the dominant ethnic group of Vietnam.

The study explores the intensification of rice production and the diversification of agriculture of land-owning households between 1993 and 2009. The data for my study was gathered from in-depth interviews with a total of 102 individuals, including 92 farmers and 10 local officials. I cross-checked in-depth interview data using secondary information obtained from various reports from local government offices. I conducted my fieldwork over four years, from 2007 to 2010, while also taking courses at Chiang Mai University. The local officials were interviewed at different points during 2007-2010, and my colleagues and I interviewed the farmers in 2009 and 2010. My overall study sample of households comprised about 23% of the total households in the hamlet. I selected households purposively based on the list of households in hamlet that the local officials had classified into the different groups (i.e. the better-off, medium and poor households). The data for this paper is part of data from a larger research project. Interview data were analyzed using SPSS. All names of interviewees are disguised in this paper.

IV. Results and Discussion

As noted above, Vietnam's agrarian policies since Doi Moi have attempted to modernize the country's agriculture system. Its two main goals are: (1) the intensification of rice production and (2) the diversification of the types of agricultural goods produced. Agricultural diversification has emerged as a key focus of farmers in Vietnam's Mekong Delta (Xuan 2002:115). Because of the relationship between land policies and household land ownership status, most households in the Delta have only a small amount of land, which may not be sufficient for them to support themselves via rice farming alone. Many people earn higher returns from crops other than rice or by seeking employment in other enterprises (rural enterprises or in urban or peri-urban areas). However, the practicality of diversifying farm household incomes depends on the available opportunities as well as the costs and risks of new options. Farmers need the motivation and ability to obtain the information and resources necessary to diversify. However, various government interventions encourage diversification by making it easier for farmers to upgrade their production systems. Below, I examine the attempts of households in Thoi Thuan hamlet to achieve each of these two goals.

a) Intensification of Rice Cultivation for Export

In the Mekong Delta, the poorest households rely largely on off-farm activities for their livelihoods, whereas the wealthiest households have prospered through the intensification of agriculture production (World Bank 1995). In the 2000s, government policy encouraged the farmers to enlarge their land holdings and to invest in modern intensive agriculture (i.e. high-tech agriculture). For instance, at the district level, the Thoi Lai Government Bank for Agriculture and Rural Development, under this policy, provides loans to farmers to fund investment in high-tech agriculture and agricultural business such as buying or selling paddy (rough, unprocessed rice). In addition, the Government

[1] 1 USD = 18.2000 Vietnamese đồng in 2009

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Bank for Social Policy provides the loans to poor farmers to invest in farm production and the development of small businesses.Those banks started making these loans because of this policy.

Between 1980 and 1990, under the rural development policy, the local government designed a farm-level canal layout in Thoi Lai village, in which all the paddy fields had direct access to a canal. Then the villagers constructed the canals according to this design. Landowners donated land to build the new canals without compensation. The labor for construction was collected by means of social labor (lao động xã hội), contribution of labor for community projects, which is required of all adult citizens. Thoi Thuan hamlet excavated cross-stripe farm-level canals at intervals of 500 meters. These were called kinh 500 and were six meters wide and 1.5 meters deep. Once the irrigation system had been improved, the farm households in my study hamlet intensified rice cultivation in two ways: by expanding the area under rice cultivation and by increasing the numbers of rice crops planted in a given rice field per year.

Green Revolution technologies and hybrid seeds and mechanization have been used under the agricultural modernity policy, which have allowed farmers in the study village to plant three rice crops per year instead of the previous two.

b) Use of New Rice Varieties Enabling Switch from Two to Three Crops Per Year

Beginning in 1976, the local government of Thoi Thuan hamlet has mobilized the farmers to use high yielding rice varieties (Kono 2001). This was part of a broader national policy introduced in 1968, but it took eight years for the plan to mobilize farmers in Thoi Thuan. Since 1985, the farmers in Thoi Thuan have stopped growing traditional rice varieties and have replaced them with high yielding and short duration rice varieties which have enabled them to plant two rice crops per year. Later on, in about 1995, farmers switched rice varieties again to high yield varieties such as Jasmine 85, OMCS 2000, OM 2517, OM 4218, OM 4900, OM 1490, and IR 50404, with a very short duration (less than 105 days), enabling farmers to produce three rice crops per year (Interviews with Key Informants 2010). As of 2005, about three-quarters of the farmers in Thoi Thuan hamlet have intensified the utilization of their rice production land in order to increase the rice production and income of their households. This extensive farming has had a positive impact on their on-farm production. As a result, between 1993 and 2009, the hamlet's farmers' rice yields increased by 1.1 tons per hectare, or by an annual 6.4 percent. This rate of increase was higher than the average rate of increase in rice yields in the Mekong Delta, which was only 4.4 percent between 1980 and 2009 (Ha 2009). Between 1993 and 2009, in the hamlet, the net income of the farmers from rice crops increased by 13.5 million dong per hectare (Key informants interview March 2010 and Household survey October 2009).

c) Two Main Activities Using Mechanization in Rice Production

In the study hamlet, farmers typically prepare their land for planting using either hand tractors (rototillers) or tractors. [2] The use of modern machinery is the result of some of the agrarian policies associated with Doi Moi. For the first rice crop, before sowing the germinated seeds, farmers muddy and level the land because soil of land is wet after the flooding season. For the second rice crop, if only two rice crops are being planted in that year, they plow, muddy, and level the land. However, if they are planting three annual rice crops, they may not plow the land and may instead burn the rice straw left in the field because land preparation is very short in this rice season. Then, if there is a third rice crop, they again plow, muddy, and level the land. For the Winter-Spring rice season in 2008-2009, for example, villagers in Thoi Thuan relied on 20 family laborers and three hired laborers (all men) (Tuyen 2011). Beginning in the early 2000s, all farmers in the hamlet began producing three rice crops per year, so they all faced a shorter interval for harvesting one rice crop and preparing land for the next. As a result, the farmers needed a large number of laborers for short periods of time and so began to hire temporary laborers from Thoi Thuan as well as laborers from outside the hamlet, including Khmer laborers from many districts of Soc Trang province. According to my study, most of farm households had to hire extra labor, except for a few of farm households with very small rice fields of about 0.1-0.2 ha, who used only family laborers, including men and women.

For the harvest, the migrant laborers from Soc Trang and the poor farmers from Thoi Thuan who hired themselves as temporary laborers worked alongside the land-holding farmers of the village. They divided themselves into two main groups: the harvesting group and the threshing/packaging/transporting group. After completion of the rice harvest, the latter was responsible for bringing the paddy (rough rice) to the houses of the landholders. The harvesting group is normally made up of women, while the threshing/packing/transporting group is typically comprised of men because the latter is considered to be harder work than the former. In 2008 and 2009 during my study, the rice harvests in the hamlet lasted about one month. [3]In this hamlet, most farmers hold small pieces of land (e.g. 50% of the farmers hold under a 0.5 ha rice field), which are not

[2] Farmers traditionally used plows pulled by water buffalo; however, tractor was replaced gradually beginning in the 1960s.

[3] Household labor is typically used in conjunction with hired labor. No system of sharing labor with neighbor exists, unlike in other parts of Southeast Asia.

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suitable for combine harvesters, so the farmers of Thoi Thoi Thuan hamlet have not yet used combine harvesters to harvest rice, as was recommended by the local government's rural development policy in 2000s. However, since the 1970s, rice produced in the district is threshed by mechanical threshers. In 2010, combine harvesters began to be introduced gradually in the research site. The land of farmers may have to be consolidated to facilitate this activity. Of course, their increased use of mechanization is because of the need for 3 crops per year.

d) *More Fertilizers and Pesticides*

As noted earlier, farmers in the study village began planting two rice crops per year in 1985 and three per year since 1995. For this intensive production, farmers in the hamlet usually use inorganic fertilizers along with high yielding rice seeds, largely because these varieties absorb higher amounts of Nitrogen-Phosphorus-Potassium (NPK), Urea, and Diammonium Phosphate (DAP) compound fertilizers to enhance productivity and reproduce more intensively. [4] But, for many farmers, the cost of the additional fertilizer needed to increase from two to three rice crops per year proved to be a problem. As Mr. A (38 years old) put it:

The cost of fertilizer increased 1.3 times, from15 million VN dong (810 USD) for two rice crops to 19 million VN dong (1027 USD) in 2010[5] for three rice crops per hectare in a year.

He also mentioned that about 95 percent of the farmers in Thoi Thuan hamlet had to buy fertilizer on credit and pay the shop owners at the end of the rice crop with an interest rate of three percent per month, because they did not have enough cash to purchase agricultural materials including fertilizers. This investment is high in comparison to their net income.

Farmers in the study hamlet tend to broadcast the NPK compound fertilizers about five times during each rice crop to supply the nutrients needed for properrice growth. Many farmers in Thoi Thuan rely on family members to broadcast fertilizer, while others hire local laborers to do it when family members are not available. According to Mr. A, the high amount of inorganic fertilizer used intensively for rice fields each year is making the soil hard (chai), which is problematic. In 1986, the study hamlet experienced an outbreak of brown plant hopper insects due to a shortage of agricultural extension workers and a lack of insecticides. High yielding rice varieties were particularly impacted. As farmers switched from two to three crops in the 1990s, they faced an increased risk of rice pests (De 2008). Farmers, most of whom had only limited knowledge of rice pests and ways to control them, resorted to applying insecticides more than before (e.g. about four applications per crop, or as many as 12 applications for an annual three crops). As a Kinh farmer, Mr. B, noted in 2010:

The cost of pesticides increased 1.5 times, from 9 million VN dong for two rice crops to 14 million VN dongfor three rice crops per hectare in a year because by adding the extra rice crop per year, there are more pests.

However, many farmers also applied integrated pest management (IPM)[6] to protect rice fields during this period, which was a better choice for protecting human and environmental health.

e) *Attempts to Contract With A Particular Company to Raise A Particular Type of Rice*

In 2005 the People's Committee of Thoi Lai district began encouraging farmers in Thoi Thuan hamlet to produce high quality rice varieties such as Jasmine and OMCS 2000, which the farmers contracted to sell for the Mekong Food Company (MFC)[7] at the price of 3 million dong per ton for the first rice crop of 2006-2007. The People's Committee of Thoi Lai helped the farmers obtain the contract. This contract fit under Decree No.80 of the Central Government (2002), which covers the purchase of agricultural or rice products by companies. Some farm households that had at least one hectare of farmland and that agreed to produce under the contract were able to receive 40 percent of the seed price from the district agricultural office for the first year (Individual interviews May 2007). Despite the potential benefit of reduced seed prices, contract rice production was not very popular in my study village. Given the complicated system of different actors including banks, companies, local authorities, middlemen and farmers, the networks do not cooperate closely and the farmers are frequently excluded from voicing their views. My fieldwork also indicates that many farmers in Thoi Thuan did not want to produce the special rice varieties like Jasmine, even though they are more profitable than the ordinary rice varieties like IR50404, because Jasmine must grow for a longer duration and is easily infected by insects and pests. Moreover, in order to meet Mekong Food Company standards, the moisture content of Jasmine rice must be standardized at 14 percent. To achieve this standard requires careful work that costs the farmers more than what they normally spend on other types of rice. Therefore, most of the farmers in my study preferred planting ordinary rice varieties like IR 50404, even though the product prices and profits for this variety are lower than for Jasmine rice. Ordinary rice

[4] I have never seen the farmers use organic fertilizers in their rice fields in Thoi Thuan hamlet.

[5] 1USD = 18.500 dong in 2010

[6] According to definition from the University of California's "Integrated Pest Management On-Line," Integrated Pest Management (IPM) is a process you can use to solve pest problems while minimizing risks to people and the environment. IPM can be used to manage all kinds of pests anywhere—in urban, agricultural, and wild land or natural areas (University of California 2000).

[7] Mekong Food Company (MFC) is a joint-stock company

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varieties like IR 50404 produce high yields, are easy to grow, and can be sold at the farm gate, even with high paddy moisture. Many farmers in my study felt that it is inconvenient to bring Jasmine products to the MFC's rice miller to sell it, both because they have to pay for their own transportation and may have to dry the rice seeds again and again until they reach the acceptable moisture level.

According to farmers, contract rice farming was less attractive as it was difficult to achieve the high quality requirements of the MFC. According to the opinions of both the local authorities and the MFC, farmers and the MFC have not yet attained the common contract goals of high quality rice production in varieties such as Jasmine (Individual interviews June 2008). In 2008, the number of farmers in the hamlet who participated in the contract farming of Jasmine 85 and the other rice seeds desired by the MFC was reduced, and production for the MFC stopped completely in 2009, largely because neither the farmers nor the MFC have kept the agreements of the rice production contract. According to my research, the contract that MFC had negotiated with farmers gave the company higher profits, while the farmers experienced greater difficulties and costs to obtain the higher standard of rice quality required by the MFC. Some farmers became involved in contract production because 40 percent of the costs of rice seed were subsidized for the first year and because the local People's Committee had actually encouraged local farmers to begin contract farming as a means of diffusing these high price rice seeds in the community[8].

In 2008, the crisis in the global economy crisis dramatically affected farmers' livelihoods in the research site and in the Mekong Delta in general because many areas were cultivated with the ordinary rice variety IR 50404, which was difficult to trade because it could not be exported under the restricted standards, while at the same time there was a surplus of this rice in the domestic market. The global crisis may inspire more farmers in Thoi Thuan to switch to Jasmine rice production for export because of better export potential.

V. Impacts

a) *New Farm Labor Requirements in Context of Local Labor Shortage*

Beginning in 2000, the size of the farm labor force in Thoi Thuan hamlet began to decline moderately due to increasing industrialization and urbanization in Cantho, the nearby Binh Duong industrial zone, and Ho Chi Minh City. According to my interviews, particularly since 2005, the farm labor force has been decreasing considerably because so many young people have moved to urban areas or industrial zones to work in manufacturing companies. According to my data, 30 percent of interviewed households had at least one member working in an urban area (Key Informants Interview 2008). This out-migration has created a shortage of local labor for the three annual rice harvest seasons, leading to a rapid increase in the cost of rice harvesting in the study hamlet compared to what it was prior to 2000. In 2000 the local cost of harvesting rice was 700.000 VN dong per hectare in 2000, while in 2009, the cost had more than doubled to 1.500.000 VN dong per hectare (Key Informants Interview 2010).

b) *Women and Men's Labor Increased*

One way to grapple with the increased farm labor needs in the context of overall local labor shortage was to increase women and men's labor. In the study hamlet, the share of women in the overall rice production labor force was about one-third of the total farm labor force in both 1993 and 2009 (Tuyen 2011). But, the number of working days women have devoted to agriculture increased by 30 percent between 1993 and 2005 (Tuyen 2011). [9] In 1993, when farm families in the hamlet were growing only 2 crops a year, women spent 90 labor-days per hectare per year. But, by 2005, when farm families in the hamlet had begun raising 3 rice crops per year, women spent 117 labor days per hectare per year. Similarly, men's labor days increased as well and the share of men in the overall rice production labor force was about a half of the total farm labor force in both 1993 and 2009 (Tuyen 2011).[10]

c) *Increased Reliance on Seasonal Agricultural Wage Labor From Soc Trang*

Because of this labor shortage, in order to meet the new labor requirements for intensifying rice production, since 2000 most farmers in Thoi Thuan have relied not only on increased hours of women and men workers but also on seasonal agricultural wage labor from nearby Soc Trang province. In 2009, migrant Khmer workers from Soc Trang provided 75 work days per hectare and supplied at least 20 percent of the total labor force for rice production overall; But they provided 70 percent of the total hired labor for rice harvests in this year. The Soc Trang workers who help with the harvest in Thoi Thuan are mainly poor land-holding and poor landless Khmer ethnicity people; in general, their resources in terms of land, cash and education are

[8] This sort of government subsidy and promotion of seeds to benefit one corporation (MFC) runs counter to free market capitalism where producers make their own decisions and businesses have to negotiate contracts that are acceptable to producers or not have any producers and thus fail as businesses. This seems like a remnant of state-dominated agriculture left over from pre-Doi Moi times.

[9] These statistics included women who are members of farm families in the research hamlet as well as women migrant workers.

[10] These statistics included men who are members of farm families in the research hamlet as well as men migrant workers.

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limited. After the harvest season has finished in their home province, they work as hired labor for other farmers' rice harvests, moving from province to province in the Mekong Delta (Tuyen 2011). Agricultural wage labor is a key part of the livelihood of Soc Trang migrants during the rest of the year.

d) Increased Inequality

While the intensification of rice production in Thoi Thuan Hamlet has resulted in increased production, several negative impacts have emerged. One of these is increased inequality between farmers with medium or large land holdings and farmers with smaller or no land holdings. According to one a leader of Thoi Thuan hamlet's farmer association (2007 interview):

Not all can afford to enlarge land holdings. Therefore, the better-off and the medium farmers can have capacity to buy farm land to enlarge their land holdings. Then, those farmers can access easily new inputs such as hybrid seeds like high yielding rice varieties from the Agricultural Extension Department at the district level and buy fertilizer from the private shops, while the poor farmers do not have enough capital to buy land to enlarge land holdings and access to hybrid seeds from local Agricultural Extension Department and access to fertilizers from local private shops. This reflects that the poor farmers have limitation of household capitals comparing to those of the better-off and the medium farmers. Thus, the poor farmers are difficult to obtain the supports from the local government.

Other countries, including India, have encountered similar problems with increased inequity between better-off and less well-off farmers as a result of Green Revolution policies (McMichael 2012).

e) Not all Farmers are Selected as "Advantaged Farmers" For Trainings

In order to improve its agrarian policies after Doi Moi, Vietnam's government has implemented many programs to support the livelihoods of farmers. In addition to expanding agricultural extension and communication of government policies such as plans regarding farming, the local authority of the People's Committee selects "advantaged farmers" (who are better-off or medium farmers rather than poor farmers) to participate in training courses, workshops and field trips on agricultural production technology which are organized by plant protection companies (the pesticide and herbicide companies) and agricultural extension technicians of Co Do district. This sort of training allows them to obtain information on farming, including using effective fertilizers and insecticides, and to gain access to local agricultural material shops including private businesses selling fertilizers and insecticides. According to records of the leader of the Farmer Association of Thoi Thuan B hamlet, about 70 percent of invited farmers participated in training courses.

While it might be helpful to train farmers to facilitate Green Revolution policies, According to local authorities, farmers selected to be trained to apply the new agricultural technologies were restricted to medium and better-off farmers because only they have large enough land holdings and sufficient capital and education to take advantage of them. Thus, not all the farmers in the hamlet had an opportunity to access and apply Green Revolution technologies. Poor farmers, who are most at need of assistance, were excluded.

f) Not all Farmers are Willing to Follow With Recommendations of the Local Government/ People's Committee

While the intent of the local government may have been to intensify rice production only in areas where it was appropriate, local people have attempted to intensify rice production everywhere, even where intensive rice farming is not appropriate. According to one local People's Committee leader (2009):

The local government actually encouraged the farmers to intensify the three rice crops a year only in appropriate places, but most local farmers did not follow these recommendations, and they tried to do three rice crops a year in any fields because of their livelihoods. So, the local authority has not enforced this recommendation upon the farmers and let them try. In fact, the local government wants to avoid risk of flood or degradation of soil fertility that can damage rice production for farmers in the fields on low ground or soil fertility overuse.

This may indicate a problem with lack of adequate research as to which pieces of land were ill-suited to intensive rice production and/or miscommunication of a policy to local farmers.

g) Contract Production of Seeds Isn't Achieving its Objective

In fact, the policy called "The Contracted Purchase of Agricultural or Rice Products by State Companies" is still far from reaching its objective, in part due to the complicated system of different actors involved, including banks, companies, local government authorities, middlemen and farmers and a lack of cooperation between actors. Frequently these actors blame other actors for their difficulties. For instance, a Joint Stock Company (JSC) blamed farmers for not selling their rice seeds to JSC at the price agreed upon in their contract; farmers instead sold them to the middlemen at a higher price. The farmers, in turn, complained that the JSC was too strict and that it was too difficult to produce seeds that it would accept, thus some farmers were unwilling to meet their contracts with seed companies. In a context of free market capitalism, it may be more difficult for the state to dictate policies such as this one; perhaps a more necessary role of the

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state is to ensure an adequate sense of rule of law so that formal legal contracts can be negotiated more easily, and, if they are broken, penalties enforced by the courts.

VI. Diversification of Farm Incomes in Thoi Thuan Hamlet

a) How this Occurred

In Thoi Thuan, like in the rest of Vietnam, diversification of farm incomes started in 1997 as farmers' incomes from rice production were decreasing. In 2000, the national government issued an official authorization to restructure agricultural production in suitable ecosystems, and since farmers in the Mekong Delta have begun to diversify (Xuan 2002:115). Those with small farms may derive higher returns by planting crops other than rice or by seeking employment in other enterprises instead of or in addition to their agricultural work. However, the practicality of diversification depends on the available opportunities and the costs and risks of new options. Farmers need both the motivation and the ability to obtain the information and resources necessary to make a change. Government interventions to encourage diversification basically try to make it easier for farmers to change and upgrade their production systems, but this remains a challenge.

In recent years, agricultural production in Vietnam has been changing. In 2001, some new annual farming models were applied in Thoi Lai district for the first time, such as growing two rice crops and one upland crop such as mungbeans or vegetables per year; growing two rice crops and one fish culture per year on the same piece of land; and one rice crop and one prawn culture on the same land each year (People's Committee of Thoi Lai 2006).

The government has encouraged farmers to practice aquaculture; raising freshwater prawns is one such opportunity. In order to promote this practice with farmers willing to try to get into prawn production, the Department for Agriculture and Rural Development of Cantho City covered 40 percent of the purchase price for juvenile prawns in 2007. Additionally, the Agricultural Department of Cantho City, in collaboration with the Fishery Department of Cantho, the Agricultural Extension Center of Cantho and the Agricultural Extension Station of Co Do district, has organized training courses on the techniques of prawn culture and rice cultivation for farmers in Thoi Thuan B hamlet.

b) Producing Different Crops Remains Unpopular

In Thoi Thuan hamlet, despite the government's efforts to encourage farmers to diversify their crops, none of the farmers I interviewed were growing upland crops such as corn or vegetables in their rice fields. However, some of them are growing mung beans of the dykes surrounding their fields.

c) Attempts at Prawn Production

In Thoi Thuan, only a few households have attempted to diversify their incomes by combining rice production with prawn production. Instead, as noted earlier, almost all of them have been trying to intensify their rice production to three crops a year. But, this intensive rice production has led to environmental problems such as water pollution and soil fertility degradation, which affect other components of production diversification. For instance, insecticides and pesticides use for plant protection polluted the water source with toxic wastes, which negatively affected prawn and fish growth, impeding effective diversification. Additionally, market problems constrain the continuity and expansion of these diverse farming patterns. The case study below illustrates some of the problems.

In 2001, the practice of alternating rice and prawn farming was adopted by five farm households along the main canal in Thoi Thuan hamlet, where they were able to exchange enough water to be able to raise prawns in their fields. For prawn production, often over 30 centimeters of water has to be kept in the field to facilitate prawn growth. Water coming into the field is pumped in one way and pumped out another way, which is a strict requirement of raising prawns but can be a problem in field management. The irrigation canals are shallow, leading to a shortage of irrigation water that sometimes impacted the second rice crop for prawn producers as well as for their neighbors who also need the water but who are not producing prawns. This shortage of irrigation water often reduces the output of the second rice crop.

Table 2, below, compares the prawn income of Mr. A, a better-off farmer who is the head of the prawn-raising club of Thoi Lai, with that of Ms. B, a better-off farmer who is the member of the prawn-raising club. Mr. A's income, is six times higher than that of Ms. B because he has more knowledge and experience in raising prawns than she does. Between 2001 and 2009, he had a prawn production failure only one time, but she had prawn production failures three times, likely due to the combination of the high cost of inputs, limited market for prawns, and the high risks of prawn production in the hamlet. In 2008, polluted water and difficult to find a source for juvenile prawns caused the failure. Mr. A, Ms. B, and other local prawn producers are likely to stop growing prawns altogether because of the heavy losses they experienced in 2008 and because none of them obtained a loan for raising prawns from a local bank in 2010, perhaps because they were unable to repay bank loans for prawn production taken in previous years (Key Informants Interview 2010).

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Table 2 : Prawn Production of Two Sample Farmers in Thoi Thuan B Hamlet, Thoi Lai, since 2001

Year	Net prawn income (Mr. A: Head of prawn-raising club)	Net prawn income (Ms. B: Member of prawn-raising club)
2001	1200	0 (no profit)
2002	1355	645
2003	1590	-330 (loss)
2004	2200	1320
2005	2500	125
2006	2000	-625 (loss)
2007	1690	1000
2008	Lost	Lost
2009	Did not raise	Did not raise
Average	1390	240

Sources : Individuals Interviews, Dec. 2007, Jun. 2008, Jun. 2009 and Mar. 2010

So, while raising prawns usually produced higher incomes, it also carried higher risks than rice production. As one female Khmer farmer noted:

A farmer has experience in raising prawns in the field since 2001, with an average income of 1390 USD for a six month prawn season. The benefits of prawn production are higher than those of rice, but raising prawns in the rice field can be high risk. For instance, farmers can face risks when juvenile prawns which will produce more eggs and big claws are bought. These prawns will grow slowly (Interviews 2009).

d) Attempts at Fish Production

Within the hamlet, only a handful of households raise fish in ponds; most do not have fish ponds due to the small size of their land holdings (e.g. an average of 0.6 ha for farmers in my study), the investment in digging ponds is very high, and because the water from intensive rice cultivation could affect their aquaculture production in a negative way (e.g. Pesticides applied to rice paddies get into fish ponds and kill the fish) (Individual interview, November 2008). The few farmers in the hamlet producing fish raise either juvenile or adult fish and sell them to merchants at their farm gates. However, switching to fish production is risky. For instance, in 2007, one poor, landless farm household tried to produce fish in their rice fields for the first time. The farmer rented farmland from his mother and borrowed money from a local money lender to buy fingerlings. But, because of water problems and lack of experience, their attempts to raise fish led not only to a loss of production, but also a loss of income and an accumulation of debt (Individual interview, November 2007). In 2008 this household had to escape the money lenders by migrating to another district to work in off-farm activities.

e) Overall Evaluation of Diversification Efforts

Few households in Thoi Thuan were diversifying their production into different types of crops. A few farm households had, however, moved into prawn or fish production. But, while diversifying into fish or prawn production may increase the incomes of some farm households, like Mr. A, above, diversification also involves greater risks. Many poor farmers, who cannot risk a potential loss of a significant part of their annual income or going into debt, can ill-afford the switch.

VII. Conclusion

Since "Doi Moi" began in 1986, the Vietnamese government has expanded programs supporting farmers. As this case study has shown, countries agricultural policies have encouraged farmers toward intensive production of three rice crops per year using new high yielding rice varieties. However, many small farmers and local government officers as well feel that it is too difficult to practice the combine-harvesters for the rice harvest in their small fragmented pieces of fields with their small dikes in this village. Despite an increase in the number of hours women and men are spending in agricultural production, farmers have had to rely more and more on hired laborers, particularly during the three harvest periods. The use of hired labor reduces farmers' profits.

The change in policy has helped intensify rice production in the Mekong Delta. In the study hamlet, the intensification of rice land utilization has increased rice yields by 1.1 tons per hectare and has raised the net rice incomes of the farmers in the hamlet by 13.5 million dong per hectare; this policy has positively impacted the farmers' incomes, even though their expenditures on hired labor have increased.

The farmers in the study hamlet have produced more rice for consumption and export than previously; however, the small farmers in particular still faced many difficulties in their lives, such as shrinking farmland size and high cost of production inputs such as producing the new varieties and/or producing 3 instead of 2 crops per year, which requires more intensive use of fertilizers and pesticides. In the hamlet, large farmers are more likely than small farmers to be selected for trainings and workshops on applying new agricultural technologies and only the farmers with farm land of one or more hectares can participate in contract farming with

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Mekong Food Company to produce new rice seeds, which may, ultimately, give them an advantage.

In Thoi Thuan, government efforts to encourage farmers to diversify their crops and move to higher-value crop production like prawns or fish for both domestic and international markets have not been particularly successful, partly due to the high set-up costs and high risks that some farmers have experienced. As the average landholding size in the research hamlet is rather small and because industrialization and urbanization are expanding, in the future the farm households may have one or more members switch to non-farm employment as a way of diversifying their household income.

VIII. Recommendations

Based on the evidence of "Doi Moi" and agrarian reform from this village, some recommendations can be suggested. The local government target small farmers by including them in training workshops and offering them added incentives to intensify crop production or diversify their production. Crop insurance as well as rural, off-farm employment opportunities could help minimize the risks to their livelihood and reduce some of the inequities resulting from the shift towards a free market, capitalist economy. Because efforts to intensify rice production were impeding efforts to diversity farm incomes into fish or prawn production because of environmental problems, the Centers for Agricultural Extension of provinces should work to maintain the long-term sustainability of intensive rice production through new technical application such methods as the "1 play and 5 reductions" plan.[11] Private and state-owned businesses contracting for seed production, as well as the farmers who sign on to the contract, must follow the terms of the contract, even if rice prices fluctuate over time. One way to enhance the fulfillment of contracts would be for the government to expand its efforts to spread the rule of law and strengthen the legal system so that both contracting companies and farmers who sign contracts can be sure that the terms of the contract will be followed and have legal recourse through the courts if legal contracts are not followed.

In terms of research, since agricultural policies may impact different communities in different ways, in the future, research should be conducted in more villages so that the impacts can be understood more comprehensively. Also, to better understand these changes over time, longitudinal studies should be conducted.

[11] The "1play and 5 reduction" plan includes "1 for using certified rice seed and 5 for reducing amount of rice seed, fertilizer, pesticide, irrigated water and labor." This is a way to simultaneously limit damage to the fertility of farm land, reduce the cost of production, and increase rice yields.

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