THE SOCIOECONOMIC IMPACTS OF SHRIMP FARMING DEVELOPMENT ON HOUSEHOLDS IN CHU CHOT HAMLET, A VIETNAMESE RURAL AREA

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Tran Minh Tri

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The thesis entitled:

THE SOCIOECONOMIC IMPACTS OF SHRIMP FARMING DEVELOPMENT ON HOUSEHOLDS IN CHU CHOT HAMLET, A VIETNAMESE RURAL AREA

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CONTENTS

LIST OF TABLES x

LIST OF FIGURES xiii

ACRONYMS AND ABBREVIATIONS USED xv

GLOSSARY xvii

Chapter

1. INTRODUCTION 1

Background of the Study 1

Statement of the Problem 3

Research Objectives 6

Significance of the Study 7

Scope and Limitation of the Study 8

Review of Related Literature 8

Socioeconomic impacts of shrimp farming on households 9

Shrimp farming: An opportunity for local people 9

Shrimp farming: A threat to impoverish the poor 11

Concept of capital, types of capital and interrelations among them 13

Analytical Framework. 17

Methodology 20

Research setting 20

Research design. 21

Research techniques..... 23

Respondent and key informant selection..... 25

Data Analysis..... 26

Thesis Organization..... 26

2. PROFILE OF THE STUDY SITE..... 28

Profile of Ninh Thanh Loi Commune..... 28

Geographic and demographic characteristics..... 28

Economic features 31

Land use pattern 32

An Overview of Chu Chot Hamlet. 34

Geographic features..... 35

Natural features..... 37

Socioeconomic characteristics 41

Organizations 48

Public services 49

Summary 52

3. THE EXPANSION OF SHRIMP FARMING AND ITS SOCIOECONOMIC IMPACTS ON THE COMMUNITY..... 55

Shrimp Farming Method 55

Preparation of shrimp farm..... 55

Putting fingerlings on vuong 56

Irrigation 58

Harvest..... 59

Crop pattern 59

The Expansion of Shrimp Farming..... 61

Socioeconomic Impacts of Shrimp Farming Expansion 62

Income sources, actual income, and income distribution..... 63

Landholding and land distribution..... 71

Housing and holding of valuable assets 73

Education 75

Family and social relations 77

Summary 79

4. CHANGES IN HOUSEHOLDS' LIVING CONDITION AND ITS CORRELATES 82

Changes in Households' Living Condition..... 82

Income 85

Landholding..... 90

Housing and holding of valuable assets 94

Factors Determining Patterns of Change in Living Condition. 97

Socioeconomic status 98

Labor force 100

Education 103

Land size 107

Credit access 109

Attending technology training/s 111

Organizational membership 113

Discussion with neighbors, friends, and relatives about shrimp farming technology 115

Summary 118

5. CAPITAL MOBILIZATION OF SELECTED HOUSEHOLDS 121

Improvement of Living Condition 121

Description of capital holding and capital mobilization in study cases 122

Discussion 127

Causes of Unimproved Living Condition 129

Description of study cases 129

Discussion 135

Summary 137

6. SUMMARY OF FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS 139

Summary of Findings 139

Advantages and disadvantages of the study site 139

Expansion of shrimp farming and its socioeconomic impacts 142

Income change as a result of shrimp farming expansion 143

Landholding and land distribution change as a result of income change 143

Household housing and material conditions as improved by income increase 144

Heightened educational attainment as one of the outcomes of shrimp farming expansion 144

Relationships as affected by shrimp farming 144

Different patterns of change in household's living condition and factors determining the difference 145

Determinants of the improvement of household's living condition 146

Conclusions 149

Recommendations 152

For policy makers and local government 152

For farmers 155

For researchers 156

APPENDICES 160

BIBLIOGRAPHY 177

LIST OF TABLES

Table		Page
1.	Research Topics, Data Sets, Data Sources, and Data Collection Techniques	23
2.	Types of Key Informants and Respondents	25
3.	Percentage of Land Use Pattern in Ninh Thanh Loi Commune	33
4.	Irrigation System of Chu Chot Hamlet	38
5.	Percentage Distribution of Land Use Pattern in Chu Chot Hamlet	39
6.	Percentage Distributions of Sample Households, by Landholding	40
7.	Percentage of Land Distribution of Sample Households	41
8.	Percentage Distribution of Sample Households, by Demographic Features	43
9.	Income Structure of Sample Households	45
10.	Percentage Distribution of Sample Households, by Income	46
11.	Holding of Valuable Assets of. Sample Households	47
12.	Percentage Distribution of Wealth among Sample Households	48
13.	Change in Landholding and Land Distribution (2001-2006)	72

Table | Page

14. Change in Housing and Asset Holding (2001-2006) 74

15. Change in Educational Attainment of People in “6-23” Schooling Age (2001-2006) 76

16. Different Patterns of Change in Households’ Living Condition 83

17. Reasons for Changes in Household’s Living Condition 84

18. Change in Income of Household Groups (2001-2006) 86

19. Change in Landholding of Household Groups (2001-2006)..... 91

20. Change in Estimated Value of Houses and Valuable Assets of Household Groups (2001-2006) 95

21. Percentage Distribution of Household Groups, by Change in Living Condition and Socioeconomic Status..... 99

22. Percentage Distribution of Household Groups, by Change in Living Condition and Number of Workers..... 101

23. Percentage Distribution of Household Groups, by Change in Living Condition and Household Size 103

24. Percentage Distribution of Household Groups, by Change in Living Condition and Educational Level of Workers..... 104

25. Percentage Distribution of Household Groups, by Change in Living Condition and Frequency of Learning Shrimp Farming Technology via Television 106

Table Page

26. Percentage Distribution of Household Groups, by Change in Living Condition and Frequency of Learning Shrimp Farming Technology via Radio 106

27. Percentage Distribution of Household Groups, by Change in Living Condition and Reading Materials on Shrimp Farming Technology 107

28. Percentage Distribution of Household Groups, by Change in Living Condition and Land Size 108

29. Percentage Distribution of Household Groups, by Change in Living Condition and Credit Access 110

30. Percentage Distribution of Household Groups, by Change in Living Condition and Participants In Technology Training/s 112

31. Percentage Distribution of Household Groups, by Change in Living Condition and Organizational Membership 114

32. Change in Living Condition, by Frequency of Discussion with Neighbors, Friends, and Relatives about Shrimp Farming Technology 116

LIST OF FIGURES

Figure		Page
1.	Analytical Framework	19
2.	Location of Bac Lieu Province, Hong Dan Province, Ninh Thanh Loi Commune, and Chu Chot Hamlet	29
3.	Percentage Distribution of Ninh Thanh Loi Commune, by Total GDP Shares	32
4.	Map of Chu Chot Hamlet	36
5.	Seasonality of Water Salinity	37
6.	Kinds of “Moving” Markets	52
7.	Black Tiger Shrimp	56
8.	Typical Shrimp Farm or “Vuong”	57
9.	Calendar of Crops	59
10.	Timber Gardens Newly Converted to Shrimp Farms	62
11.	Percentage Distribution of Rich Household Group, by Change in Income Shares (1996-2000)	64
12.	Percentage Distribution of Average Household Group, by Change in Income Shares (1996-2000)	65
13.	Percentage Distribution of Poor Household Group, by Change in Income Source (1997-2000)	66
14.	Changes in Income Score of Household Groups, by Social Status (1996-2000)	68

Figure		Page
15.	Lorenz Curves of Income Distribution (2001-2006)	71
16.	Lorenz Curves of Land Distribution (2001-2006)	73
17.	Ways To Mobilize Capitals toward the Improvement of Households' Living Condition	128
18.	Ways Leading to the Setback of Households' Living Condition	136

ACRONYMS AND ABBREVIATIONS USED

ADB	Asian Development Bank
DFID	Department for International Development
EJF	Environmental Justice Foundation
FAO	Food and Agriculture Organization
GB	Great Britain
GDP	Gross Domestic Product
ha	hectare
HS	household survey
IDI	in-depth interview
IMF	International Monetary Fund
IRRI	International Rice Research Institute
km	kilometer
MoFi	Ministry of Fisheries
mt	metric ton
NGO	nongovernment organization
PO	Participant observation
PRA	Participatory Rural Appraisal
SDC	secondary data collection
SFT	shrimp farming technology
sq m	square meter

WB	World Bank

GLOSSARY

Chiu kho lam on. Hard working

Con tom om goc lua. Raising shrimp and growing rice in the same field at the same time

Khong lo lam an. Lazy to work, wasteful in spending, careless about the future

Lu. A kind of shrimp-catching gear

Moi. New

Muong. Water drain

Veo. Small pond that is used to familiarize shrimp with new water environment

Vuong. Shrimp farm

Xu. Cent

CHAPTER 1

INTRODUCTION

Background of the Study

Shrimp is an important source of protein-rich food. The demand for it has progressively grown in recent years, as shrimp products become an increasingly popular feature of people's diets throughout the world. To meet this accelerating demand—coming mainly from North America, Europe, and Japan—many governments, particularly those in developing countries, have encouraged shrimp farming development as a source of economic growth and a strategy to alleviate poverty.

In recent decades, shrimp farming has expanded rapidly in many regions of the world, especially in the subtropical and tropical lowlands of America and Asia. According to the Food and Agriculture Organization ([FAO] 1999), the production of farmed shrimp in the world increased by 300 percent from 1975 to 1985, and continuously grew at the rate of 250 percent from 1985 to 1995. The FAO also reported that in 1998 alone, the world's shrimp farmers produced an estimated 840,200 metric tons (mt) of whole shrimp in an operating area of 999,350 hectares (ha). More recently, Rosenberry (2004) calculates that from 1999 to 2004, world production of farmed shrimp doubled, from approximately 1 million mt to an estimated 2 million mt.

Among countries, China and Vietnam rank as the most active shrimp farming countries in the world, exhibiting very high shrimp farming development rates in recent years. China now leads the world in the production of farmed shrimp with about 450,000 mt in 2004, surpassing Thailand which held the crown for over a decade (ibid.). Following China, as predicted by Rosenberry (2004), Vietnam would probably produce around 350,000 mt of farmed shrimp in 2004, also surpassing Thailand which would probably produce only around 300,000 mt.

Vietnam, with its 3,200-kilometer coastline, has great potential for sustaining shrimp farming as a major source of revenue. Indeed, in the last decade, the expansion of shrimp farming in the country has been spectacular. Vietnam's Ministry of Fisheries (MoFi) and the World Bank ([WB] 2005, 6) report, for example, that the area cultivated for shrimp farming in the country leaped more than fivefold, from about 100,000 ha in 1991 to 550,000 ha in 2003; between the one year period 2000-2001, in particular, the increase almost doubled from 250,000 ha to 478,000 ha.

What brought about this growth? Both the MoFi and the WB concede that the most dramatic increase in the size of shrimp-cultivated area followed the government's decision to allow farmers to convert unproductive rice fields, uncultivated areas, and saltpans into aquaculture ponds. Similarly, the report, *The Comprehensive Poverty Reduction and Growth Strategy*, approved by the Vietnamese Prime Minister in 2003 (IMF 2003), also notes that "the Vietnamese Government has continued to support the planning and construction of dykes, water inlet sluices, and channels; and provide public goods such as extension services,

quarantine, quality control for breeding, and feeding in order to help farmers increase production efficiency and achieve sustainability in aquaculture."

Statement of the Problem

It is obvious that shrimp farming has been developing rapidly following the Vietnamese Government's strategy. But what does the growth of shrimp farming bring about? What are its impacts on the communities engaged in shrimp production? Contrary views about impacts of shrimp farming development prevail. In Vietnam's aquacultural official reports, shrimp farming, in general, is considered a source of revenue, contributing to economic growth and poverty reduction. Consequently, the Vietnamese Government continues to support shrimp farming.

In contrast, nongovernment organizations (NGOs) and newspapers report shrimp farming as a risky business that threatens farmers' livelihood. The Environmental Justice Foundation ([EJF] 2003, 17) cites the experience of a shrimp farmer in Xuan Tu Village, Van Ninh District, Khanh Hoa Province in Vietnam, He shares, "Shrimps have small mouths but they can eat my house and my motorbike—if they are lost, I lose everything." As a way to explain the risky nature of shrimp farming, Huu, an engineer who is drawing on expertise culled from American universities and from a California biotechnology firm, explains the risky nature of shrimp farming: "Raising shrimp is more difficult than raising a baby. A shrimp doesn't cry when it's sick" (cited in Cohen 2002).

Given the risk in shrimp farming, the rate of failure from shrimp farming was found to be high. In 1999, Oxfam Great Britain (GB) estimates that the rate of failure from shrimp farming in Duyen Hai, Tra Vinh Province is 50 percent. Le Quang Binh (in Oxfam GB) estimates that in 2001, 40 percent of shrimp harvests in Tra Vinh failed, with failure rates in some districts (such as Tra Cu) as high as 70 percent. In Dam Doi District of Ca Mau, it has been estimated that 80 percent of shrimp farmers are currently losing money; in Tuan Le Village, Khanh Hoa, 70 percent to 80 percent of shrimp harvests failed in 2001 (EJF 2003, 17).

Regarding the impacts of shrimp farming on farmers' living, the article *Tragedy of Shrimp* in Tuoi Tre newspaper notes that shrimp farming in Bac Lieu seriously damaged farmers' living. A woman complains: "When cultivating rice, my house was full of rice. I never thought of lacking rice. Now (after failure from shrimp farming) there is sometimes not even a wisp of rice for cooking soup." Moreover, shrimp farming also brought farmers huge debts that are mostly unpaid. An estimated 80 percent of land use certificates of farmers in Vinh Hau Commune are now deposited in banks. This is a consequence of a series of shrimp crop failure that farmers experienced in recent years, following several years of success with shrimp farming. Duong, a farmer and a hamlet leader, says:

> My family has never experienced difficulty and debt like now. I have no other source of income, except my monthly salary of VND 300,000 from the government. Given such a situation, I find it difficult to pay my overdue debt of VND 100 million. (Tuoi Tre 2007)

Although some impacts of shrimp farming have been mentioned in reports and in the media, little or no research has been done systematically on the issue. Thus, this study aims to supplement the existing literature on the impact of shrimp farming and look into some factors that determine farmers' success or failure in shrimp farming. The study chooses Chu Chot Hamlet, Ninh Thanh Loi Commune, Hong Dan District, Bac Lieu Province in Vietnam as the study site.

Chu Chot Hamlet has experienced a shift from rice production to shrimp farming since the 1990s, after several farmers applied successfully the shrimp farming technology that they had learned from other places. The result of an early survey in 2001 by the International Rice Research Institute (IRRI) shows that the appearance of shrimp farming in Chu Chot Hamlet contributed significantly to the improved living conditions of the villagers, including the poor, by increasing both shrimp income and nonfarm income (Hossain, Ut, and Bose 2003). However, an observation in 2003 found that the benefits of shrimp farming have not been distributed equally among households. While some households have improved their living conditions owing to shrimp farming, others have not improved and have even worsened.

The situation in Chu Chot Hamlet prompts us to ask several questions. How did the process of shrimp farming development take place in the village? To what extent have households in general benefited from shrimp farming? Which factors determined the success and failure of households in improving their living conditions? Among those who improved their living conditions, what resources or

types of capital were used to venture into shrimp farming, and how were types of capital mobilized for shrimp farming? In turn, among those who have not improved their living condition, why could they not cope with the demands of the new livelihood project and what are causes of the failure? What recommendations can be given to enable households to benefit more from shrimp farming cultivation? Answering these questions constitute the major analytic task of this study.

Research Objectives

The general objective of this study is to identify the socioeconomic impacts of shrimp farming development on households in Chu Chot Hamlet. The specific objectives are as follows:

1. to describe the process of shrimp farming development and its socioeconomic impact on the community and the people;
2. to identify the different patterns of change in households' living conditions since shrimp farming was introduced in Chu Chot Hamlet;
3. to point out which types of resource or capital (e.g., human, financial, social, institutional, or natural capital) are associated with the success or failure of households in improving their living conditions;
4. to learn how households mobilize, if at all, available capitals in shrimp farming; and
5. to make recommendations for formulating policies related to capital building on future shrimp farming development in Vietnam.

Significance of the Study

Many reports have been written on shrimp farming development in Vietnam. Most of these documents, however, only provide general information concerning shrimp farming at the macro or meso-levels. A few studies focus on the impact of shrimp farming at the household level. Moreover, very few studies aim to discover in some detail which factors influence the success or failure of farmers in shrimp farming and how households mobilize their capitals in shrimp farming to achieve stable livelihoods. The present study hopes to supplement some of the limitations in these previous studies, at least as far as socioeconomic impacts are concerned.

Hopefully, the study's findings would be useful for policy makers in reconsidering policies on aquaculture development and poverty reduction policies; for local government in acknowledging the issue in the community; and for researchers as well as students in understanding the socioeconomic impact of shrimp farming on households' livelihoods and the factors that influence the success or failure of shrimp farming. Moreover, as aquaculture development is a common strategy in many countries, it is hoped that the study's findings are meaningful for other developing countries that have experienced rapid aquaculture development similar to that experience in Vietnam.

Scope and Limitation of the Study

Shrimp farming affects many aspects of household life. The study, however, touches only on its socioeconomic impact, not its natural, environmental consequences.

As well, the success or failure in shrimp farming stems from many factors. The study focuses only on social and economic factors, specifically the different types of resources (i.e., personal, social, natural, and institutional) that may affect farming outcomes. Other factors can be investigated in future studies.

In addition, the study was conducted in a small village with its particular characteristic; thus, the findings of the study can only illustrate or suggest what happens in the research site village or in other villages with relevant characteristics.

Review of Related Literature

This section reviews both empirical and theoretical works. Regarding the *empirical works*, the section focuses on socioeconomic impacts of shrimp farming in the previous studies. It also looks for factors that influence the success or failure of shrimp farming. In terms of the *theoretical works,* the section reviews the concept of capital and some types of capital or resource that people use to sustain their livelihood. From both empirical and theoretical issues, an analytical framework is drawn.

Socioeconomic impacts of shrimp farming on households

Shrimp farming has expanded rapidly in many areas of the world. Previous researches have shown that shrimp farming bring about both positive and negative impacts on households. In some researches, shrimp farming was found as an opportunity for local people to improve their living condition. In other studies, it was also a threat that impoverishes people.

Shrimp farming: An opportunity for local people

Researches found positive impacts of shrimp farming in some aspects. First, it has played an important role in creating more jobs for people. Second, it has increased the income of farmers. The development of shrimp farming also enables people to gain better access to public services such as roads and school.

In a study of the impact of shrimp farming development upon rural communities in Mexico, Cruz (1992) points out that the main benefit of the introduction of shrimp farming is the creation of jobs. Besides, the contribution of shrimp farming in improving local infrastructure is also noted as another benefit of shrimp farming development. For instance, the main road in the community where the semi-intensive system had been developed was repaired because it was needed to make the shrimp farm accessible, and the shrimp cooperative contributed money to repair the community's school.

Similarly, in a study done in Ecuador, Epler (1992) notes that the expansion of shrimp farming brought about an increase in the income of raisers. In addition, it also boosted local employment.

More recently, Bergquist (2001, 40) states that shrimp farming in Nicaragua has contributed to demarginalization. He writes:

> Before the shrimp farming industry was developed, many families depended only from one income source such as fishing. This one-sidedness made them vulnerable during bad times when the fish caught in the estuary could not support the households. Shrimp farming now is an alternative survival strategy that offers a combination of traditional fishing and shrimp cultivation, thus making them less vulnerable during bad times. Also, transportation and sale of both shrimps and post larvae are survival strategies that have emerged, thanks to the shrimp farming development. The fact that many shrimp farms in the Puerto Morazán area are cooperatively owned also enables more households to benefit from the activity. This way, shrimp farming has contributed to demarginalization and improved household economy for the people involved in the shrimp farming industry.

Combining findings from researches on the impact of shrimp farming in Bangladesh, Islam (2003) summarizes several positive impacts of shrimp farming in relation to the living conditions of people and their access to public services. These include improvement of households' economic conditions, improvement of infrastructure, creation of employment opportunities, and increase in education due to the higher investment of households in their children's education.

These results echo those found in a report on shrimp farming prepared by the EJF in Vietnam. The report recognizes shrimp farming as having a role in diversifying the livelihood of households. It contributes to increased household income and mitigates households' risk in areas where rice returns are low owing to

salinity and the presence of acid sulphate in the soil. The report also notes that the development of shrimp farming has increased trading opportunities for local people (EJF 2003).

Shrimp farming: A threat to impoverish the poor

Shrimp farming, however, has its downside. It has been seen, for example, as a threat to shrimp raisers or those who live in the shrimp farming communities. It can marginalize resource-poor people as well.

Chua and other authors (1989 cited in Tobey, Clay, and Vergne 1998, 32) note that shrimp farming leads to the marginalization of poor residents. They explain that "due to the nature of shrimp aquaculture (that require more capital and technology), resource-poor individuals are often excluded because of lack of capital, lack of skills, and the inability to acquire and process information related to project sitting and obtaining concessions." They also observe that shrimp farming decreases employment opportunities for poor people. They write:

> Once the pond is constructed, labor needs are limited. Farm employment ranges from 0.1 to 1.0 persons per ha (lower than that in agricultural activities). While many jobs have been created through the growth of the shrimp industry, the majority are low paying and seasonal. (Ibid.)

Similarly, Bailey's (1992) study in Indonesia points out that the intensification of shrimp farming causes the marginalization among poor farmers. He states that "the advantages of new technology from aquaculture lie with those who are relatively wealthy and well-educated; hence, new economic opportunities serve to expand the gap between the haves and the have-nots." This is because shrimp farming requires

capital and technical sophistication that are more accessible to rich or wealthier households.

Bailey's explanation reflects many researchers' assessment of the social impacts of new technologies in agriculture. For example, Griffin (1979, 26), in an effort to explain why the gap between rich landlords and poor peasants widens under Green Revolution, stresses that rich landlords possess more advantages in the rural capital market compared with poor peasants. Rich farmers do not only have easier access to credit, they also obtain lower interest rates. He explains:

> They (rich landlords) have ready access to commercial banks outside the farming locality and can obtain loans at preferential interest rates since their wealth, income and status make the risk of lending to them minimal. Moreover, the larger farmers are able to use their political influence to ensure that government credit programs cater to their needs, to the neglect of the needs of less powerful and influential cultivators. The small peasants, in contrast, have little working capital and restricted access to credit. Often his land title is disputed or his tenancy arrangement is insecure, and as a result he may not be eligible to borrow on the organized credit market. Instead, he turns to the informal market—the village moneylender, a local shopkeeper or a large landowner. Rates of interest in this market tend to be very high, in part because of monopoly elements, but more important because of the high risk of default, the lack of collateral and the large overhead costs of small loans…

In another example, Feder (1983, 47) also points out that large farmers obtain credit more easily because of their large collateral. Similarly, studies in Tra Vinh, Vietnam (Oxfam 1999 cited in WB and Department for International Development [DFID] 1999) show that wealthier households gain easier access to financial capital because they have more social capital, called "connections." As regards access to technical assistance, the 2004 Vietnam Development Report (Asian Development Bank [ADB] 2004) notes that "extension services were seen as not providing much

meaningful assistance to the poor either because the poor were not attending the training or because the services and training that the extension workers delivered were more suitable for better-off farmers."

In sum, the empirical studies have shown that shrimp farming brings about both positive and negative impacts on households. They also show that only households with structural advantages gain benefits from shrimp farming. These advantages may be seen as possession of some types of resources such as wealth, educational attainment, land, and social connections. These resources, in turn, enable household members to gain access to credit, technology, and training that will help yield a profitable shrimp farming activity. In contrast, households who lack these kinds of resources are excluded from shrimp farming and are even marginalized.

Concept of capital, types of capital, and interrelations among them

In the sociological literature, wealth, educational attainment, land, and social connections fall under the concept of capital which may be defined as resources that people may use in their livelihood strategy. Widely used among sociological theorists and development practitioners, the concept of capital has been conceptualized and categorized in different ways. For example, Bourdieu (1984) claims that there are four main types of capital: economic capital, cultural capital, social capital, and symbolic capital. He conceptualizes each type of capital as follows:

> Economic capital consists of material goods – wealth, in such forms of shares, land, or property, and income for employment and other sources. Wealth can be passed on quite easily through gifts or inheritance from parents to children.
>
> Cultural capital can take a number of forms. First, it includes educational qualifications. Second, it includes a knowledge and understanding of creative and artistic aspects of culture, such as music, drama, art, and cinema.
>
> Social capital consists of social connections – who you know and who you are friendly with; who you can call on for help or favours.
>
> Symbolic capital is similar to the concept of status and refers to "a reputation for competence and an image of respectability and honorability."

Different from Bourdieu, Burchardt, Le Grand, and Piachaud (2002, 8) argue that capital can take three forms including human capital, physical capital, and financial capital. Of these, human capital refers to genetic inheritance (e.g., family, health, housing, poverty, and social environment among others), education, and training. Physical capital refers to ownership of housing, land, equipment, and others. In turn, financial capital refers to ownership of financial assets or liabilities.

In turn, according to the DFID (1999), as seen in the Sustainable Livelihood Framework, people may use five types of capital in their livelihood. These include human capital, natural capital, financial capital, physical capital, and social capital. Each of these is described briefly below.

> Human capital represents the skills, knowledge, ability to work, and good health that together enable people to pursue different livelihood strategies and achieve their livelihood objectives. At the household level, human capital is a factor of the amount and quality of labor available; this varies according to household size, skill levels, leadership potential, and health status among others.

> Natural capital is the term used for the natural resource stocks from which resource flows and services useful for livelihoods are derived. It includes assets used directly for production such as trees, land, and surface water.
>
> Financial capital denotes the financial resources that people use to achieve their livelihood objectives such as cash, remittance, pension, and credit.
>
> Physical capital comprises the material objects that support the livelihood of the people such as secure shelter, means of production, and transportation such as tractor, car, motorbike, and bicycle. Physical capital also includes basic infrastructure and access to information to help people meet their basic needs and to be more productive.
>
> Social capital can be considered as the relationship and the interaction among people in society. This includes network relationship, such as being a member of an institution, which increases people's trust and ability to work together and expand their access to wider institutions.

Although studies categorize and conceptualize capital in different ways, they also share the argument that different types of capital are interrelated. Bourdieu (1984), for example, writes:

> It may be difficult to accumulate economic capital without the possession of some cultural, social or symbolic capital. Without educational qualifications, the appropriate taste to mix in the right cycles or to impress at an interview, the 'right' social contacts, or a reputation for competence it might be difficult or impossible to get a well-paid job. To a certain extent, one type of capital can be used to accumulate a different type of capital. The wealthy, who lack cultural capital, can spend extra money on education to help increase their children's cultural capital. Similarly, those with cultural capital can used it to make social contacts or acquire educational qualifications which might help them make money.

Similarly, Burchardt, Le Grand, and Piachaud (2002) clarify the interrelations among types of capital. They explain:

> Physical capital and financial capital may be related if, say, housing is required by taking out a mortgage liability. So too human capital may link to financial capital if it is paid for taking out a loan.

The argument also echoes in discussions of the Sustainable Livelihood Framework by DFID (1999). Moreover, several empirical studies, applying the framework, have also found interrelations among different kinds of capital. For example, Phuc (2001, 98), in a study on people's livelihood in Vietnam, emphasizes:

> Households with large landholdings (natural capital) acquire a surplus from agricultural products produced from land. By selling those products, the households earn cash income (financial capital). This cash income can be used to support their children's' schooling (human capital), to host friends and relatives (social capital), invest in buying animals or build a new house (physical capital).

Similarly, Viet (2003, 137) states:

> Those who have good human, physical, and financial capitals can resist the shock of losing land (natural capital). Conversely, those who do not possess these capitals easily fall into poverty or insecure livelihood.

On the other hand, studies of social capital also reveal relations between social capital and other types of capital. For example, Woolcock (2002, 20) writes: "one's family, friends, and associates constitute an important asset, one that can be called upon in a crisis for its own sake, or leveraged for material gain." Or in another study, Abad (2006, 2), by reviewing literatures on social capital, argues that "what you know," (human capital) and "what you have," (material capital) depend largely on "who you know" (social capital).

In short, all types of capital, as seen above, are necessary for people to secure their lives. Each type not only helps people achieve their livelihood strategies but also enables people mobilize other types of capital. In turn, lack of these types of capital may lead to marginality, poverty, or social exclusion.

Altogether, previous literatures draw attention to three main points necessary to understand the consequences of shrimp farming in the study site. First, shrimp farming creates different outcomes among households. Some households are able to reap benefits from shrimp farming, some other households, however, are excluded and impoverished. Second, structural advantages owing to possessing some types of capital, or resources, are important for farmers in shrimp farming. These advantages may be seen in terms of human capital (availability of labor, and educational attainment), financial capital (wealth), natural capital (land), and social capital (organizational membership and community ties). These capitals, in turn, enable households to gain access to institutional capitals like credit, technological training needed to engage in profitable shrimp farming and even enlarge natural capital (buying more land). Only households possessing these advantages gain benefits from shrimp farming. In contrast, households who lack these types of capitals are excluded from shrimp farming and even get impoverished. Third, there are the interrelations among different types of resources. Each type of resources can be used to acquire other resources.

Analytical Framework

The study's analytical framework bases on these three points from literature. This framework has three assumptions. First, there exist different patterns of change in living condition among households in the context of shrimp farming development in Chu Chot Hamlet. Because shrimp farming has been seen in one part as an

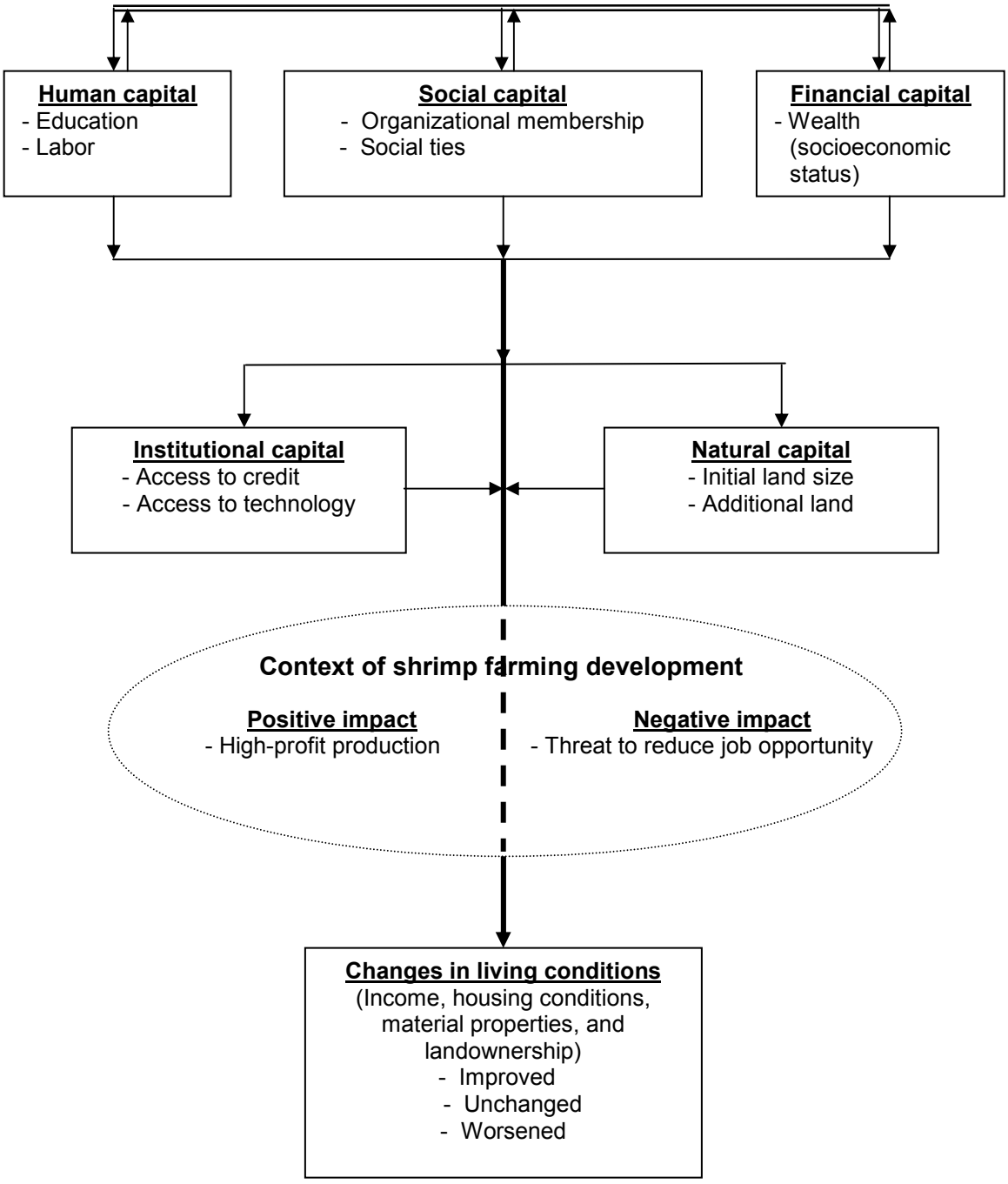
opportunity and in another part as a threat; it is probable that some households have improved their living condition, while others have remained unchanged or have worsened. Second, it is assumed that households who have structural advantages owing to the possession of several types of capital can achieve improvement in their living condition more than those households with capital shortage. Third, interrelations among different types of capital also contribute to the improvement of household's living condition.

Dealing with the first assumption, the study describes different patterns of change in household's living conditions. Change in living condition is firstly measured by a subjective measure, namely self-assessment of households about change in their living condition. The subjective measure has been categorized as "improved," "unchanged," and "worsened" (see figure 1). The subjective measure is then tested and validated by objective indicators such as income, land ownership, housing, and possession of valuable assets. Change in living condition also represents the study's dependent variable.

For the second assumption, the study tests some hypotheses to identify what factors significantly influence change in living condition. The study's independent variables are factors related to different kinds of household's capitals. Eight factors belonging to five sets of capitals including human, financial, social, institutional, and natural are assumed to be associated with changes in households' living condition. Financial capital refers to wealth which is based on a measure of socioeconomic

FIGURE 1

ANALYTICAL FRAMEWORK



status. Human capital covers educational attainment and labor force. Social capital is measured by membership in social organizations and social ties represented by frequency of interaction with neighbors, relatives, and friends. Natural capital refers to land size. In turn, institutional capital is represented by two indicators: access to credit and access to technology training.

To clarify the third assumption, the study describes how different types of capital are interrelated. For instance, human capital, as the framework assumes, may be critical in enhancing social capital, obtaining much-needed institutional capital such as credit access and technology training as well as enlarging natural resource (e.g., land). Social capital may play a vital role in increasing financial capital (e.g., wealth), enlarging natural capital (e.g., inherited land), and gaining institutional resources (e.g., credit access). All of these resources, in turn, enable households to profit from shrimp farming cultivation.

Methodology

Research setting

The study was conducted in Chu Chot Hamlet, Ninh Thanh Loi Commune in Hong Dan District, Bac Lieu Province, Southern Vietnam. A particular characteristic of the village is the existence of perennial low-saline water from both the eastern and western seas. This water characteristic restricts rice production so that only one rice crop can be cultivated per year. Not surprisingly, rice production is usually low in the village. Low-saline water is most suitable, however, for shrimp production.

Before 1994, when farmers did not know how to raise shrimp, livelihood was based mainly on rice production with low productivity. To earn additional income, some households also engaged in other activities such as handicraft making, vending on boat and catching natural fish or shrimp in channels or rice fields. By 1994, when some farmers applied successfully the shrimp-raising technology learned from farmers in other regions, a rapid shift of rice-to-shrimp production began. By 2001, all rice lands were used to raise shrimp. Some farmers applied a rice-shrimp production system that involves a combination of one rice crop in the rainy season and two shrimp crops in the dry season. Others just raised shrimp with two crops in the dry season and abandoned rice production.

Although shrimp farming was accessible to almost all farmers, not all farmers benefit from it. While some farmers could improve their living condition owing to shrimp farming, others were impoverished by the earning activity.

Research design

To achieve the research objectives of the study, a multimethod research design was applied. This design entailed a combination of survey method and field research.

For the survey method, two sets of survey data on 110 households were used. The first set, representing the baseline data, were part of a household survey conducted in Chu Chot Hamlet in 2001.[1] The data covers a broad array of indicators

[1]The 2001 household survey was conducted by the International Rice Research Institute in five rural villages of Bac Lieu Province, including Chu Chot Hamlet. The

of living conditions such as income, land, housing, material properties, and so forth.

The second set of data, representing the present situation, was collected in 2006 by a repeated survey on the same households who have remained in the area in the past five years. Although in the 2006 survey intended to cover all 154 households included in the 2001 survey, only 110 households or 71.4 percent of the sampling universe were reinterviewed. The remaining percentage of households was not in the community at the time of study; many households migrated to other places during the period 2001-2006. The questionnaire for the 2006 study used a shortened version of the original instrument used in the 2001 survey. The revised version contains only information relevant for this research.

The survey method was used merely to describe changes in household's living conditions over time and to identify households' resources that influence the status of change. It does not deal with how these factors interact mutually with resources to reap or not to reap benefits from shrimp farming. Therefore, to supplement the method, qualitative methods were also applied. Case studies of households are described to clarify how households mobilized resources in order to achieve better material life.

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survey carried out for a research project. The researcher was involved in the survey lead the interviewing and later data encoding team. He also has obtained permission from the International Rice Research Institute to use the data for this thesis. All 187 households in Chu Chot Hamlet were covered in the 2001 study, and part of the research results can be found in Hossain, Ut, and Bose (2006). However, in 2006, some respondents were out of the community at the time of the survey so only 154 households were interviewed.

Research techniques

Secondary data collection, socioeconomic survey, in-depth interview, and participant observation were the four research techniques adopted for the study: (see table 1).

TABLE 1

RESEARCH TOPICS, DATA SETS, DATA SOURCES, AND DATA COLLECTION TECHNIQUES

Topic	Data sets	Data sources	Data collection techniques
A. Community profile			
1. Physical characteristics	Administrative boundaries, water source, land use patterns, natural resources	Village leaders, commune government agencies	SDC, PO
2. Socioeconomic characteristics	Community organization, population, labor, education, health services, infrastructure, economic structure	Village leaders, commune government agencies, related reports	SDC, PO
B. Process of shrimp farming development and its following changes	Process of shrimp farming, development of changes in the community, natural changes, environmental changes, economic changes	Village leaders, commune leader, household	IDI, HS
C. Socioeconomic characteristics of households and changes in households' living conditions	Household capitals: income, land, education, labor force, properties, access to credit, technical training, and other perceived changes in living condition	Households IRRI	SDC, IDI HS

Secondary data collection (SDC). The technique allowed the researcher to gather documents related to the natural and socioeconomic characteristics of the

village. The data included village maps, statistical data, annual reports from the local government, and other related documents collected from the village leaders and the Commune People's Committee. In addition, by the technique, the researcher also obtained the 2001 survey data from the IRRI (see appendix A).

Household survey (HS). A socioeconomic survey involving face-to-face household interviews was carried out to obtain posttest data. The survey used an interview questionnaire shorter than the one used in 2001 (see appendix B). In the previous survey, the instrument collected data on socioeconomic income, land, material properties, and other relevant factors. Some unnecessary data in the previous questionnaire was excluded in the new questionnaire.

The survey targeted to repeatedly interview 154 households involved in the 2001 survey. However, due to the relocation of some households outside the community and the involvement of some others in farms far from the hamlet during the interview time, only 110 households of the 154 respondents were interviewed in the 2006 survey.

In-depth interview (IDI). After analyzing survey data, the technique of in-depth interview were carried out in order to explain deeper quantitative findings and to clarify how households mobilized their resources in shrimp farming. This instrument was a semistructured interview schedule containing open-ended and closed questions (see appendix C). In the technique, twenty-four case study households represented by the household head, all of whom were involved in the household survey, were chosen for a more detailed re-interview. Of these, eighteen cases, the

best representatives of their class/situation bracket, were selected as study cases. Other households whose situations were similar to the chosen cases were excluded.

Participant observation (PO). The technique enabled the researcher to establish good rapport with the local people and to facilitate the data collection process. In addition, the technique enabled the research to validate other data obtained using other techniques.

The data topics, data sources, and data collection techniques are summarized in table 1.

Respondent and key informant selection

Table 2 shows the types of key informants and respondents for each data collection technique.

TABLE 2

TYPES OF KEY INFORMANTS AND RESPONDENTS

Technique	Informant/Respondent	Number
Household survey	Household heads	110
In-depth interview		26
	Household heads	24
	Local officers	2
Total		136

Data Analysis

The study applied two modes of data analysis methods: quantitative and case study methods. In quantitative data analysis, the survey data were analyzed by SPSS and Excel to describe changes in household's living conditions and to test the research hypotheses. Techniques to analyze quantitative data include frequency, descriptive statistics (mean, standard deviation, max, and min), and bivariate analysis (cross tabulation). In addition, quantitative data analysis also works on computing Gini coefficient and drawing Lorenz Curve which measure level of inequality. In case study method, the study selects and describes eight study cases of households to understand how different types of resources interact mutually or households mobilize their resources in shrimp farming. The analytical framework serves as a guide to this analysis.

Thesis Organization

The study has six chapters. Chapter 1 presents the research background, objectives, significance, scope and limitation, review of related literatures, analytical framework, and methodology. Chapter 2 describes the physical and socioeconomic characteristics of the community at present. Chapter 3 discusses the expansion of shrimp farming and its socioeconomic impact on the community and its people. Chapter 4 elucidates on different patterns of change in households' living conditions (i.e., improved, unchanged, and worsened) and find out factors that influence the different outcomes. Chapter 5 clarifies how households mobilized their resources in

shrimp farming as another way to explain their improvement or failure in their living conditions. Finally, chapter 6 summarizes the findings obtained in the previous chapters, and presents the conclusions as well as the recommendations of the study.

CHAPTER 2

PROFILE OF THE STUDY SITE

The chapter has two parts: a profile of Ninh Thanh Loi Commune and an overview of Chu Chot Hamlet. The first part, based on official reports and documents, provides a general picture of the commune. The second, based mainly on the 2006 survey, gives more details related to types of capital and shrimp farming in Chu Chot Hamlet.

Profile of Ninh Thanh Loi Commune

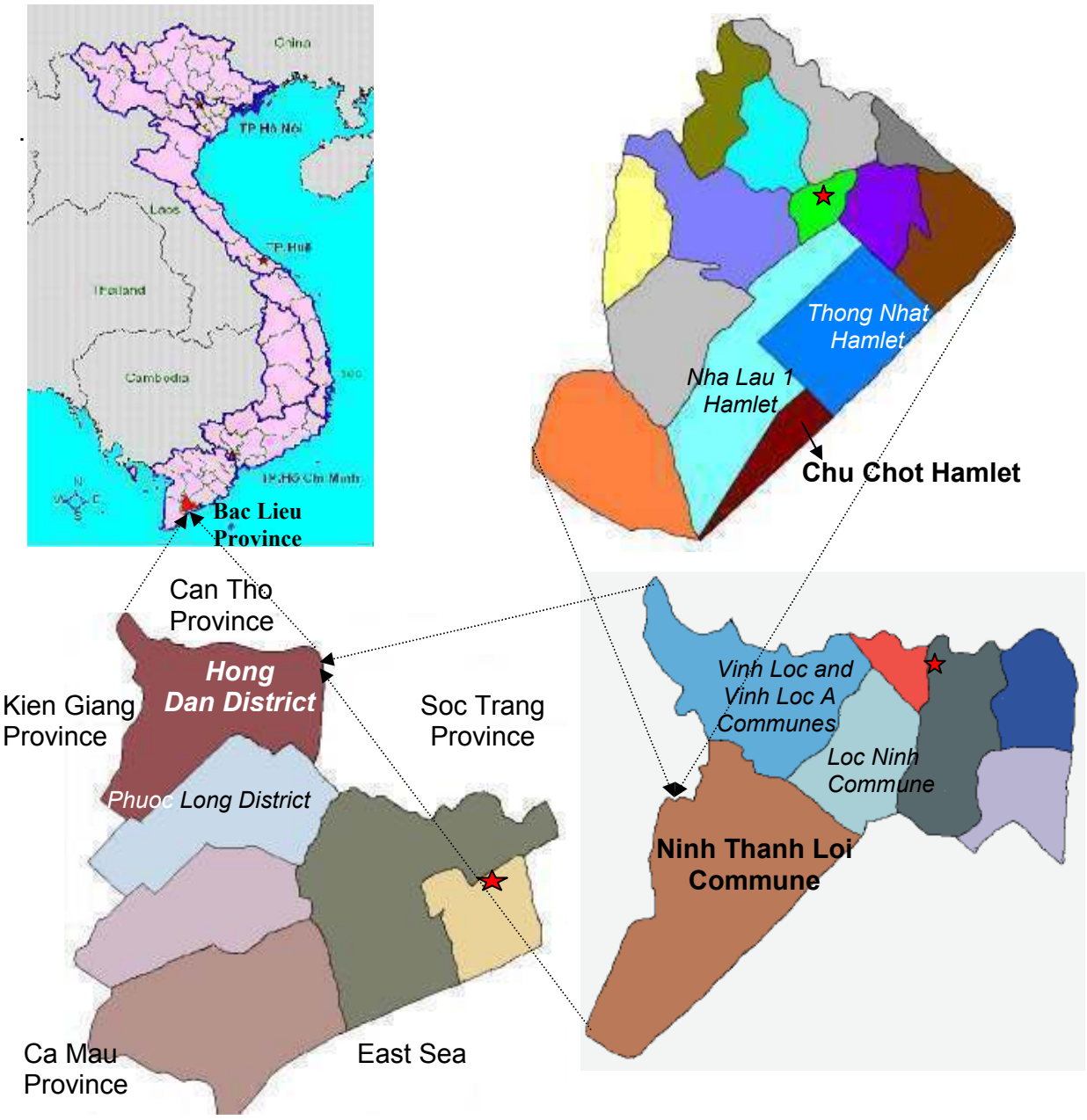
This section covers the commune's geographic and demographic characteristics, economic features, and land use pattern.

Geographic and demographic characteristics

Ninh Thanh Loi Commune is located in Bac Lieu Province which shares the boundaries with Ca Mau Province, the southernmost province of Vietnam, on the southwest, Soc Trang and Can Tho Provinces on the north, Kien Giang Province on the west, and the East Sea on the southeast. The location lays the commune's foundation that led its shift from rice production to shrimp farming, as salt water that facilitates shrimp farming comes from both the East Sea and the West Sea through Kien Giang Province (see figure 2).

FIGURE 2

LOCATION OF BAC LIEU PROVINCE, HONG DAN DISTRICT,
NINH THANH LOI COMMUNE, AND CHU CHOT HAMLET



Among eight communes in Hong Dan District, Ninh Thanh Loi is the largest. With a total natural area of 14,452 ha, the commune shares nearly one-third of the total natural area of the whole district of 42,118 ha (Hong Dan District Statistical Report 2005). The total area of Ninh Thanh Loi is more than twice as large as the second largest commune, Ninh Hoa; 14,452 ha and 5,576 ha correspondingly. In terms of land use, a high proportion of land is agricultural and aquacultural, accounting for 85.9 percent of the total land area.

In 2005, the population of Ninh Thanh Loi reached 19,630 people, of which 60.4 percent was in labor age (from 18 to 60 years old) and 50.1 percent are female. Almost all residents, about 80 percent of the total population of Ninh Thanh Loi, are land-based farmers, as estimated by the Commune Committee Chairman. The yearly average population growth of the commune from 2001 to 2005 was 1.54 percent. There has been no dramatic change of population. As estimated by the Hong Dan District 2005 Statistic Report, the total population of Ninh Thanh Loi will be 18,162 people in 2010, correspondingly the yearly average population growth rate of 1.7 percent.

The average population density of the commune is quite low, in comparison with that of the whole district and that of the other communes. In 2005, the average population density of Ninh Thanh Loi was only 118 people per square kilometer, the entire district was 237 people per square kilometer, and the second lowest commune was 188 people per square kilometer (ibid.). As explained by the People Committee Chairman, the low population density was due to historical characteristics of the

commune related to the livelihood of residents. Before 1994 when farmers did not know how to raise shrimp, the livelihood of farmers was primarily based on the cultivation of a single rice crop yearly, owing to the impact of salty water. The rice yield was also low due to the same reason. With such a condition, people found it difficult to survive in the region. Thus, few people came to live in the commune before 1994 when land could be reclaimed for free or could be bought at a low price.

Economic features

The major economic activities of Ninh Thanh Loi are land-based, mainly agricultural and aquacultural. As reported by a commune officer, agriculture and aquaculture account for about 80 percent of the total Gross Domestic Product (GDP). Of the total GDP, aquaculture, particularly shrimp farming, shares 68 percent and agriculture only accounts for 12 percent (figure 3).

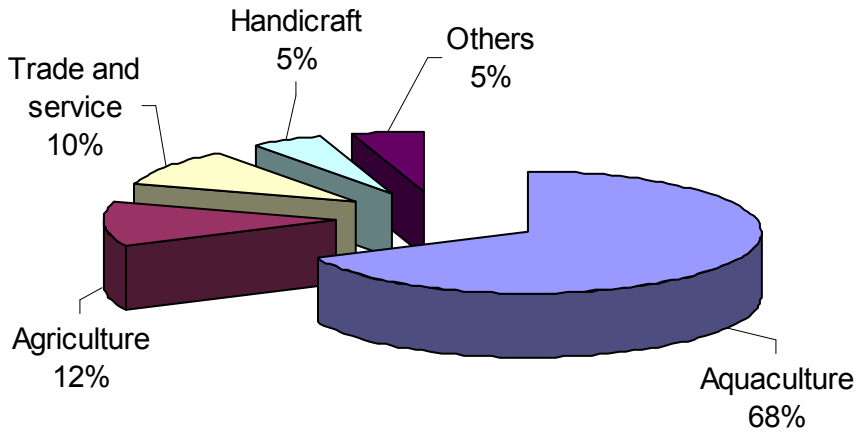
Following aquaculture and agriculture, trade and service also play an important role in the commune economy. These activities contribute about 10 percent of total GDP. In recent years, the number of enterprises in these factors has increased dramatically, from 173 enterprises in 2001 to 303 in 2002, and then 323 in 2003, 473 in 2004, to 520 in 2005.

Aside from the factors above, handicraft is a preferred livelihood source of the poor and the landless, accounting for 5 percent of total GDP. In tendency, handicraft has been redeveloping after poor people with small land size could not benefit from shrimp farming or they have lost their land as a result of failure of shrimp farming.

Last of all, as figure 3 shows, other income sources such as salary, off-farm, the like sources account for the 5 percent of total GDP.

FIGURE 3

PERCENTAGE DISTRIBUTION OF NINH THANH LOI COMMUNE, BY TOTAL GDP SHARES



Source: Estimation of the Commune Committee Chairman (2006).

Land use pattern

Because Ninh Thanh Loi is an agricultural and aquacultural commune, most of its land areas are used for such purposes. As of 2006, land used for aquacultural production share the highest proportion in total natural land area. Of the total natural land area of 14,452 ha, aquacultural land accounts for 74.1 percent (see table 3). Among aquacultural land, the land utilized for rice-shrimp combined model contribute 32.5 percent (4,700 ha). Land specializing in shrimp production accounts for 16.0

percent (2,310 ha). Land used for shrimp-other aquatic species combined model constitutes 15.2 percent (2,200 ha). In turn, land used for rice-fish combined model accounts for 10.4 percent (1,500 ha).

Owing to the rapid expansion of shrimp farming, the mixed garden area used for other planting crops such as timber (tram), bamboo cane, and palm is negligible, accounting for 13.6 percent in total natural land area. Particularly, timber planting land is 1,720 ha, accounting for 11.9 percent in the total area. Bamboo cane land is 140 ha, respectively 1.0 percent; and palm land stands about 100 ha, constituting 0.7 percent of the total.

TABLE 3

PERCENTAGE OF LAND USE PATTERN
IN NINH THANH LOI COMMUNE

Land use	Area (ha)	Percentage (%)
Aquacultural-agricultural	**10,710**	**74.1**
Rice-shrimp	4,700	32.5
Shrimp only	2,310	16.0
Shrimp-other aquatic species	2,200	15.2
Rice-fish	1,500	10.4
Mixed garden	**1,960**	**13.6**
Timber trees	1,720	11.9
Bamboo	140	1.0
Palm	100	0.7
Others (residential, construction)	**1,782**	**12.3**
Total	14,452	100

Source: Report of Ninh Thanh Loi Commune (2005).

Besides aquacultural and agricultural land, a part of natural land is also used for house, rural infrastructure, and public land allocated for infrastructure

development. The total land area for these purposes is 1,782 ha, or 12.3 percent in total natural land.

According to the Commune Committee Chairman, the commune's land use pattern has changed notably in the trend of transition from agriculture to aquaculture since 1996. The trend started when farmers recognized that shrimp farming brought higher economic profit than other crop productions. By 2005, land specializing rice production before has been converted completely to shrimp farming with two options of specializing shrimp or shrimp-rice combined model.

Similar to rice land, land used for pineapple, bamboo cane, and palm productions has also been converted to shrimp farming land. In 2005, pineapple land disappeared altogether. Timber and palm lands have been declining continuously over the years. As predicted, these lands will probably disappear if shrimp farming still remains in its high economic efficiency.

In contrast to timber and palm land, land used for bamboo cane was only converted to shrimp farming between 1996 and 2000 and not between 2000 and 2005. This took place because the price of bamboo cane had increased in the recent years due to the increasing number of people, mainly poor people, reverting to handicraft after they failed in their shrimp farming ventures.

An Overview of Chu Chot Hamlet

The section gives a brief description of the geographic, natural features, socioeconomic characteristics, organizations, and public services of Chu Chot

Hamlet, the study site. More attention is given to characteristics related to shrimp farming.

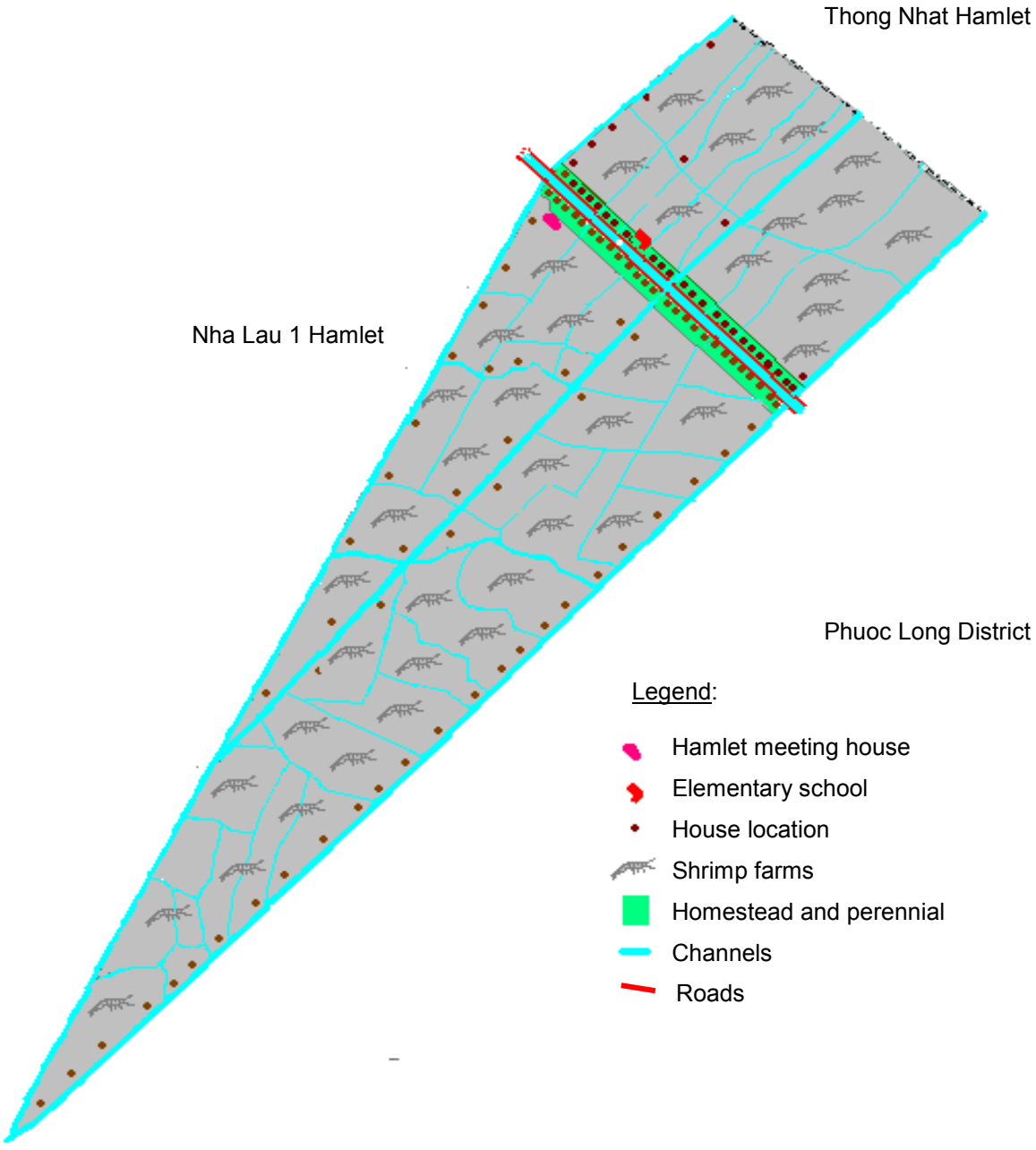
Geographic features

Chu Chot Hamlet is the second smallest among fourteen hamlets of Ninh Thanh Loi Commune. It is bordered by Nha Lau 1 Hamlet on the northwest, by Thong Nhat hamlet on the northeast, and by Phuoc Long District on the southeast (see figure 4). Chu Chot Hamlet is 10 km away from the commune center, and 35 km away from the district center, making government offices or public services distant from residents in times of need. However, it is close to the centers of neighboring commune and district, only 7 km from Phuoc Long Commune's center and 20 km from Phuoc Long District's center. Thus, local people can access in these areas markets, schools, and other basic services, except official documents.

Chu Chot Hamlet is wet lowland, lower than some other areas in the same district. With such topography, rice production cannot intensify beyond one rice crop per year. Because of that, the hamlet was a part of the wide uncultivated field in the 1960s, called *canh dong cho ngap* (the field is so wide that the dog gets exhausted when passing it). After the Vietnam War, people came to reclaim the uncultivated

FIGURE 4

MAP OF CHU CHOT HAMLET



land and transformed it into a rice field. However, the rice yield is low because of the field's acidity, salinity, and lowness.

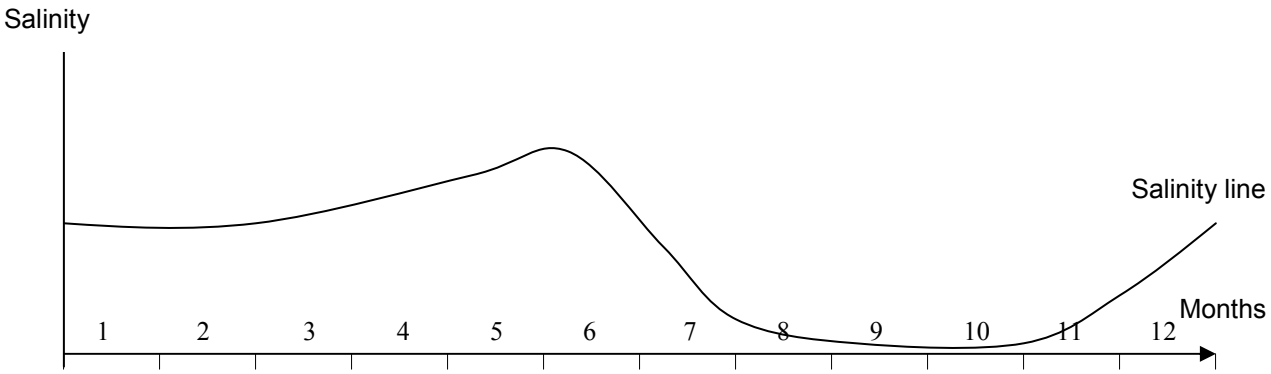
Natural features

The section covers features related to shrimp farming, including the nature of water and the channel system. Its natural resource, especially land, is also described by factors such as total land resource, landholding of households, and land distribution.

Nature of water. Having connections with both the east and the west seas, Chu Chot is intruded by sea water. Salinity of water is seasonal. It increases during the dry season, from January to June. When the rainy season comes, salinity of water reduces, making it almost fresh, and increases again when the rainy season ends. It is estimated that salinity of water is quite low, ranging from 0.3 to 1 percent in dry season and being nearly zero during rainy season (see figure 5).

FIGURE 5

SEASONALITY OF WATER SALINITY



Irrigation system. Chu Chot is traversed by many channels, both person-dug and natural ones. Table 4 lists the person-dug channels in the community. Of these channels, Pho Sinh Channel is the widest with amplitude of 25 meters. The channel passes the hamlet two kilometers in length and serves as the main water source for cultivation. Salty water favorable for shrimp farming can be taken from both the east and west seas through this channel. Similar to Pho Sinh Channel, Channels 6000, 7000, and 8000 with the same length of 10 meters are also person-dug. These channels were dug to take water from the main channel to fields. Aside from the channels above, Xa Tu Channel was re-dug from a natural channel to facilitate cultivation. Besides, a large number of small channels dug by particular households also serve as production activities.

TABLE 4

IRRIGATION SYSTEM OF CHU CHOT HAMLET

Name of channel	Construction time	Estimated amplitude (m)
Pho Sinh Channel	before 1975	25
Xa Tu Channel	before 1975	8
Channel 6000	1987	10
Channel 7000	2000	10
Channel 8000	1987	10

Source: Hamlet leader (2006).

Land resources. The total natural land of Chu Chot in 2006 is 272 ha. Of this total, 72.1 percent (196 ha) is used for aquacultural and agricultural cultivation; 15.4 percent (42 ha) are perennial gardens including timber and fruits; 8.8 percent (24 hectare) is utilized for homestead; and the 3.7 percent (10 ha) public land is

used for infrastructure system (see table 5). For aquacultural and agricultural land, a hundred percent of the land is used for shrimp farming during the dry season, while only about 40 percent of this land is used to cultivate rice during the rainy season.

TABLE 5

PERCENTAGE DISTRIBUTION OF LAND USE PATTERN IN CHU CHOT HAMLET

Land use	Area (ha)	Percentage (%)
Aquacultural-agricultural	196	72.1
Mixed garden (timber and others)	42	15.4
Homestead	24	8.8
Public land (road, channel, and others)	10	3.7
Total	272	100

Source: Hamlet leader (2006).

Landholdings. On average, each household in the hamlet owns 2.76 ha of land. The disparity of landholding among households, however, is quite high (standard deviation is 5.4). The household with the largest land area owns 52.2 ha, while some households do not have land even for building a house. It is also calculated that 20 percent of the households are landless or nearly landless, while nearly 40 percent of households own at least two hectares of land (see table 6). With such a disparity, shrimp farming is probably not applicable for all households; it may only be appropriate for those who have land or for those who can afford to rent land.

TABLE 6

PERCENTAGE DISTRIBUTION OF SAMPLE HOUSEHOLDS, BY LANDHOLDING

Groups		Number of households	Percentage (%)
Landless or near landless		22	20.00
Less than 1 ha		31	28.18
From 1 to 2 ha		14	12.73
Equal to 2 ha and above		43	39.09
Total		110	100.00
Mean of land area per household	=	27,645 (m^2)	
Standard deviation	=	54,011 (m^2)	
Max	=	522,000 (m^2)	
Min	=	0 (m^2)	

Source: Household survey (2006).

Land distribution. Inequality in land distribution is evident in Chu Chot. While 80 percent of households (four first quintiles) own only 36.5 percent of land, the rest or 20 percent (the last quintile) own 63.5 percent of land (see table 7). Another measure of distribution, namely the Gini coefficient, also shows a high level of inequality in land distribution in the hamlet. Based on the 2006 survey data, the Gini coefficient of land distribution is measured at 0.61.[1] The number is much higher than Gini coefficient of land distribution in other rural areas in Vietnam, (i.e., Gini coefficient of land distribution in Ha Noi, Thai Nguyen, Long An, and Can Tho is

[1]Gini coefficient ranges from 0 to 1. Gini coefficient of 1 implies the perfect inequality, while Gini coefficient of 0 means the perfect equality.

0.26, 0.37, 0.34 and 0.33, respectively.[2] The high inequality is a consequence of expansion of shrimp farming cultivation in the community.

TABLE 7

PERCENTAGE OF LAND DISTRIBUTION
OF SAMPLE HOUSEHOLDS

Quintiles	Percentage of land	Accumulative percentage of land
First (bottom)	0.57	0.57
Second	5.93	6.51
Third	11.28	17.78
Fourth	18.75	36.53
Last (top)	63.47	100.00

Source: Household survey (2006).

Socioeconomic characteristics

Human resources and financial capital determine socioeconomic characteristics. Human resources refer to demographic features (gender, age, and education) and occupation pattern, while financial capital covers income and income sources, income distribution, and holding of valuable asset.

Demographic features. The population of Chu Chot in 2006 was 1,189 people, spreading out over 254 households. On average, each household has nearly five members. In comparison with the 2001 survey data, the number of households

[2]The numbers are computed from another household survey that the researcher conducted in four provinces of Ha Noi, Thai Nguyen, Long An, and Can Tho in 2003.

in the hamlet grew by sixty-seven households. The increase is owing to affiliation of the former hamlet with a part of neighboring hamlet, namely Phuoc Truong (in Phuoc Long Commune, Phuoc Long District).

In terms of gender, table 8 shows that 51.6 percent of the hamlet population is male and 48.4 percent is female. Almost all households are headed by men, accounting for 86.4 percent. The rest or 13.6 percent of total households are headed by women. In these households, women household heads are generally single, divorced, or widowed.

The labor force of the hamlet is rich, with 62.5 percent of its population within the working age (from eighteen to sixty years old). Despite the large size of the labor force, workers have little education. The average number of schooling years of laborers is only five years. Calculated differently, 9.2 percent of workers are illiterate and 55.7 percent have reached the primary education level. Only 7.6 percent of these workers have reached high school or higher educational level. In terms of the whole population, 20.5 percent is illiterate and only 5 percent reached high school.

The population density of the hamlet is 349 people per square kilometer, much higher than the average of commune's population density of 118. This is because Pho Sinh Channel, the largest channel passing the commune, makes the hamlet a good place to live in where transportation, markets, and other services are accessible.

TABLE 8

PERCENTAGE DISTRIBUTION OF SAMPLE HOUSEHOLDS,
BY DEMOGRAPHIC FEATURES

Demographic features	Frequency (people)	Percentage (%)
Gender		
+ Whole population		
- Male	270	51.6
- Female	253	48.4
Total	523	100
+ Household head		
- Male	95	86.4
- Female	15	13.6
Total	110	100
Age groups		
- Below 6	33	6.3
- Between 6 to 17	109	20.9
- Between 18 to 60 (labor age)	327	62.5
- Above 60	54	10.3
Total	523	100
Education		
+ Educational attainment of whole population		
- Illiterate	107	20.5
- Elementary (class 1 to 5)	246	47.0
- Secondary (class 6 to 9)	144	27.5
- High school (class 10 to 12)	26	5.0
Total	523	100
Average* = 4.3 (schooling years)		
+ Educational attainment of workers (18 to 60 years old)		
- Illiterate	30	9.2
- Elementary (class 1 to 5)	182	55.7
- Secondary (class 6 to 9)	90	27.5
- High school (class 10 to 12)	25	7.6
Total	327	100
*Average = 5.0 (schooling years)		

Source: Household survey (2006).

Occupational patterns. As earlier mentioned, 80 percent of the residents have land and 20 percent are landless or nearly landless (having no land to cultivate). All

households who own land engage in aquacultural and agricultural activities. A majority of them engage in shrimp farming as a main source of livelihood. Besides, some better-off households also work as gasoline seller or aquacultural and agricultural input service provider. Some average-income households make handicraft to earn extra income.

In turn, for a majority of those who are landless or near landless, handicraft is their main income source. Some of the landless people also work as barbers, transport workers, (*xe om* by motorbike, dua do by boat), or engage in other off-farm or nonfarm jobs.

Income and income structure. The yearly average household income in 2006, estimated from detailed accounting of the costs and returns from various activities, is US$3,172 (standard deviation is estimated at 5,668). The range of income is quite wide among households. The highest income household earns US$37,500 per year, while the lowest income earner has negative income of -US$409 owing to failure in shrimp farming investment. Among the determinants of household income, shrimp income, accounting for 69.2 percent contributes the most in total income. Following shrimp income is rice income (10.1 percent) and trade (9.7 percent). Income share of handicraft (5.0 percent) and livestock (1.2 percent) is negligible. The rest of the income (4.8 percent) is from services, off-farm, and other sources (see table 9).

With an average household size of 4.8, the annual average per capita income is estimated at US$667, or US$1.83 per capita per day. It is also calculated that 60.9 percent of people earn less than the absolute poverty line of US$1 per day, as

suggested by WB, while 23.6 percent of people earn more than US$2. The rest or 15.5 percent is at average level of income ranging from US$1 to US$2. The figures suggest an inequitable income distribution in the area.

TABLE 9

INCOME STRUCTURE OF SAMPLE HOUSEHOLDS

Income sources	Average income per households of interviewed household (US$)*	Percentage (%)
Shrimp	2,196	69.2
Rice	321	10.1
Animal breeding	38	1.2
Trade	307	9.7
Handicraft	159	5.0
Others	151	4.8
Average of total	3,172	100
Standard deviation =	5,668	
Maximum =	37,500	
Minimum =	-409	

*US$1 = VND 16,000

Source: Household survey (2006).

Income distribution. Inequality in income distribution is thus high. Table 10 shows that accumulation of four bottom quintiles of households (respectively 80 percent) shares only 30.9 percent of total income, while the top quintile gets 69.1 percent of income (see table 10). Not surprising, the Gini coefficient of income distribution is measured at 0.65; much higher than the Gini of whole country of 0.37 (UNDP 2005). This inequality reflects the inequality in land distribution, as discussed earlier.

TABLE 10

PERCENTAGE DISTRIBUTION OF SAMPLE HOUSEHOLDS, BY INCOME

Quintiles	Percentage of income	Accumulative percentage of income
First (bottom)	1.84	1.84
Second	3.84	5.68
Third	7.84	13.52
Fourth	17.39	30.91
Last (top)	69.09	100.00

Source: Household survey (2006).

Housing and owning of valuable asset. In terms of housing, 45.5 percent of households own temporary[3] houses with an average estimated value of US$361 per unit; 24.5 percent of houses are semipermanent at US$1,442 per unit; and 30 percent of houses are permanent at US$8,313 per unit (see table 11). Almost all permanent houses had been built since 1998 owing to increased income from shrimp farming.

With regard to owning of valuable assets, 75.5 percent of households have television, 31.9 percent have cassette/VCD player, 35.5 have motorbike, 66.4 percent own machine boat, and 75.5 percent own at least one gasoline pump (see table 11). Similar to building permanent houses, buying other valuable assets has

[3]A temporary house is characterized by palm or cement-tiled roof, palm or wood wall, and bare or cement floor; it is estimated less than VND 15 million. A semipermanent house is named for house with tile roof, wood or cement wall, and cement or ceramic brick; it is evaluated from VND 15 million to VND 50 million. A permanent house is characterized by tiled roof, cemented wall, and ceramic brick, evaluated more than VND 50 million.

taken place since 1998 after people have engaged in shrimp farming. Almost all of these assets were owned by better-off people.

TABLE 11

HOLDING OF VALUABLE ASSETS OF SAMPLE HOUSEHOLDS

Groups	Number of households	Percentage (%)	Average estimated value of each unit (US$)
Housing			
Temporary	50	45. 5	361
Semipermanent	27	24.5	1,442
Permanent	33	30.0	8,313
Total	110	100.0	3,012
Television			
No	27	24.5	-
Yes	83	75.50	118
Total	110	100.0	0
Cassette/VCD player			0
No	75	68.2	-
Yes	35	31.8	259
Total	110	100.0	
Motorbike			
No	71	64.6	-
Yes	39	35.5	1,650
Total	110	100.0	
Machine boat			
No	37	33.6	-
Yes	73	66.4	473
Total	110	100.0	
Gasoline pump			
No	27	24.5	-
Yes	83	75.5	250
Total	110	100.0	

Source: Household survey (2006).

Considering the value of the aforementioned assets as a measure of wealth, the distribution of wealth can be seen in table 12. Similar to the picture of distribution of land and income, wealth is also distributed unequally: 80 percent of the

households only own 34.6 percent of wealth, while 20 percent gets 65.4 percent. Gini coefficient is measured at 0.62.

TABLE 12

PERCENTAGE DISTRIBUTION OF WEALTH
AMONG SAMPLE HOUSEHOLDS

Quintiles	Percentage of wealth (%)	Accumulative percentage of wealth (%)
First (bottom)	1.0	1.0
Second	3.8	4.8
Third	8.4	13.2
Fourth	21.4	34.6
Last (top)	65.4	100.0

Source: Household survey (2006).

Organizations

In Chu Chot Hamlet, organizations such as farmer's union, women's union, veteran's union, and youth's union were established. However, their role is negligible.

The farmer's union, which was established in the early 1990s, has a role of helping farmers gain access to productive technologies. Since it was established, the association has not grown. In 2006, there were only fifty-five members, a number too small compared to a community of 258 households. Poor and infrequent operations make the organization unattractive. Attending the meeting, according to members, is useless. The number of meetings, only twice yearly, is too few to create an impact.

The same goes for the women's union. Established in 2003, the union with about one hundred members initially created a mutual support fund. The members,

especially the poor, take turns in availing the loanable amount from the union fund. The funding operation lasted for about one year. It ended because some members were unable to repay their loan.

Similarly, the youth's union has remained nominal since it was first established in 1998 with about twenty members. It did not do any special functions.

In contrast, the veteran's union perform better in helping the families of its members who encounter difficulties such as illness and death. Support from the union is both intangible (consolation or encouragement) and tangible (cash from the fund contributed by members). However, because the union only has thirty-one members and the fund is low, its contribution to the community has been nil.

Public services

School, health care, road, electricity, bank, aquaculture extension, and market are important public services for local people. These services are related to both residents' living and productive condition.

School. An elementary school operates in Chu Chot Hamlet. With three rooms, the school serves six classes ranging from kindergarten to grade 5. Each class consists of twenty to thirty pupils. One class is basically taught by one teacher most of the time. Two other teachers, one for music and the other for painting, also serve these classes, except kindergarten, part time or once per week.

The community has no secondary and high school.[4] Thus, secondary school and high school pupils have to go to Phuoc Long Commune's schools to study. These schools are located in Phuoc Long Commune, Phuoc Long District, about 7 km away from Chu Chot Hamlet. The pupils normally enrol in schools in Phuoc Long Commune instead of enrolling in schools in Ninh Thanh Loi Commune due to convenient transportation.

Health care. No clinic operates in the hamlet. However, there is a male nurse taking care of the community health. His work includes conducting health consultations, selling medicine, and administering transfusions. He only treats less serious illnesses like flu, cough, and the like. When serious diseases arise, local people often go to Phuoc Long Hospital at the center of Phuoc Long District which is about 20 km from the hamlet.

Road. Two roads, 2 meters wide and 2 kilometres long, were constructed along two sides of Pho Sinh Channel; one was finished in 2004, the other in 2006. The two roads make it convenient for people to go from place to place. Instead of only transporting by boat as previously done, people can now go out of the community by motorbike.

[4]Three levels of basic education exist in Vietnam's educational system. These levels include primary (cap I), secondary (cap II), and high school (cap III). The primary level has five classes ranging from 1 to 5. The secondary level includes four classes from 6 to 9. In turn, the high school level has three classes from 9 to 12.

Electricity. Because Chu Chot is a remote area, electricity remains unavailable for the people. It is probable, however, that electricity will come in the near future because the electric system is presently installed.

Banks. The district's agricultural and rural development bank is accessible to farmers. However, the bank only serves those who have certificates indicating landowning as collateral. Besides, poor and landless people also get loans from the district bank which does not require any collateral. To get a loan from the credit source, poor people must have the certificate of poorness and be introduced by the hamlet leader. Aside from the government banks, commercial banks located in Bac Lieu Province are also accessible for those who have collaterals.

Agricultural-aquacultural extension. Agricultural and aquacultural extension activities are weak in the area. For the whole district, only eight extension workers assist in training farmers on cultivation technologies. The number worker is too small relative to the district's total population of 99,007 people. Thus, technology trainings seldom reach small remote areas, like Chu Chot Hamlet.

Market. There is no market in Chu Chot. However, the community's people can access to Moi (New) market, at the center of Ninh Thanh Loi Commune or Pho Sinh market in Phuoc Long Commune. Besides, people can also sell products and buy many kinds of goods easily through "moving" market, which is called for selling/buying boats (see figure 6). All shrimp trading activities take place in the market.

Summary

The chapter describes the geographic, natural, and socioeconomic characteristics of Chu Chot Hamlet and determines the site's advantages and disadvantages with regard to local people's life and shrimp farming development. The chapter also provides information about organizations and public services in the community.

FIGURE 6

KINDS OF "MOVING" MARKETS

Chu Chot Hamlet is located in Ninh Thanh Loi Commune, Hong Dan District, Bac Lieu Province. Its location connects with both the east and west seas which provide salty water essential for shrimp farming. At the same time, existence of channels within the area also plays an important role in facilitating shrimp farming.

Rich land resource is another advantage for shrimp farming. On average, a household holds 2.76 ha. The number is higher than the average land size per household in other areas. However, it is unfortunate that level of inequality in land distribution here is very high; the Gini coefficient is measured at 0.61. It means that not all households have land to raise shrimp since most land areas belong to large-scale farmers.

Income can be understood as a source of capital needed to reinvest. From this view, yearly average income per households of US$3,171 or yearly average income per capita of US$667 is a grant capital source for farmers in shrimp farming. But similar to land distribution, income distribution is also highly unequal; Gini is measured at 0.65. This implies that high proportion of capital is in the hands of the rich farmers. The figure suggests that few households benefit from shrimp farming.

Demographic characteristics also show some advantages and disadvantages. While the labor force is evaluated to be plentiful with 62.5 percent of population in working age, education of labor (related to quality of labor) is low with only 7.6 percent of labor reaching high school level.

Organizations such as farmers' union, women's union, and other organizations are expected to play an important role in access to credit, technology and so forth. However, these organizations operate poorly and meet infrequently, thus, they are not helpful to farmers.

Availability of bank system in the area is an additional advantage for farmers in serving loans. The district's bank of agriculture and rural development and other

commercial banks within Bac Lieu Province are accessible for all those who have “certificate of land” as collateral. Besides, the bank for the poor is also accessible for those who have certificate of poorness.

Although there is an agricultural and aquacultural extension office at district level, activities of shrimp farming technology transference is weak because of shortage of people in the extension staff force.

The next chapter describes the expansion of shrimp farming in the study site as well as the socioeconomic impacts of that expansion among households.

CHAPTER 3

THE EXPANSION OF SHRIMP FARMING AND ITS SOCIOECONOMIC IMPACTS ON THE COMMUNITY

The chapter seeks to describe the expansion of shrimp farming and to find out its impacts on the community and local people. To provide a context for these discussions, the chapter first provides an overview of shrimp farming method practiced in the area.

Shrimp Farming Method

The specie of shrimp raised in Chu Chot Hamlet is the black tiger shrimp (*Penaeus monodon*). This is the unique specie of shrimp raised in the area (see figure 7).

In terms of farming method, the kind of shrimp farming practiced in Chu Chot is called the "improved-extensive" model.[1] The method of the model, drawn mainly from farmer's experiences, is quite simple. Several main techniques are involved including preparation of shrimp farm, giving fingerlings, irrigation, and harvesting.

Preparation of shrimp farm

To raise shrimp, farmers need to first convert a rice farm into a shrimp farm also called *vuong*. Farmers dig drains two meters wide and a meter deep along the

[1]This is one of the four main models of shrimp farming in Vietnam, as normally being categorized, including: extensive, improved-extensive, semi-industrial, and industrial. These models vary by level of investment of inputs, especially by density of fingerlings, quantity of fertilizers, lime, and feedings. Accordingly, industrial model is invested at most and extensive model is invested at least.

FIGURE 7

BLACK TIGER SHRIMP

Source: field work (2006).

borders of the farm (see figure 8). The digging divides the shrimp farm into two areas: Area 1 and Area 2. Area 1, also called "ruong," is substantially the former rice farm that is about 0.5 meter deep in water; it remains suitable for rice cultivation during rainy season. In this area, farmers can cultivate rice or plant grasses in order to create an appropriate environment for the development of algae as shrimp feed. Area 2, also called "muong," is about 1.5 meters deep in water and is suitable for shrimps to hide during daytime; shrimps often swim toward Area 1 for food at nighttime.

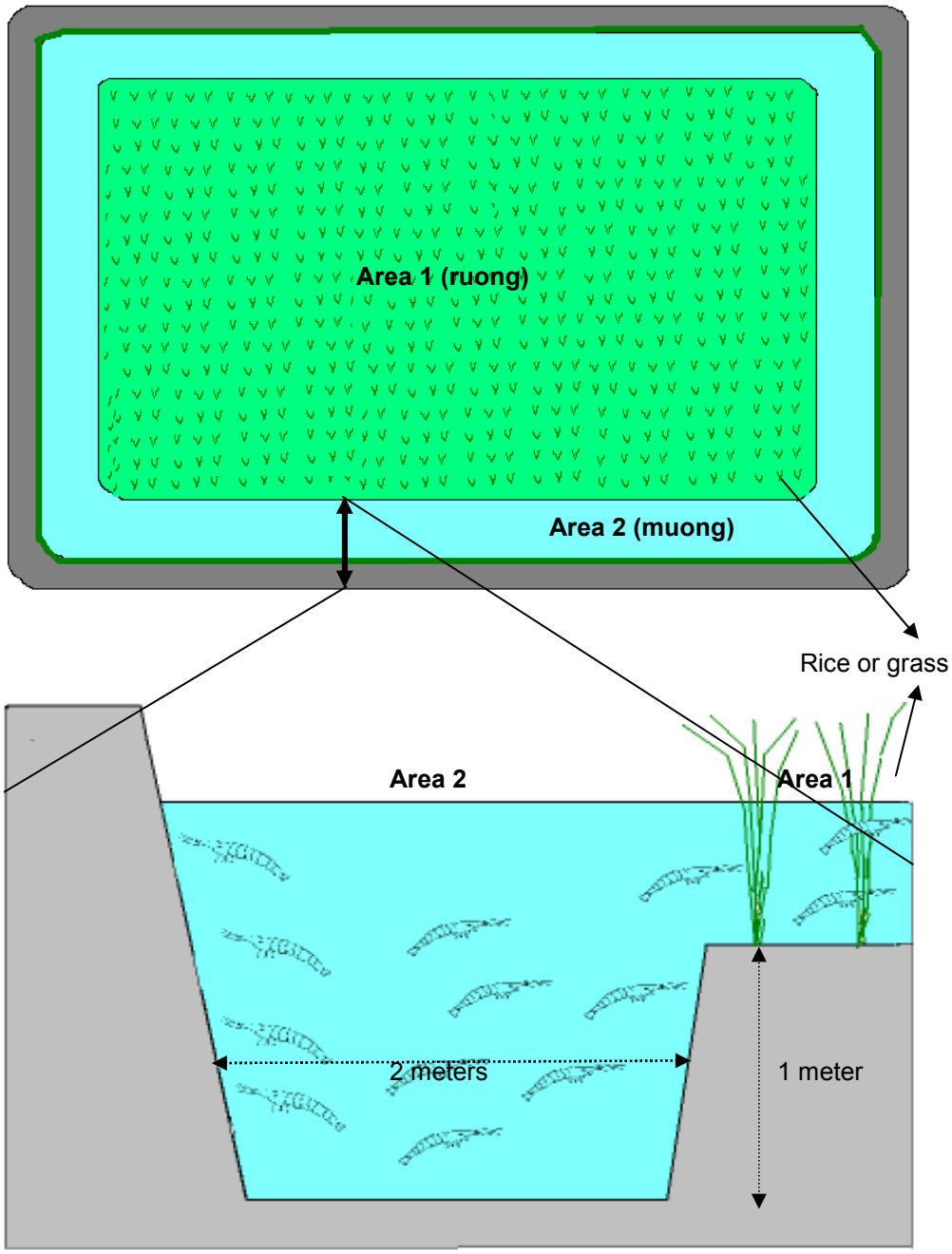
Putting fingerlings[2] on vuong

When the farm is ready, farmers put fingerlings on vuong with an average density of 1 to 2 fingerling/s per square meter. With such low density, farmers

[2]Fingerlings refer to larvae or tiny shrimps.

FIGURE 8

TYPICAL SHRIMP FARM OR “VUONG”



generally do not need to feed shrimps; shrimps can find food on vuong. The manner of putting fingerlings varies among farmers. While some farmers put fingerlings (just bought from fingerling providers) directly to the large farm, some others do more carefully by domesticating[3] fingerlings in *veo* (a small pond of about 10 sq m), about one week before releasing them into the large farm.

Irrigation

Water is considered as the most important factor in shrimp farming. In this regard, farmers are most concerned with in terms of its quantity, salinity, acidity, and sufficiency of algae. Appropriate quantity of water on farm ranges from 0.4 to 0.6 m on Area 1. Farmers are able to adjust water quantity on farm by pumping water from channels or water drains anytime during the crops. Salinity of water in Chu Chot ranges from 3 to 10 millesimal in the dry season and zero in rainy season. The salinity of water is liveable for shrimps because fingerlings are domesticated by sellers before farmers buy and make use of them in the farm. In order to adjust water acidity in the farm, some farmers sometimes add lime. To provide sufficiency of algae, farmers plant grasses, or rice on Area 1 in the rainy season. Some farmers also add a little bit of fertilizer to let the crop grow.

[3]Original fingerlings, when they are just born, normally grow well in water with the salinity about 25 millesimal, similar to the salinity of sea water. They are probably shocked if they are suddenly placed in water with lower salinity. Thus, fingerling providers domesticate them by reducing gradually the salinity of water.

Harvest

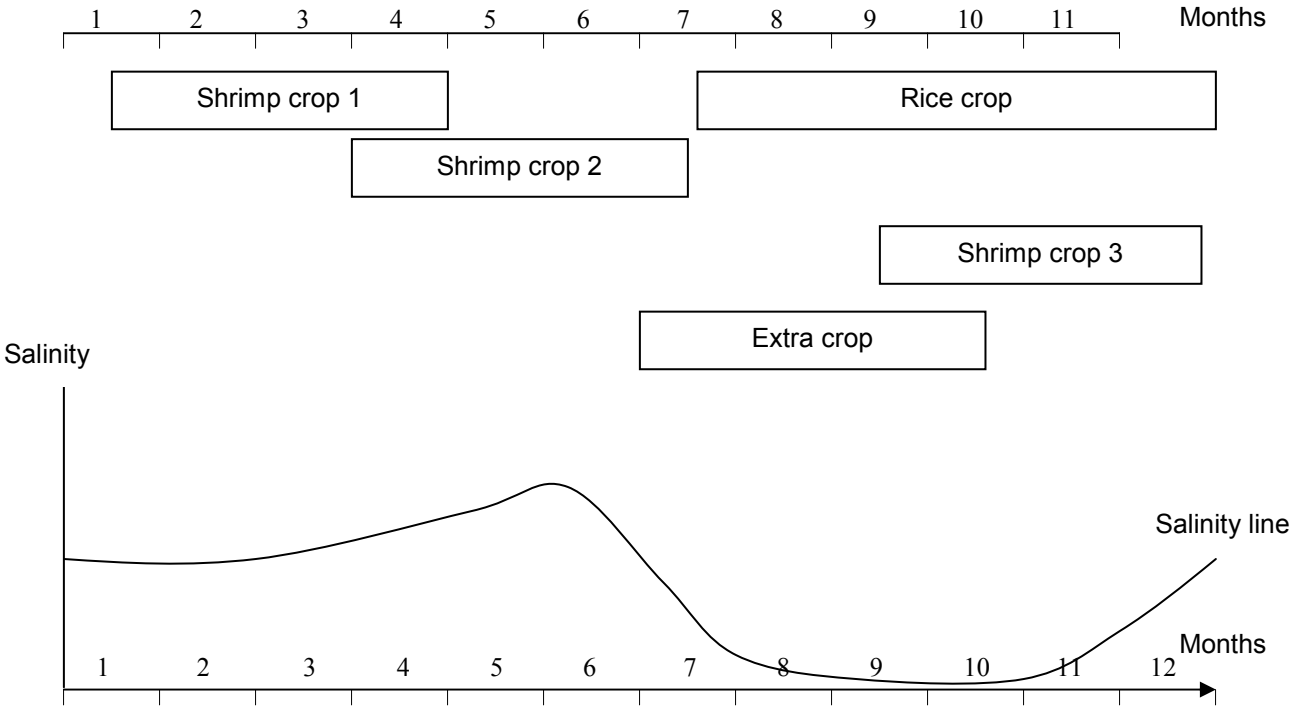
For the “improved-extensive” model, farmers in Chu Chot Hamlet harvest little by little. By using a *lu*, a kind of shrimp-catching gear, farmers only catch big shrimps which are entangled in the gear. The period of shrimp harvest extends to about one month for each crop.

Crop pattern

Farmers in the hamlet mostly raise three main shrimp crops every year. Some farmers, however, also raise an extra shrimp crop during the rainy season. Duration of each crop is about 3.5 months (see figure 9).

FIGURE 9

CALENDAR OF CROPS



The first crop starts in the middle of January after farmers re-dig water drains in Area 2, dry the farm for about three weeks to clean it, and give lime to adjust the acidity of the water. The harvesttime of the crop begins in early April and extends for one month.

At the start of harvesting the first crop in early April, farmers issue fingerlings for the second crop; fingerlings are not injured by the shrimp-catching gear since it only catches big shrimps. Similarly, the period of harvesting the second crop is from mid-June to mid-July.

While harvesting the second crop, some farmers give fingerlings for extra shrimp crop. The extra crop is at a riskier condition than the main crops owing to the influence of fresh water (unsuitable for shrimp growth), coming in as the rainy season begins. At the time, some farmers[4] plant rice in order to earn extra income and to release straw which creates appropriate environment for algae development for the next shrimp crops. The extra crop is harvested from September to October.

The main third shrimp crop normally begins about the middle of September when rice is still on farm if applicable, or during harvesttime of extra crop. The crop is harvested in December. At the end of the third shrimp crop and also the rice crop, farmers prepare for the next crop by re-digging drains, adding lime, and cleaning and drying the farm.

[4]Because land, influenced by salinity, often gives low yield of rice, not all farmers cultivate rice.

The Expansion of Shrimp Farming

Shrimp farming in Chu Chot first emerged in 1994 when a farmer tried applying shrimp farming technology which he had done several years earlier in another area. The profit that he had made called the attention of farmers. In 1995, owing to experiences learned from the frontier, about ten farmers applied and succeeded in shrimp farming. Consequently, the number of shrimp farmers increased in the following years. Rice land was gradually transformed vuong. According to the hamlet leader, shrimp farming land accounted for 50 percent in total rice land earlier in 1998 and 100 percent in 2001.

Even after all rice land converted perfectly to shrimp farming, the expansion of shrimp farming still went on by converting pineapple fields, bamboo gardens, and timber garden into shrimp farms. To date, the transformation of from timber gardens to shrimp farms still goes on (see figure 10). Pineapple farms are no longer found because the last pineapple farm became a shrimp farm in 1998. The conversion from bamboo gardens to shrimp farms ends since 2000 because the price of bamboo has risen owing to an increasing number of people engaging in handicrafts. As estimated, about 70 percent of former bamboo gardens were converted.

The development of shrimp farming, as noted by a hamlet leader, was spontaneous and was not done out of the local government's initiative. However, when shrimp farming was seen as a way to increase economic growth, the local government supported this economic activity by facilitating banking and aquacultural extension programs.

FIGURE 10

TIMBER GARDENS NEWLY CONVERTED TO SHRIMP FARMS

Apparently, that the expansion of shrimp farming changes the crop pattern in particular and the regional ecosystem in general. It has also created socioeconomic impacts on the community, as discussed further in the next section.

Socioeconomic Impacts of Shrimp Farming Expansion

What are the socioeconomic impacts of shrimp farming expansion on the community and its people? The section discovers how income sources, actual income, income distribution, landholding, land distribution, housing, asset holding, and education changed over time following the expansion of shrimp farming.

To find out the impacts of the shrimp farming expansion on the community, availability of pretest and posttest data is essential. Unfortunately, pretest survey data before shrimp farming time is unavailable. To handle this limitation, several data

sources such as the 2000 Participatory Rural Appraisal (PRA) data, 2001 survey data, 2006 survey data, and 2006 in-depth interview data are tapped as bases for discussion.[5]

Income sources, actual income, and income distribution

Income sources. As a result of the change in crop pattern, income sources (or income shares) have changed dramatically. Indeed, the 2000 PRA data show that income shares among all three household groups[6] of rich, average, and poor have changed when shrimp farming expanded in Chu Chot Hamlet.

For the rich households, the pattern of the change was mainly the replacement of shrimp income over trade income. The income share of trade, mainly handicraft product trade, declined dramatically from 65 percent in the years before 1997 to 0 percent between 1997 and 2000, while the shrimp income share increased from 15 percent in 1996 to about 90 percent in the latter years. The change occurred because rich people engaged in shrimp farming on their land after they knew how to raise shrimp, instead of trading outside the village by boat in earlier times (see figure 11).

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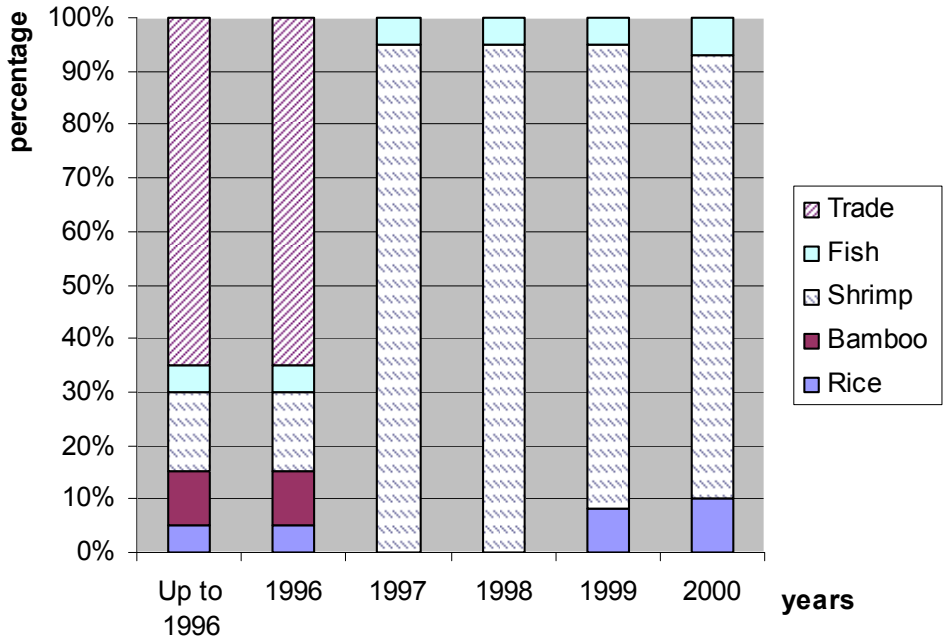
[5]For details on these data sets, see methodology section in chapter 1.

[6]In the 2000 PRA, classification of household was based on the approach of participation assessment. By which, rich households were named for those who had large size of land, high income, and lived in permanent houses. Poor households included those who were landless or nearly landless, have low and unstable income, and lived in temporary houses. “Average” households are at average level of all indicators.

FIGURE 11

PERCENTAGE DISTRIBUTION OF RICH HOUSEHOLD GROUP,
BY CHANGE OF INCOME SHARES (1996-2000)



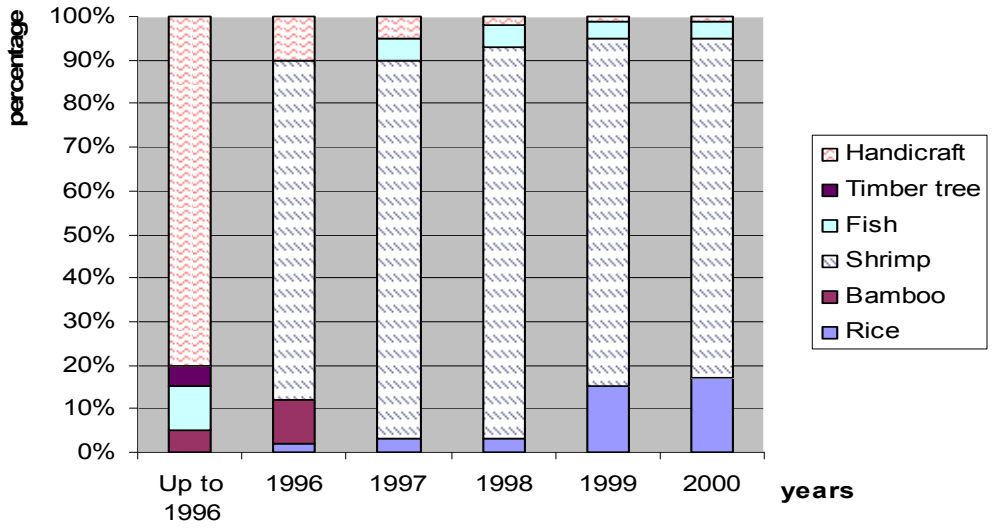
Source: PRA (2000).

For the average income household group, shrimp farming replaced handicraft as the main livelihood. Before 1996, handicraft was the main income source of these households with its income share accounting for 80 percent of total income. However, the dependence on handicraft declined dramatically in later years. Handicraft's income share reduced from 10 percent in 1996, to 5 percent in 1997, 2 percent in 1998, and 1 percent in 1999 and 2000. Similar to handicraft, the shares of other income sources such as timber, bamboo, and fishing also reduced. People did not care much about these activities anymore when they could earn much higher in shrimp farming. In contrast, the share of shrimp income jumped sharply; constituting

about 80 percent in total income from 1996 to 2000 after shrimp was raised widely (see figure 12).

FIGURE 12

PERCENTAGE DISTRIBUTION OF AVERAGE HOUSEHOLD GROUP, BY CHANGE OF INCOME SHARES (1996-2000)



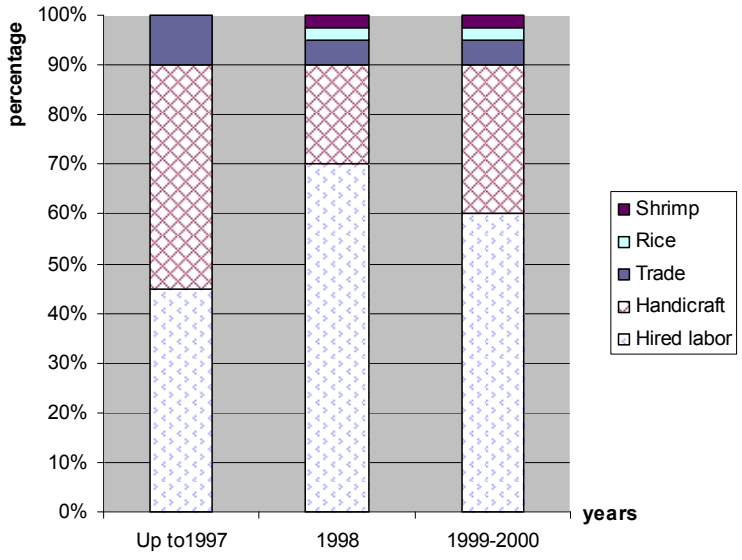
Source: PRA (2000).

Contrary to the high and middle income groups, the poor household's income composition did not change much over time. The share of shrimp income only changed a bit because almost all of the poor were landless or nearly landless when shrimp farming was introduced. However, the expansion of shrimp farming changed off-farm job opportunities. Up to 1998, the massive conversion of rice fields to shrimp farms, which require hired labor, created a lot of off-farm work for the poor. In the period 1999-2000, however, the demand for hired labor decreased not only because

the conversion of rice fields to shrimp farms was almost outright but also because farmers began to prefer machines to handwork for digging land. Not surprisingly, then, income share from off-farm works increased significantly from 45 percent in the years before 1998 to 70 percent in 1998, and then reduced to 60 percent in 1999 and 2000. Conversely, income from handicraft making decreased from 45 percent in 1997 to 20 percent in 1998, and then increased to 30 percent in 1999 and 2000. Lack of jobs forced poor households to engage in handicraft making to survive (see figure 13).

FIGURE 13

PERCENTAGE DISTRIBUTION OF POOR HOUSEHOLD GROUP, BY CHANGE OF INCOME SOURCE (1997-2000)



Source: PRA (2000).

In brief, shrimp farming, since it emerged as a profitable livelihood, has become the main income source of a majority of households, especially in the cases of better-off households. As showed earlier in table 11, shrimp income shares in 2006 was about 70 percent of the total household income. Change of income composition mainly took place in the years before 2000 during the period when shrimp farming expanded rapidly. Then, the change was nil because shrimp farming became stable and all rice lands were used for shrimp farming.

In addition, figures 8 and 9 show that the share of rice income also increased according to shrimp income share. The increase of rice income share resulted from the rice-shrimp combined model (planting rice in the rainy season). Activities involved in growing shrimp such as land preparation, fertilization, adding lime, and the like enrich the quality of land. Besides, it is recognized that shrimp itself also contributes to enrich land owing to its waste.

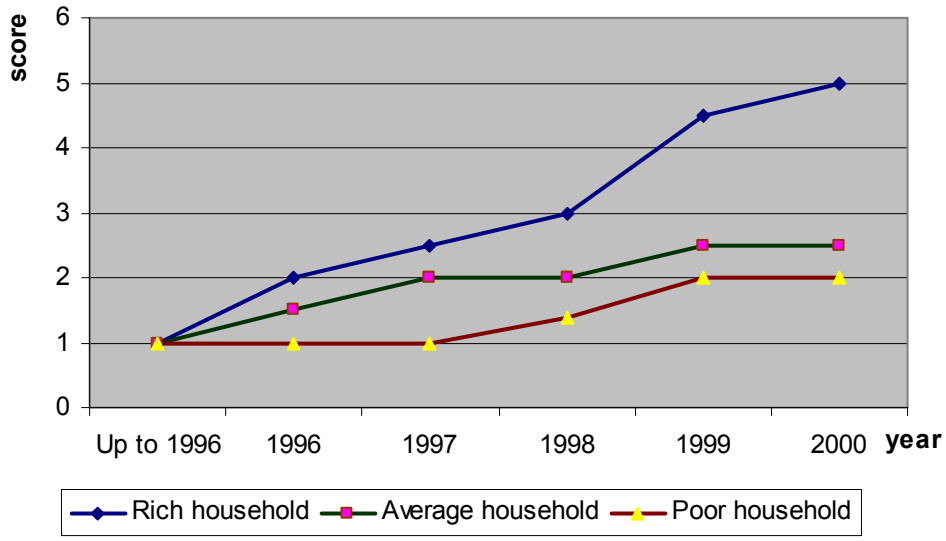
Change in the amount of income. The change in the amount of income varies in two periods before and after 2001. Before 2001, household income increased dramatically because profit of shrimp farming is much higher than that of rice production. The hamlet leader, when asked about how he evaluates profit of shrimp farming compared with rice cultivation, gave a comparison:

> …One hectare of land only earns VND 5 million when being cultivated with rice, while it can earn VND 20 million when it is used to raise shrimp. For example, before raising shrimp, my annual rice income from 6 hectares of land ranged from VND 20 million to VND 30 million, while I earned VND 110 million in 2001 and VND 90 million this year (2006) with the same size of land.

The increase of income before 2001 can also be seen in 2000 PRA data. As shown in figure 14, a timeline chart drawn from income scores given by farmers,[7] income of three household groups including rich, average, and poor all increased since shrimp farming was practiced in the hamlet.

FIGURE 14

CHANGES IN INCOME SCORE OF HOUSEHOLD GROUPS, BY SOCIAL STATUS (1996-2000)



Source: PRA (2000).

Among the three household groups, the rich household group had the highest rate of income growth; steadily increasing from score of 1, years before 1996 to 2, 3,

[7]When requested to show change of income with a suggestion that the lowest income time point is scored as 1, each of the three households coming from the rich, average, and poor groups gave scores of their income covering the period until 2000.

and 5 in the years 1996, 1998, and 2000 respectively. The average group and poor group also obtained the increase in income though not as high as the rich group. The average group's income increased from score of 1 in years before 1996 to 1.5 in 1996, 2 in 1997 and 1998, and 2.5 in 1999 and 2000; while the poor group's income increased to 1.4 in 1998 and to 2 in 1999 and 2000.

Between 2001 and 2006, average household income declined. Comparison of income data collected in 2001 and in 2006 shows that on the average annual household income decreased by 8 percent from US$3,468 in 2001 to US$3,174 in 2006.[8] The decrease of income not only came about because of the reduction of shrimp yield but also because the price of shrimp has decreased over a period of time. The decrease of shrimp yield was seen mainly as a consequence of water pollution, while the reduction in price stems from the impact of the decrease in global market price. A farmer, Lam Viet Thanh, provides a parallel observation:

> I received my highest shrimp income in 2001. At that time, land was still "new" and fertile; moreover, water was fresh. In the following years, water became polluted because people would pollute water in the public channels. Thus, those who collected water from this source would have their shrimp infected, and incur loss. In my case, shrimp loss takes so much of our income. I earned about VND 100 million in 2001, while I only earned only about VND 60 million in 2002, nothing in 2004, and VND 50 million in 2006. Price fluctuation is an additional factor that made us earn less in recent years. Prices went down from VND 180,000 per kilogram in 2001 to VND 120,000 per kilogram in 2006.

Income distribution. In terms of income distribution, the income gap between

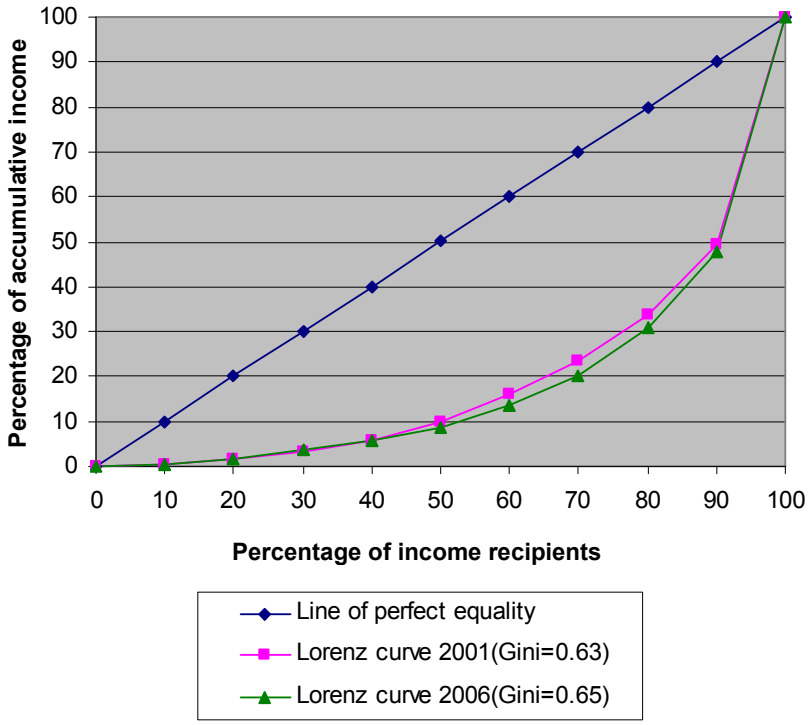
[8]In the section, local currency VND is converted to US$ in order to restrain inexactitude in comparison due to instability of local currency. Accordingly, USD$1 = VND 15,000 in 2001 and US$1 = VND 16,000 in 2006.

the rich and the poor widened. Before 2001, inequality increase in income distribution could also be seen in figure 14. Accordingly, the rich group's income score grew at a rate higher than that of the poor group and the average income group (i.e., disparity of the rich group's income scores between 2000 and years before 1996 is fivefold, while the difference of poor group's income scores at the two points of time is only double). Between 2001 and 2006, as figure 15 shows, inequality in income distribution continued to increase. The 2006 Lorenz curve[9] moved far away the line of perfect equality than the 2001 Lorenz curve. Accordingly, the 2006 Gini coefficient of 0.65 is higher than 2001 Gini coefficient of 0.63.

[9]Lorenz curve is a graphical representation of the cumulative distribution function of a probability distribution. It is often used to measure inequality in distribution of income, wealth, land, among others. The curve shows that the farther the distance between Lorenz curve and line of perfect equality, the higher the level of inequality.

FIGURE 15

LORENZ CURVES OF INCOME DISTRIBUTION (2001-2006)



Landholding and land distribution

The change of income results in changes of landholding and land distribution. Time-series comparison of land data show that the average land area per household in the hamlet had increased to 33 percent between of 2001 and 2006, from 20,665 sq m in 2001 to 27,646 sq m in 2006. The increase stems from a large number of high-income households who bought land outside the community.

The change of landholding was unequal among various quintiles grouped by land size (households are ordered by increasing land size and are then divided into

five quintiles). The average land area of the top 20 percent of households (the last quintile) increased from 57,720 sq m to 87,732 sq m, while the average land area of the bottom 20 percent of households (the first quintile) decreased from 1,127 sq m to 793 sq m (see table 13). The data point out that large-size farmers not only bought land from outside-farmers, but also bought land from small-size farmers in the community.

TABLE 13

CHANGE IN LANDHOLDING AND LAND DISTRIBUTION
(2001-2006)

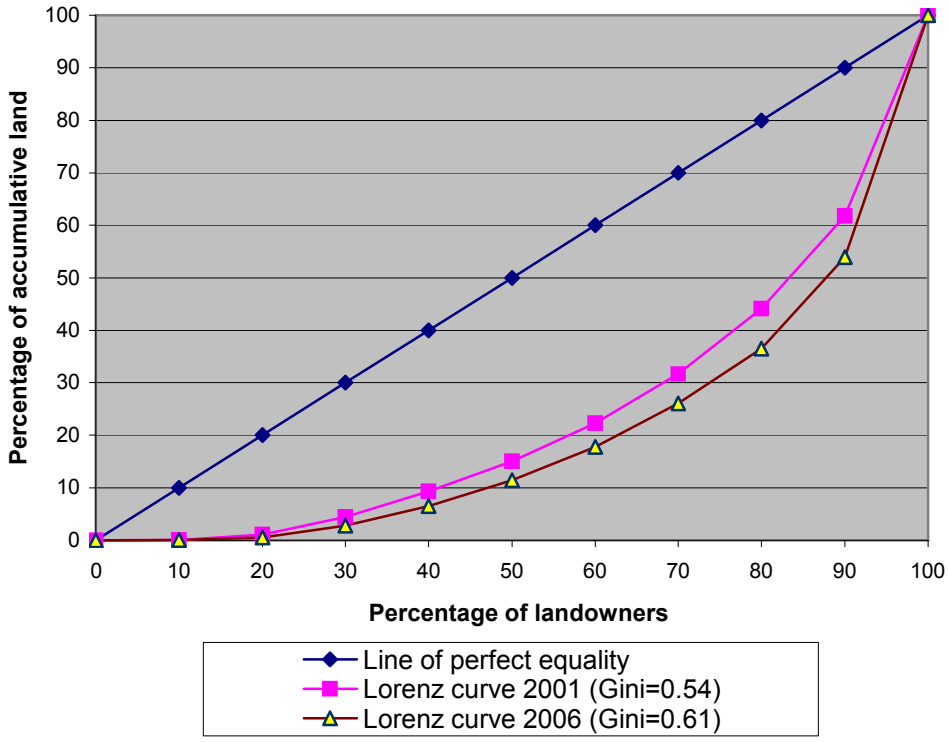
Quintiles	2001		2006	
	Share of total land	Average land area	Share of total land	Average land area
First (bottom)	1.09	1,127	0.57	793
Second	8.21	8,484	5.93	8,200
Third	12.95	13,377	11.28	15,586
Fourth	21.89	22,614	18.75	25,917
Last (top)	55.86	57,720	63.47	87,732
Total	100	20,665	100	27,646

Source: Household survey (2006).

The disparity of the change of landholding among groups contributed to an increase of inequality in land distribution in the hamlet. As shown in figure 16, inequality in land distribution increased sharply between 2006 and 2001. The 2006 Lorenz curve moved farther away from the line of perfect equality as compared to the 2001 Lorenz curve. Supporting the observation, the Gini coefficient between 2001 and 2006 increased from 0.54 to 0.61.

FIGURE 16

LORENZ CURVES OF LAND DISTRIBUTION (2001-2006)



Housing and holding of valuable assets

As a result of income increase, housing and assets holding of households as a whole have improved dramatically.

For housing, the 2000 PRA data show that the number of permanent houses increased from zero in 1996 to 10 in 1997, 15 in 1998, 30 in 1999, and 35 in 2000. The improvement of housing condition continues between 2001 and 2006. Table 14 shows that the percentage of permanent houses in 2006 is higher than that in 2001, 30 percent compared with 11.8 percent respectively. Similarly, the percentage of

semipermanent houses in 2006 is also higher than that in 2001, 24.6 percent and 13.6 percent correspondingly. In contrast, a percentage of temporary houses in 2006 (45.5 percent) is lower than that in 2001 (74.6 percent).

The holding of valuable assets has also increased significantly between 2006 and 2001. The proportion of households owning motorbikes, for instance increased from 3.7 percent in 2001 to 35.5 percent in 2006, while the proportion of households owning motorboat increased from 43.6 percent to 66.4 percent (see table 14). Aside from the two kinds of assets, holding of other assets such as television, cassette/DVD player, and gasoline pump is more likely to be found as an outcome of shrimp farming. When asked in more detail about the holding of assets, many interviewees in the 2006 survey gave the same answer:

> All the assets were bought in recent years from “shrimp farming” money. Before raising shrimp, we did not even have enough money to survive; where do we get the money for luxurious things like these?

It has also been found out that the improvement of housing and asset owning mainly come from better-off households. However, some households who were previously poor also had improved their living condition.

TABLE 14

CHANGE IN HOUSING AND ASSET HOLDING (2001-2006)

Items	2001		2006	
	Frequency (Households)	Percentage (%)	Frequency (Households)	Percentage (%)
Housing				
Temporary (less than VND 15 million)	82	74.6	50	45.5

Table 14—*Continued*

Items	2001		2006	
	Frequency (Households)	Percentage (%)	Frequency (Households)	Percentage (%)
Semipermanent (VND 15 million to VND 50 million)	15	13.6	27	24.5
Permanent (above VND 50 million)	13	11.8	33	30.0
Total	110	100	110	100
Motorcycle				
No	106	96.4	71	64.5
Yes	4	3.6	39	35.5
Total	110	100	110	100
Motorboat				
No	62	56.4	37	33.6
Yes	48	43.6	73	66.4
Total	110	100	110	100
Television				
No	-	-	27	24.6
Yes	-	-	83	75.4
Total	-	-	110	100
Cassette/VCD player				
No	-	-	75	68.2
Yes	-	-	35	31.8
Total	-	-	110	100
Gasoline pump				
No	-	-	27	24.6
Yes	-	-	83	75.4
Total	-	-	110	100

Source: Household survey (2006).

Education

In the period 2001-2006, educational attainment in the hamlet had improved significantly. As table 15 shows, the average number of schooling years of those

who are in schooling ages[10] (from six to twenty-three years old) increased from 4.0 in 2001 to 5.7 in 2006. Likewise, while no people reached high school level in 2001, the proportion of people attending high school in 2006 was 8.5 percent. Moreover, the proportion of people participating in secondary schools also increased, from 23.6 to 44.7 percent. In contrast, the proportion of people at the elementary school level declined from 70.7 to 40.7 percent. The proportion of people who have no schooling remained almost the same at about 6 percent from 2001 to 2006. In each year, about 50 percent of "no schooling" people are presently six-year-old children who would attend school in the near future and the rest are teenage children who did not attend school when they were young.

TABLE 15

CHANGE IN EDUCATIONAL ATTAINMENT OF PEOPLE
IN "6-23" SCHOOLING AGE (2001-2006)

Education level	2001		2006	
	Frequency (people)	Percentage %	Frequency (people)	Percentage %
- No schooling	14	5.79	12	6.03
- Elementary l	171	70.66	81	40.70
- Secondary	57	23.55	89	44.72
- High school	0	0	17	8.54
Total	242	100	199	100
Average no. of schooling years		=3.95		= 5.71

Source: Household survey (2006).

[10]Change of educational attainment was only analyzed for those who are schooling ages, not for all population because education of adults did not change in the last five years.

Improvement in education occurred in part owing to the increase of household income from shrimp farming and to the development of rural infrastructure. When farmers became better-off, they invested in their children's education by paying school fees and buying vehicles such as motorbike or bicycle to transport children to school (or let them drive for themselves). The presence of the two roads, which were constructed with 50 percent of budget from government and 50 percent from local people's contribution, enables students to go to school easily. In addition, since farmers who have engaged in shrimp farming needed less labor, their children are also released from work.

Family and social relations

Through open-ended questions, the survey also found changes in family relations and social relations since shrimp farming was practiced.

On family relations. While engaging in shrimp farming, farmers, mainly men, often spend their nights in the farm to keep watch shrimps from theft, especially when shrimps have grown big. As a result, normal family relations, such as husband-wife and father-children, are disrupted. Wives and children receive less attention from their husband and father. When being asked: "Do you feel unhappy when your husband always spends his nights in the farm in season time?" a 26-year-old woman shyly answers: "How can I be happy when my husband is away from me at night; we are too young," and smiles. Addressing the same question, a 35-year-old woman gives the same answer and adds:

> I sometimes follow him to the shrimp-watching shanty but not frequently because I have to take care of our little children. During that time, my husband has less talk with me and our children. He seldom cares about our children studying; in some instances, he only asks few questions about them.

A farmer, giving the general view of male farmers who live far away from their houses at night, says:

> Although I know my wife and children are probably unhappy when I am not home at night with them, I cannot do anything better. I have to keep watch on shrimp when they become big enough to be stolen. If not, I could lose too much; a kilogram of shrimp is about VND 130,000, which is equivalent to a fivefold day-labor payment.

Relation with neighbors. Since local people engaged in shrimp farming, social relations, like the one that prevails in a closely knit neighborhood, do not remain as intimate as before. Poor people and/or those who failed in shrimp farming feel embarrassed to communicate with others, especially with rich or successful farmers. In addition, poor people participate less when invited in usual community activities such as weddings, death anniversaries.

The poor people's weak financial ability to participate in cultural activities is the main reason why they feel isolated in the community. After all, the cost for attending these cultural activities had increased dramatically than before. For instance, in previous times, attending a wedding normally costs about VND 20,000 to VND 30,000; now the invitee must give the new couple at least VND 50,000. The same way applies during a death anniversary. The invitee must, at present, pay at least VND 50,000 in cash for the host family; previously it would cost only about VND 10,000 to buy a liter of wine or some sweet cakes.

The increase resulted from a cultural change in the celebration of these activities. Originally, the change began when some people, who became richer owing to shrimp farming, spend extravagantly on parties such as weddings, death anniversaries, and the like. As a way to contribute to the host family, invitees paid in cash with an adequate amount, instead of gifts. Later on, cash dole outs have become a cultural norm which people follow. Nowadays, such cultural activities have become quasi-economic transaction. Many people consider celebration of these parties as a way to get back their money which they paid when they were invited. The fact increases the cost of participation. As a result, the poor who have financial difficulty seldom attend these activities. They become isolated and excluded from social life.

Summary

The chapter briefly introduces shrimp farming technology in the area, describes expansion of shrimp farming, and discusses its socioeconomic impacts on the community and people.

The shrimp farming technology applied in Chu Chot was quite simple. Shrimp farms were converted from rice fields with a little bit change, only by digging drains along borders. Density of shrimp raised was low, from 1 to 2 fingerlings per square meters. With such low density, feeding was not required; shrimps could find natural food in the farm. Fertilization was optional. Some farmers fertilized and added lime for their farms while others did not.

This simple technology requires less farming investment. Costs are mainly concentrated on digging during the initial investment period and allocated for fingerlings in each crop. As a result, shrimp farming has expanded rapidly when it proved its economic benefits. Land formerly used to cultivate rice, pineapple, bamboo, and even timber had been gradually converted to shrimp farms since the time that shrimp farming started. By 2006, pineapple gardens were no longer found, all rice fields were used for shrimp farming, and timber gardens were in the process of transfer. In contrast, bamboo lands were no longer converted since 1998 because bamboo price increased as a result of the increasing number of handicraft makers who failed in shrimp farming.

The expansion of shrimp farming created socioeconomic impacts on the community and people. It was discovered that shrimp farming contributed to increase significantly households' income, in general. However, almost all beneficiaries are rich people; thus, inequality in income distribution increased.

In terms of landholding, some households were able to enlarge their land size; average land size per household also increased. Land transfers come from both the internal and external areas of the hamlet. With internal land transfers, land was transferred from households with small land size to households with large land size, eventually causing an increase in the inequality of land distribution.

As a result of increased income, household housing and material conditions improved dramatically. Temporary houses had been replaced gradually with permanent houses. The number of motorbikes, motorboats, television sets,

cassettes, VCD/DVD players, and other luxury goods owned by households increased over time.

Education of children also improved substantially, thanks again to shrimp farming. High income from shrimp farming enabled many families to invest for their children by paying school fees and buying vehicles such as motorbike or bicycle to transport children to school (or let them drive for themselves).

However, there are certain trade-offs from the prosperity that most households experienced. Shrimp farming, for example, ruptures family and neighborhood relationships. Husband-wife and father-children relationships, for instance, become more distant than before because the men spent more time to monitor the farm far away from house, their wives, and children. Similarly, neighborhood relationships have worsened because poor people, particularly those who incurred shrimp farming losses, could not meet the financial demands made by attending community celebrations.

In short, shrimp farming has led to increases in income, assets, and educational opportunity of local residents in general. But, it also produces class division, weakens family and neighborhood relations, and induces social exclusion of some households. Let us take a closer look at changes from households that improve their living condition versus those whose living condition remain the same or worse. How much did each of these groups alter their living condition? What factors affect these outcomes? The next chapter tackles these issues.

CHAPTER 4

CHANGES IN HOUSEHOLDS' LIVING CONDITION AND ITS CORRELATES

The chapter aims to identify what changes took place in households' living condition when they engaged in shrimp farming and what factors affected these different outcomes. Two sections clarify these issues. The first section describes different patterns of the change of households' living condition, including "improved," "unchanged," and "worsened." The second identifies the correlates of these different patterns of change.

Changes in Households' Living Condition

In this study, "change in household's living condition" is operationalized through both subjective and objective measures. The subjective measure, based on the respondents' self-perception of changes in their living condition, aims to classify households according to outcomes of "improved," "unchanged," and "worsened." Objective indicators such as income, landholding, housing, and valuable assets strengthen the validity of the subjective measure.

For the subjective assessment, household informants were asked: "How has your family's living condition changed since shrimp farming began in the area; "improved," "unchanged," or "worsened?" The result reveals that 64.5 percent perceive their living condition generally had improved, 20 percent say their living condition remains "unchanged," and 15.5 percent confirm that theirs have worsened

(see table 16). The finding verifies the point made in chapter 3 that shrimp farming generally contributed to the improvement of household's living condition in Chu Chot. At the same time, the finding also confirms the statement that benefits from shrimp farming have been distributed unequally among households.

TABLE 16

DIFFERENT PATTERNS OF CHANGE IN HOUSEHOLDS' LIVING CONDITION

Nature of change	Frequency	Percent
Improved	71	64.5
Unchanged	22	20.0
Worsened	17	15.5
Total	110	100

Source: Household survey (2006).

Has shrimp farming indeed brought about these changes? Survey data, as table 17 shows, support this claim. Among "improved" households, 84.5 percent recognize that their improvement results from shrimp farming. Only 8.5 percent say that their improvement was based mainly on handicraft making. Other reasons, including trade, services, and increase of labor (as children have grown and become workers) range from 1.4 to 2.8 percent.

Those whose situations have worsened cite their failure in shrimp farming as the primary reason behind their unfavourable living condition, accounting for 47 percent of the total "worsened" households. The following reasons are landlessness

(29.4 percent), disadvantages in making handicraft such as limited inputs and low price of output (11.8 percent) and loss of off-farm job (11.8 percent).

TABLE 17

REASONS FOR CHANGES IN HOUSEHOLD'S LIVING CONDITION

Reasons for change	Frequency	Percent
Improved	**71**	**100**
Shrimp farming	60	84.5
Handicraft making	6	8.5
Trade	1	1.4
Services	2	2.8
Labor increase	2	2.8
Unchanged	**22**	**100**
Shrimp farming	3	13.6
Landlessness	15	68.2
Handicraft making	2	9.1
No answer	2	9.1
Worsened	**17**	**100**
Shrimp farming	8	47.0
Landlessness	5	29.4
Handicraft making	2	11.8
Loss of off-farm job	2	11.8

Source: Household survey (2006).

In the case of "unchanged" households, 68.2 percent of these households cite that lack of land, a main productive resource needed for shrimp farming, was the root cause of "unchanged" situation. Furthermore, 13.6 percent of these households cite their failure in shrimp farming as the main barrier to achieve an improvement of

living condition. In turn, 9.1 percent say that problems in making handicrafts, including the limited availability of inputs and the low price of output, have hindered chances of improving their condition. Another two households, or 9.1 percent of the total, gave no reason for their unchanged status over time.

The basis for assessing the changes, however, remains a subjective measure. How does this measure square with objective indicators? The following discussion describes the correlates between this subjective measure with related objective indicators including income, landholding, housing, and holding of valuable assets. In addition, case studies enrich description.

Income

As mentioned in chapter 3, household income, in general, increased since shrimp began to be raised in the mid-1990s. However, the change of income varies in different periods. Before 2001, household income increased sharply. But it decreased between the period 2001 and 2006 because of both reduction of shrimp yield, as a consequence of water pollution, and decrease of shrimp price. Moreover, the change of household income also varies among household groups: “improved,” “unchanged,” and “worsened” in terms of living condition. While the “improved” households achieved the increase of income before 2001 and remains unchanged after 2001, “worsened” households’ income decreased in the period. The difference of income change between these groups is shown in longitudinal data and via case studies.

In the period 2001-2006, as shown in longitudinal data, the income of all groups decreased because the year 2001, when the baseline data were conducted, was the time when farmers earned the most from shrimp farming (see table 18). However, it became more apparent that the decrease rates vary among groups of “improved,” “unchanged,” and “worsened living conditions.” Accordingly, the “improved” group’s average income was reduced by an insignificant decreasing rate of only -2 percent from US$4,644 in 2001 to US$4,446 in 2006. In contrast, the "unchanged" group’s average income reduced to a larger rate of -40.3 percent from US$1,010 in 2001 to US$603 in 2006. More extremely, the "worsened" group’s average income decreased by -56.6 percent from US$1,736 to US$753.

TABLE 18

CHANGE IN INCOME OF HOUSEHOLD GROUPS
(2001-2006)

Unit: US$

Nature of change	Frequency	Year		Change	
		2001 (1)	2006 (2)	Difference (3) = (2)-(1)	Rate (%) (4) = (3)/(1)
Improved	71	4,644	4,546	-99	-2.1
Unchanged	22	1,010	603	-407	-40.3
Worsened	17	1,736	753	-983	-56.6
Total	110	3,468	3,171	-297	-8.6

Source: Household survey (2006).

Unavailability of survey data in years before 2001 is limited to provide a full understanding of difference of income change among these groups over time since

shrimp farming emerged in Chu Chot Hamlet. Study cases in the following box supplement the limitations.

Box 1: Stories of increase and decrease of income

Income increase of "improved" households. Farmer Huynh Van Tuan, fifty-eight years old in 2006, is one of the richest men in the hamlet both in the past and at present. His family's livelihood is mainly land-based. Since he engaged in shrimp farming, his family's income has increased sharply.

Before Mr. Tuan started to raise shrimp in 1995, he cultivated rice on his 8-ha land. Cultivating only one crop per year during rainy season, his annual rice income was around VND 30 million (rice yield was about 3 tons per hectare and rice price at the time is about VND 1.5 per kilogram).

To earn more, he tried raising shrimp with 2 ha of land in 1995. For this, he earned an additional VND 20 million from shrimp farming during dry season. Consequently, he expanded shrimp farming throughout his land the next year and earned VND 150 million. In 2001, his total income reached the highest point of VND 320 million; in which shrimp income contributed VND 270 million. In 2006, his income reduced a little bit with the earning of VND 300 million.

Different from Mr. Tuan, farmer Cao Van Hy was poor before he engaged in shrimp farming that began in the area. Before 1996, the time he started to raise shrimp, he produced rice on a hectare of land. With a low yield of about 2.5 tons per hectare, the rice harvested was just enough for seven "mouths" to feed in his family.

Thus, he and his wife had to do business as "channel" grocery vendors to earn additional income for everyday expenditures. They earned only about VND 5 million yearly for the livelihood activity.

To improve their financial condition, Cao started shrimp farming in 1996 and earned an additional income of VND 12 million. In the next years, owing to shrimp income contribution, his annual income remained about VND 15 million. In 2003, he purchased an additional 1.3 ha of land (10 congs). As a result, his income increased even more. By 2006, his total income was VND 32 million with a share of VND 27 million from shrimp.

Income decrease of "worsened" households.[1] Le Van Toan, fifty-one years old in 2006, was an average-income household head before the time of shrimp farming. Since he engaged in shrimp farming in 1997, his income decreased because he frequently had shrimp-crop loss in recent years. He had also no back up because he gave up handicraft making, his former livelihood source, when he ventured into shrimp farming.

Before 1997, Toan had only a hectare of land for rice production. At the time, his family did not face financial difficulties because his family's income, estimated about VND 12 million, from rice production and handicraft making was sufficient for everyday expenditures. In 1997 he started to raise shrimp and earned an additional income of VND 10 million. In 1998, the next year, he continued to have a good

[1]Real names of respondents had been replaced to protect their identities.

shrimp crop with an earning of VND 12 million and reached an accumulated income of VND 20 million from all of his income sources. Later on, he found it difficult to buy bamboo for handicraft making because bamboo gardens were being converted into shrimp farms. On the other hand, earning from shrimp farming is much easier than earning from handicraft making. As a result, he gave up handicraft making in 1999 and concentrated on shrimp farming where he reached the highest total income of VND 22 million in 2001. After 2001, his income reduced substantially in part due to the effects of polluted water, a general concern in the area and also because he paid less attention to his farms. His wife complained, “While others go to the shrimp farm to take care of their farms, he goes there everyday to drink (alcohol); he even catches shrimps to eat while drinking.” In 2006, he earned only VND 4.5 million and this is the sole source of his family’s income.

Now, his family faces financial difficulty in part because of Toan’s wasteful spending and because his family pay less attention to their future life.

Unlike the case of Toan whose income decreased while engaging in shrimp farming, the case of Mr. Do Van Luan is a special case illustrating income reduction owing to both shrimp trading and farming.

Luan is a young farmer, thirty-six years old in 2006. Ten years ago, he was a rice farmer with 1.3 ha of land. With a family of three members, the total annual income of about VND 10 million from rice production and “channel” boat vending was comfortable to lead a secure life.

In 1996, like some other farmers, Luom tried raising shrimp and received an additional income of VND 8 million. The following year, he continued to raise shrimp and earned VND 10 million. At the same time, he switched his business from "channel" vending to shrimp trading. Because shrimp trading is risky owing to the nature of shrimp business as he says, his annual income in the next few years is unstable. He earned more than VND 100 million per year in some years, but he also failed or earned lower in others years. Finally, he failed as a shrimp trader. The failure in shrimp farming also lead to failure in shrimp farming because of lack of care given to the farm. In 2006, he was in debt from the bank with an amount of VND 40 million. He has withdrawn from shrimp trading and now focuses on shrimp farming.

Note:
1 cong = 1,300 m = 0.13 ha
US$1 = VND 15,000 in 2001
= VND 16,000 in 2006

In sum, both longitudinal data and study case show that income change related to shrimp farming activities varies among groups. The "improved" group's income increased sharply before 2001 and remained almost the same between 2001 and 2006. In contrast, the "worsened" group's income increased lightly before 2001 and decreased dramatically in the after part of that period.

Landholding

Change of landholding took place mainly after 2001. The extent of change also varied among the three groups. As table 19 shows, the average land area of the

"improved" group increased dramatically with the rate of 40.8 percent, from 27,247 sq m in 2001 to 38,370 sq m in 2006. In contrast, the average land area of the "worsened" group decreased at a rate of 9.3 percent from 11,089 sq m to 10,062 sq m in the same period. Meanwhile, the average land area of the “unchanged” group remained at the decreasing rate of only -2.9 percent, from 6,820 in 2001 to 6,623 in 2006.

TABLE 19

CHANGE IN LANDHOLDING OF HOUSEHOLD GROUPS
(2001-2006)

Unit: sq m

Nature of change	Frequency	Year		Change	
		2001 (1)	2006 (2)	Difference (3) = (2)-(1)	Rate (%) (4) = (3)/(1)
Improved	71	27,247	38,370	11,123	40.8
Unchanged	22	6,820	6,623	-198	-2.9
Worsened	17	11,089	10,062	-1,027	-9.3
Total	110	20,665	27,646	6,981	33.8

Source: Household survey (2006).

The difference of land accumulation occurred as a result of the difference in income gained from shrimp farming. From this income source, households of the "improved" group with almost all of them as large-size land farmers were able to reinvest their production by accumulating land from small-size land farmers in Chu Chot and also from farmers outside the community. In contrast, households of the "worsened" group or those who were landless or were small-size land farmers did

not have the financial ability to buy[2] land; they even had to sell land to large-size land farmers. Illustrative cases are seen in box 2.

Box 2: Stories of land accumulation and release of a farmers

Land accumulation of "improved" households. Farmer Huynh Van Tri, sixty years old, is one of the initiators of shrimp farming. He began to raise shrimp in 1995. As the largest land size farmer with the total land area of 28.6 ha (220 congs), he normally earned between VND 100 million and VND 200 million yearly; in 2001, a boom year, he reaped VND 1 billion. From this large earning, he purchased an additional area of 23.4 ha (180 congs) in 2001. He now remains the largest land size farmer in the hamlet with a total land area of 52 ha (40 congs).

Not as dramatically but just as profitable is the case of Mr. Tri, the case of Pham Van Nhon who gradually accumulated land. Nhon, a forty-one-year-old shrimp farmer, started engaging in shrimp farming in 1997. From 1997 to 2001, he cultivated only 3.9 ha of land which he inherited from his parents. He was successful and earned around VND 50 million to VND 300 million yearly. In 2002, he purchased an additional area of 2.6 ha (20 congs). A year later, he continued to purchase another 2.6 ha and also rented 6.5 ha to raise shrimp. When interviewed in 2006, he shared his plan of purchasing the rented land in 2007 with a budget of about VND

[2]The terms "buy" and "sell" related to land are actually the transfers of the right of land use. In Vietnamese land law, people are allowed to transfer the right of land use, but they have no right to buy or sell land. However, people normally use the terms "sell", as *ban,* and "buy", as *mua*, in their transaction.

500 million, an amount he could gain after the third crop of 2006 ended. If the purchase happens, he will move from the fifth largest land size to the second largest land size farmer in the hamlet with the total landholding area of 15.6 ha.

Land release of "worsened" households. Le Van Liet is a fifty-six-year-old farmer. He began shrimp farming in 1996 with only 1.95 ha of land which was reclaimed before. In the initial years, he earned around VND 20 million per year, an amount greater than the income he earned from rice cultivation before 1996. But the increase in income also came with the increase of household expenditure. Over time, especially when shrimp income came down lower than normal, shrimp income was insufficient to meet the household expenses of six members in the family. In 2001, he was heavily in debt. To pay the debt, he had to release his land in 2002 and become landless, except for homestead land which was used for house construction. From 2003 to 2006 he still cultivated shrimp through a rented land of 3.9 ha. But, he did not earn much from shrimp farming because of crop loss and the charge of land rent. Now, his family income is dependent mainly on handicraft making, a livelihood source he was engaged in before he raised shrimp.

Similar to the Liet case is the situation of farmer Nguyen Van The, who sold a part of his land of 3.5 ha in 2001. Since then time, he works on the farm with the remaining 1.3 ha of land that he still owns. But income from shrimp farming was small and insufficient to bear the everyday expenditures of seven household members. His family has also reengaged in handicraft making as another source of

income.

Note:
1 cong = 1,300 m = 0.13 ha
US$1 = VND 15,000 in 2001
= VND 16,000 in 2006

Housing and holding of valuable assets

Housing and the possession of valuable assets is another set of indicators where the three groups of "improved," “unchanged,” and “worsened” life conditions differ. As shown in table 20, the estimated house average value of the "improved" group increased roughly at rate of 133 percent from US$1,841 in 2001 to US$4,305 in 2006. For the "unchanged" group, the increasing rate of estimated house value is also dramatic at 84.2 percent, from US$463 in 2001 to US$852 in 2006. The increases arose from the earnings that these households gained in boom years like 2001; farmers rebuilt or repaired their houses when they had money to spend. Conversely, the estimated house average value of the "worsened" group decreased at a rate of -14.8 percent from US$475 in 2001 to US$404 in 2006.

Following this trend, the estimated value of television, cassette, motorbike, pump machine, motorboat, and other assets of the "improved" group increased at the rate of 236.9 percent, from US$545 in 2001 to US$1836 in 2006. In turn, that value of the “unchanged” group increased at the rate of 140.2 percent, from US$136 in 2001 and US$325 in 2006. In contrast, the estimated values of assets of the “worsened” group went down at the rate of -23.7 percent, from US$315 to US$241 in the same period.

TABLE 20

CHANGE IN ESTIMATED VALUE OF HOUSES AND VALUABLE ASSETS OF HOUSEHOLD GROUPS (2001-2006)

Unit: US$

Nature of change	Frequency	Year		Change	
		2001 (1)	2006 (2)	Difference (3) = (2)-(1)	Rate (%) (4) = (3)/(1)
Estimated value of house					
Improved	71	1,841	4,305	2,464	133.9
Unchanged	22	463	852	390	84.2
Worsened	17	475	404	-70	-14.8
Total	110	1,354	3,012	,658	122.4
Estimated value of assets					
Improved	71	545	1,836	1,291	236.9
Unchanged	22	136	325	190	140.2
Worsened	17	315	241	-75	-23.7
Total	110	428	1,287	860	201.0

Source: Household survey (2006).

Once more, various outcomes in shrimp farming spelled the difference among the groups of “improved,” “unchanged,” and “worsened.” With a full pocket owing to shrimp farming, some households of the "improved" group were able to construct new houses at an estimated value of about US$10,000 per unit. These households also had the financial ability to buy luxury goods (in the context of the rural area) such as color television, VCD/DVD player, motorbike, refrigerator, cellular phone, electric generator, and the like. Some households even consumed wastefully, purchasing, for example, three motorbikes for three adult members who seldom use them. In contrast, households of the "worsened" group were unable to rebuild or repair their houses and to buy new furniture. In some cases, poor households of the "worsened" group could not even save enough to construct a wall when the local

government supported to build their house by giving roof materials with a value of VND 5 million. In the houses of these households, it is hard to find valuable assets, even a radio. The differences in the change of housing and possession of valuable assets are also illustrated in box 3.

Box 3: Different pictures of the "improved" and the "unimproved"

The improvement of housing and asset holding of “improved” households. Farmer Lam Viet Thanh has cultivated shrimp since 1997. Cultivating on a shrimp field of 3 ha, the average land size in the hamlet, he earned from VND 50 million to VND 200 million yearly. In 2000, he built the front part of his new house amounting to VND 100 million. In 2003, he continued to build the back part of the house at the same cost. Around the time, he bought one electric generator, one refrigerator, two color television, one DVD player, three motorbikes, one additional motorboat, and some others.

Case of the unimprovement of housing and asset holding. Nguyen Van Son, not his real name, is a sixty-six-year-old shrimp farmer in the community. He practices shrimp farming only on a 0.65-ha lot and often incurs losses due to lack of care. His shrimp income is insufficient for everyday expenditures. His family is mainly dependent on his son’s income from barber service. In the past ten years, his family’s living condition has remained the same. Now he lives in the old palm-roofed house built in 1993. Furnitures found in his house include an old black-and-white television (worth VND 0.3 million), a radio (worth around VND 0.1 million), and a

bicycle (estimated about VND 0.3 million). He has no gasoline pump for farming, and so he has to borrow one from his neighbors when the need arises.

In sum, while a majority of beneficiaries improved their living condition owing to shrimp farming, about a third of households engaged in the same livelihood were left behind. While the "improved" household income increased significantly owing to shrimp farming, the "worsened" household income reduced substantially. While the "improved" group was able to build new houses, buy luxury goods, and purchase land, the "worsened" group could not. What factors contributed to the difference? The following section provides some answers.

Factors Determining Patterns of Change in Living Condition

To identify which factors affect the different patterns of change in living condition, the section tests some hypotheses that arise between change in living condition and socioeconomic factors. In these tests, the dependent variable is the change of living condition, having three attributes of "improved," “unchanged,” and "worsened." The independent variables are factors related to the different kinds of household capital. As shown in the analytical framework (see figure 2), eight factors belonging to four sets of capital including personal, natural, institutional, and social are involved in testing research hypotheses. Personal capital covers socioeconomic status, education, and labor force. Land size refers to natural capital. Institutional capital is represented by two indicators, access to credit and access to technology

training. In turn, social capital is measured by membership in social organizations and frequency of contact with neighbors, relatives, and friends.

Socioeconomic status

The household's socioeconomic status is considered as a measure of wealth that reflects a financial capacity to invest in shrimp farming. Rich households are assumed to invest more inputs on their farms than do their poor counterpart; the rich households thus reap more benefits from shrimp farming. It is hypothesized that positive association exists between socioeconomic status and change of living condition. Stated differently, households with higher than lower socioeconomic status tend to report an improved living condition.

The independent variable of "socioeconomic status" consists of two categories: "poor" and "nonpoor." Identifying who are poor or nonpoor is based on adjusted[3] self-perception of respondents. Accordingly, the poor are those who have little or no land, have no stable income sources, live in temporary houses, and lack essential living assets. In contrast, the nonpoor are those who have cultivated land or stable high income sources, living in permanent or semipermanent houses, and have some kind of assets. The 2006 survey shows that 64.5 percent of households are nonpoor and 35.5 percent are poor.

[3]The researcher originally intended to use self-perception of respondents as the measure of socioeconomic status. However, through considering objective measures such as income, landholding, housing, and possession of valuable assets and discussions with the hamlet leader, five households whose respondents said they were poor were actually nonpoor. These households were then reclassified to give the overall result reported above.

The hypothesis receives support from the data. As shown in table 21, 85.9 percent of nonpoor households have improved their living condition while only 25.6 percent of poor households have not. Whereas, a proportion of the nonpoor having worsened living condition is lower than that of the poor having the same condition, 5.6 percent and 33.3 percent correspondingly. Level of association between the two variables is very strong with a gamma of 0.84. The association is statistically significant beyond the 0.01 level (p=0.000).

TABLE 21

PERCENTAGE DISTRIBUTION OF HOUSEHOLD GROUPS, BY CHANGE IN LIVING CONDITION AND SOCIOECONOMIC STATUS

Nature of change	Socioeconomic status		Total
	Nonpoor	Poor	
Improved	85.9	25.6	64.5
Unchanged	8.5	41.0	20.0
Worsened	5.6	33.3	15.5
Total	100	100	100
Number of cases (N)	(71)	(39)	(110)

Gamma=0.84 (p=0.000)

Source: Household survey (2006).

In-depth qualitative interview helps explain the difference. Five main reasons were drawn from interviewees. First, almost all of the poor households have little or no land, an essential resource for shrimp farming. Lack of land restrains these households' access to shrimp farming. In case of households cultivating rented land,

additional cost reduces the size of their income. Second, landless poor households have less job opportunities than before because shrimp farming require less labor than rice cultivation. Since shrimp has been raised in farms, opportunity for off-farm work diminished and hired laborers also found it difficult to get other jobs. Third, lack of financial capital restrains poor farmers to access good source of shrimp variety. Instead of buying good fingerling quarantined at the fingerling-providing center in Bac Lieu Province as rich households do, poor households are forced to buy fingerling from local providers, who allow them to pay fingerling cost later. Fourth, because of the same lack of financial capital, poor farmers invest less on their farm. They seldom use lime to control acidity and fertilize their farm. Finally, the unavailability of money for every expenditure forces poor farmers to harvest their shrimp when shrimp is still so small. As a result of the early harvest, shrimp yield is low and so is the price of shrimp in the market.

Obviously, nonpoor households tend to improve their living condition more than poor households. However, it is also observed in table 21 that some nonpoor households have not achieved the improvement while some poor households have. What factors explain this fact? Chapter 5 answers the question.

Labor force

In shrimp farming, similar to other agricultural activities, the availability of labor is also an important factor influencing the production outcome. The hypothesis

is that “the greater the number of workers in a household, the higher the probability that the household will report an improvement in their living condition.”

In testing the hypothesis, the variable of “availability of labor” is categorized into two groups: the “less-worker” group and the “more-workers” group. The “less-worker” group includes households with one to two workers, classified as those who are of working age (18 to 60 years old). The “more-workers” group includes households with more than two workers. The survey data show that 52 cases belong to the “less-labor” group; the 58 cases belong to the “more-labor” group.

The result shown in table 22 reveals a fairly strong association between the number of workers and the change in living condition (gamma=0.48, p=0.003). The “more-workers” households (79.3 percent) compared with the “less-labor” households (48.1 percent) improve their living over time.

TABLE 22

PERCENTAGE DISTRIBUTION OF HOUSEHOLD GROUPS, BY CHANGE IN LIVING CONDITION AND NUMBER OF WORKERS

Nature of change	Group		Total
	Less labor (1-2 workers)	More labor (3 workers and above)	
Improved	48.1	79.3	64.5
Unchanged	34.6	6.9	20.0
Worsened	17.3	13.8	15.5
Total	100	100	100
(N)	(52)	(58)	(110)

Gamma=0.48 (p=0.003)

Source: Household survey (2006).

What explains the association? Drawn from the interview and observation, the availability of labor in the farm at nighttime is the key element here. In “more-labor” households, it is normal that at least one worker (staying in farm shanties) watch the farm at night during seasonal time. His work is not only to monitor shrimp growth and disease symptom of shrimp crop (shrimps can normally be seen when they look for food at night) but also to be on the lookout for thefts. The monitoring work helps farmers reduce the probability of crop loss owing to shrimp diseases, while the guarding work prevents theft incidents. In contrast, “less-labor” households seldom field workers in the shrimp farm at nighttime because main workers of these households, normally the household heads, need to spend time with their family. They are thus less likely to take care of shrimp farm at night. As a result, their earnings are often cut down owing to shrimp losses.

Another indicator related to labor force is household size. In the Vietnamese rural area in general and in Chu Chot Hamlet in particular, some people beyond the working age also engage in farming. Thus, the study tried to measure the association between the independent variable, household size, and the dependent variable, namely change in households’ living condition. The result is that the group of households having one to three members reported that their living condition stays “unchanged” or “worsened” more than other groups. However, there are no significant difference between the four-to-five member group and the group having more than five members (see table 23).

TABLE 23

PERCENTAGE DISTRIBUTION OF HOUSEHOLD GROUPS, BY CHANGE IN LIVING CONDITION AND HOUSEHOLD SIZE

Nature of change	Household size			Total
	1-3 members	4-5 members	More than 5 members	
Improved	30.0	74.1	68.8	64.5
Unchanged	45.0	13.8	15.6	20.0
Worsened	25.0	12.1	15.6	15.5
Total	100	100	100	100
(N)	(59)	(13)	(13)	(85)

Gamma=-.296 (p=0.049)

Source: Household survey (2006).

The explanation for the difference between the one-to-three member group and the others is the same as the explanation given above on the relation between number of workers and change in household living condition.

Education

It is assumed that education, as it reflects the quality of labor, enables farmers to access high level of technology which, in turn, yields benefits from shrimp farming. It is thus hypothesized that a positive association exists between education and change in living condition.

The average number of schooling years of workers (eighteen to sixty years old) is chosen as a significant factor to measure education. To test the hypothesis, sample households are divided into two groups: “lowly educated” and “highly educated.” The “lowly educated” group includes household workers with an average

number of less- than-five schooling years, or those who did not reach secondary school. “The highly educated” group includes household workers with an average number of equal-to-five-and-above schooling years. The survey data show that 49.1 percent of households are in the “lowly educated” group and 50.9 percent of households belong to the “highly educated” group.

The result, as shown in table 23, points out that education is associated significantly with the change of living condition (gamma=0.40, p=0.019). Accordingly, 75 percent of the “highly educated” group reports an improvement in living condition while only 53.7 percent of the “lowly educated” group cites an improvement in their living condition. In contrast, 20.4 percent of the “lowly educated” group has worsened, while only 10.7 percent of the “highly educated” group has worsened.

TABLE 24

PERCENTAGE DISTRIBUTION OF HOUSEHOLD GROUPS, BY CHANGE IN LIVING CONDITION AND EDUCATIONAL LEVEL OF WORKERS

Nature of change	Average education of workers (%)		Total
	Lowly educated	Highly educated	
Improved	53.7	75.0	64.5
Unchanged	25.9	14.3	20.0
Worsened	20.4	10.7	15.5
Total	100	100	100
(N)	(54)	(56)	(110)

Gamma=0.40 (p=0.019)

Source: Household survey (2006).

In what way does education help improve households' living condition? The association between education and change in living condition is found through different levels of access to technology via media such as television, radio, and other materials. Accordingly, "highly educated" farmers have more access to shrimp farming technology via the media than "lowly educated" farmers. Indeed, the associations exist between education and three variables respectively frequency of learning shrimp farming technology via television (gamma=0.41, p=0.050), frequency of learning shrimp farming technology via radio (gamma=0.28, p=0.170) and reading shrimp farming technology materials (gamma=0.72, p=0.00). In turn, it is found that learning shrimp farming technology via media associates strongly with the variable of "change in living condition" (see tables 24 to 26). The associations between "frequency of learning shrimp farming technology via television" and "change in living condition" is measured at gamma of -0.72 (p=0.000). The gamma value measuring the association between "frequency of learning shrimp farming technology via radio" and "change in living condition" is 0.57 (p=0.010). Lastly, the association between the "reading shrimp farming technology materials" variable and the "change in living condition" variable is measured at gamma value of 0.48 (p=0.086), significant at low level of 0.1.

In short, the evidence reveals that education enables farmers to gain better access of shrimp farming technology through media and other materials. In turn, the better technology helps farmers achieve high returns and improvement of their living condition in general.

TABLE 25

PERCENTAGE DISTRIBUTION OF HOUSEHOLD GROUPS, BY CHANGE IN LIVING CONDITION AND FREQUENCY OF LEARNING SHRIMP FARMING TECHNOLOGY VIA TELEVISION

Nature of change	Frequency of learning shrimp farming technology via television (%)			Total
	Seldom or never	About once per month	About once per week	
Improved	64.4	92.3	92.3	73.0
Unchanged	15.3	7.7	7.7	13.0
Worsened	20.3	0	0	14.0
Total	100	100	100	100
(N)	(59)	(13)	(13)	(85)

Gamma=-.72 (p=0.00)

Source: Household survey (2006).

TABLE 26

PERCENTAGE DISTRIBUTION OF HOUSEHOLD GROUPS, BY CHANGE IN LIVING CONDITION AND FREQUENCY OF LEARNING SHRIMP FARMING TECHNOLOGY VIA RADIO

Nature of change	Frequency of learning shrimp farming technology via radio (%)			Total
	Seldom or never	About once per month	About once per week	
Improved	64.9	93.7	83.4	73.0
Unchanged	15.8	6.3	8.3	13.0
Worsened	19.3		8.3	14.0
Total	100	100	100	100
(N)	(57)	(16)	(12)	(85)

Gamma=0.57 (p=.010)

Source: Household survey (2006).

TABLE 27

PERCENTAGE DISTRIBUTON OF HOUSEHOLD GROUPS, BY CHANGE IN LIVING CONDITION AND READING MATERIALS ON SHRIMP FARMING TECHNOLOGY

Nature of change	Reading books/materials (%)		Total
	No	Yes	
Improved	69.6	87.4	73.0
Unchanged	14.5	6.3	13.0
Worsened	15.9	6.3	14.0
Total	100	100	100
(N)	(69)	(16)	(85)

Gamma=-0.484 (p=0.086)

Source: Household survey (2006).

Land size

Shrimp farming is land-based production. Thus, land is assumed as the most important factor influencing change in households' living condition. It is hypothesized that households with larger land size tend to report having improved their living condition more than households with smaller land size.

To test the hypothesis, the variable of land size is categorized into three groups: "landless," "small land size," and "large land size." The "landless" group is named for those who have no cultivated land. The "small land size" group includes farmers with land size less than two hectares. The "large land size" group enlists farmers with land size equal to two hectares and above. The survey data show that 22 cases of the sample households are "landless," 45 cases belong to the "small land size" group, and 43 cases are in the "large land size" group (see table 27).

Table 27 further supports the research hypothesis. A majority of the “large land size” group (90.7 percent) has improved living condition; simultaneously, the “landless” group (27.3 percent) reports the same success. In contrast, 72.7 percent of the “landless” group has not achieved improvement in living condition, both “unchanged” and “worsened,” while only 9.4 percent of the “large land size” group has not improved. The association between the two variables is very strong (gamma=0.65, p=0.000).

TABLE 28

PERCENTAGE DISTRIBUTION OF HOUSEHOLD GROUPS, BY CHANGE IN LIVING CONDITION AND LAND SIZE

Nature of change	Groups by land size (%)			Total
	Landless	Average land size	Large land size	
Improved	27.3	57.8	90.6	64.5
Unchanged	50.0	20.0	4.7	20.0
Worsened	22.7	22.2	4.7	15.5
Total	100	100	100	100
(N)	(22)	(45)	(43)	(110)

Gamma=0.65 (p=.000)

Source: Household survey (2006).

It is clear that households with larger land size benefit more from shrimp farming than “landless” and “small land size” households. This is understandable because land is the most essential factor in shrimp farming. Moreover, in-depth interviewing also revealed some other reasons to explain the difference.

First, job opportunities such as off-farm work, handicraft making, and fishing, as main livelihoods of landless households, declined since shrimp farming appeared. Because shrimp farming requires less work than rice production, landless people were seldom hired. Handicraft makers, mainly landless poor people, also found it difficult to get handicraft materials because a large number of bamboo gardens were converted into shrimp farms. Furthermore, fishing has become more difficult for landless poor people because shrimp farmers no longer allowed others to fish in their farms.

Second, for landless households who cultivate shrimp on rented land, the additional cost reduces the size of their returns. In addition, these farmers normally have low yield or higher probability of crop loss because almost all rented lands are poorly irrigated. This is the reason why land is leased.

Third, aside from the advantage of having large land size, wealthy farmers, who normally have more than one parcel of land, have lower risk of crop failure. They seldom get shrimp crop loss in all their parcels of land farmed at the same time. On the other hand, their wealth, as a result of having more land, helps them overcome difficulties easier when they get crop loss.

Credit access

While wealth reflects internal financial capacity, access to credit is an indicator of external financial capacity. It is thus hypothesized that those who have access to credit have a higher probability to improve their living condition than those

who do not. In testing the hypothesis, sample households are categorized into two groups: those who have access to credit and those who have no access to credit. The group with access to credit comprises households who have had access to formal credit sources like banks during the past five years and the group with no access to credit includes those who have not. The survey data show that 48 cases of households have no access to formal credit and 62 cases of households do so (see table 29).

TABLE 29

PERCENTAGE DISTRIBUTION OF HOUSEHOLD GROUPS, BY CHANGE IN LIVING CONDITION AND CREDIT ACCESS

Nature of change	Access to credit (%)		Total
	No	Yes	
Improved	68.8	61.3	64.5
Unchanged	18.8	21.0	20.0
Worsened	12.4	17.7	15.5
Total	100	100	100
(N)	(48)	(62)	(110)

Gamma=0.16 (p=0.380)

Source: Household survey (2006).

The result of testing hypothesis, however, does not support the hypothesis. There is no significant association between the variables of access to credit and change of living condition (gamma=0.16, p=0.38). The role of credit appears insignificant in improving the households' living condition.

Qualitative data gathered from the field suggest two main reasons to explain the weak impact of credit access. The first reason stems from the poor households' inappropriate use of loan. Instead of using a loan for production investment, poor households usually spend the loan for everyday living expenditures. As a result, these households have not improved their living condition. The second reason is that almost all of the nonpoor households do not need a loan. The capital amount needed for shrimp farming investment is negligible compared to their overall financial capacity. For example, a farmer says:

> I don't want to get into debt. If I borrow loan, I must pay. While I spend only about VND 20 million (for 4 ha) and earn about VND 100 million yearly, why do I have to borrow?

Attending technology training/s

Aside from financial capital and land, cultivation technology is also assumed as an important factor influencing change in living condition. Attending technology training given by government extension staff has the potential to enhance shrimp farming technology. It is therefore hypothesized that those who attended technology trainings tend to improve their living condition more than those who did not. To test the hypothesis, sample households were divided into two groups: training participants and nontraining participants. The training participants comprise those who attended at least one technology training and nontraining participants are those who have never attended any technology trainings. The 2006 survey data show that only 19 percent of shrimp raisers (sixteen cases) were training participants and 81

percent (sixty-nine cases) were nontraining participants. Did attendance make a difference?

Table 30 shows a relatively strong association between the variables of change in living condition and attendance in technology trainings (gamma=-0.48). Accordingly, the percentage of training participants (87.5 percent) achieves a higher rate of improvement than the nontraining participants (69.6 percent). In contrast, 15.9 percent of nontraining participants report a worsened living condition, while only 6.3 percent of training participants show the same fate. However, while the gamma association is respectable (gamma=-0.48), the relationship is not statistically significant (p=0.086).

TABLE 30

PERCENTAGE DISTRIBUTION OF HOUSEHOLD GROUPS, BY CHANGE IN LIVING CONDITION AND PARTICIPANTS IN TECHNOLOGY TRAINING/S

Nature of change	Groups (%)		Total
	Training participant	Nontraining participant	
Improved	69.6	87.5	72.9
Unchanged	14.5	6.3	12.9
Worsened	15.9	6.3	14.1
Total	100	100	100
(N)	(69)	(16)	(85)

Gamma=-0.48 (p=0.086)

Source: Household survey (2006).

Why then should there be any association between the two aforementioned variables? Attending technology trainings in general is helpful to almost all participants who practice shrimp farming. Among the participants, 81.3 percent (thirteen cases) confirm that attending these trainings is helpful. Although shrimp farming technologies given by aquacultural extension workers, as perceived by participants, are not completely applicable to the context of shrimp farming administered in the area, aquacultural extension remains meaningful in some ways. Farmers are able to recognize symptom of shrimp disease, measure and adjust acidity of water, and create good environment for the development of algae. As one farmer states:

> They (implied for aquacultural extension workers) just talk about shrimp farming technology in general meaning. While we raise shrimp at the "improved-extensive" raising level, they talk about technology of the "industrial" raising level. What they talk is not applicable for the context of shrimp farming here. However, by answering our questions, they let us know how to recognize symptom of shrimp disease, using "giay qui" to measure acidity and adding lime to adjust acidity. They also advise us to plant grass or rice to develop algae.

In contrast, the rest of the participants (three cases) found these trainings to be perfectly irrelevant. Aside from recognizing that technologies given by aquacultural extension work was not applicable, they add that, ". . .they (the aquacultural extension workers) failed to answer questions related to the problems we encounter."

Organizational membership

The six variables mentioned earlier are closely related to the three most important factors in shrimp farming as well as in other economic activities, including capital, labor, and technology. In turn, the variable of organizational membership is seen as a social resource. Being a member of an organization is assumed to play an important role in mobilizing other resources such as credit, technology, and land. The relevant hypothesis to this is that those who are members of at least one social organization such as farmer's union, women's union, or veteran's union in the community tend to improve their living condition more than the rest.

The result, shown in table 31, does not endorse the research hypothesis. There is no significant association between the variable of membership in organization/s and the variable of change in living condition (gamma=-0.28, p=0.267).

TABLE 31

PERCENTAGE DISTRIBUTION OF HOUSEHOLD GROUPS, BY CHANGE IN LIVING CONDITION AND ORGANIZATIONAL MEMBERSHIP

Nature of change	Organization member (%)		Total
	Yes	No	
Improved	76.5	62.4	64.5
Unchanged	11.8	21.5	20.0
Worsened	11.8	16.1	15.5
Total	100	100	100
(N)	(17)	(93)	(110)

Gamma =-0.28 (p=0.267)

Source: Household survey (2006).

The weak influence of social organizations such as the farmers' union, women's union, and veterans' union, among others, in the community (also discussed in chapter 2), is the main reason for the lack of association between organizational membership and change in living condition. Recognizing this weakness, local people shy away from these organizations. When asked, "Are there any members in your family joining any local social organizations such as farmers' union, women's union, and veterans' union?", a farmer responded, "No, we don't want to take part in these organizations because they are unhelpful; we just contribute to the fund, but receive nothing." Meantime, members of these organizations do not care about their role as members. Answering the same question, another respondent says:

> You can note "yes" or "no." It is up to you. Although I was enlisted in the farmers' union a year ago, no one has invited me to participate in any activities. So I do not know whether I am still a member or not."

Discussion with neighbors, friends, and relatives about shrimp farming technology

Frequency of discussion with neighbors, friends, and relatives about shrimp farming technology is chosen as another form of social capital that can affect the change in one's living condition. The factor, as assumed, can enhance knowledge of shrimp farming technologies, help farmers achieve good shrimp crops, and then help enhance farmers' living condition. It is hypothesized; the more frequent farmers

discuss shrimp farming technology with neighbors, relatives, and friends, the higher the probability that they benefit from shrimp farming. To facilitate the test, the variable “frequency of discussion” is categorized into three groups: “seldom or never,” “about once a month,” and “about once a week.” The survey data show that 30 cases belong to the “seldom or never” category, 28 cases is in the “about once a month” category, and 27 cases belong to the “about once a week” category.

Table 32 supports the research hypothesis. Accordingly, the proportion of “improved” cases increases substantially by frequency of discussion, from 60 percent of the “seldom or never” group to 71.4 percent of the “about once per month” group, and to 88.9 percent of the last group. In contrast, the proportion of “worsen” cases decreases from 20 percent to 14.3 percent and to 7.4 percent correspondingly. The level of association between the two variables is quite strong at gamma value of 0.43. However, the level of statistical significance of the association is low ($p=0.12$).

In what way does the discussion of shrimp farming technology with neighbors, friends, and relatives help farmers improve their living condition? Many of those who have achieved improvement in their living condition confirm that shrimp farming experiences learned from others help them reduce the probability of crop failures, get high returns, and increase their income. A farmer, for example, shares:

> I failed during my initial attempts of raising shrimp in 1998. During that time, I did not understand what the reason was since I applied similar techniques with other farmers in preparing farm, giving fingerlings, irrigating, and so on. After consulting with some neighbors, I recognized that my failure is caused by high level of acidity; “new” shrimp farms, soon after being dug, are inclined

to such water condition. By adding lime to adjust water acidity, as consulted, I succeeded. Now, I seldom get crop loss owing to an efficient shrimp farming technology, drawn from both personal experiences and experiences learned from others. Sometimes, some people come to seek for advice, and I am willing to help them.

TABLE 32

CHANGE IN LIVING CONDITION, BY FREQUENCY OF DISCUSSION WITH NEIGHBORS, FRIENDS, AND RELATIVES ABOUT SHRIMP FARMING TECHNOLOGY

Nature of change	Frequency of discussion			Total
	Seldom or never	About once per month	About once per week	
Improved	60.0	71.4	88.9	72.9
Unchanged	20.0	14.3	3.7	12.9
Worsened	20.0	14.3	7.4	14.1
Total	100	100	100	100
(N)	(30)	(28)	(27)	(85)

Gamma=-0.428 (p=.012)

Source: Household survey (2006).

In contrast, lack of access and care of adaptability to modern technology due to infrequent discussion with others, as remarked by successful farmers, is the main reason why some farmers failed in shrimp farming. One successful farmer explains:

> …They lack technology. They are not active to learn technology from others. While we learn together frequently, some never do. Some farmers think of themselves as experts and so they don't want to learn more from others. The case of farmer Duong Van Toi is a typical example. He was the shrimp farming initiator. He was successful in the earlier years, but incurred many crop losses frequently in the recent years. With his self-respect, he never hears from others, although others, including me, want to help him.

Toi also confirms this assessment. When asked: how often he meets with neighbors, friends, and relatives to discuss and learn more about shrimp farming experiences, farmer Toi says, “Why do I have to learn from them? I am the one who brought shrimp farming to the area. I have more experiences than them.” When asked why he experienced crop loss recently, he simply answered, “because of fate.”

Summary

The chapter answers two main research questions. First, to what extent do individual households improve or not improve in their living condition? Second, which factors determine different patterns of improvement among households?

Answering the first question, the study discovered different patterns of improvement in the households’ living condition. A majority of households (64.5 percent) have expressed improvement in their living condition, while the rest of the households remained “unchanged” (20 percent) or worsened (15.5 percent). The objective measures including income, landholding, housing, and holding of valuable assets clarified how “improved,” “unchanged,” and “worsened” household groups are. Accordingly, the “improved” household group’s income increased dramatically while the “worsened” household group’s income reduced substantially. While some households of the "improved" household group were able to enlarge their land size, some of the "worsened" household group had to sell their land. While the "improved" households also enhanced their housing condition and possessed more valuable

assets, the "worsened" households did not. For “unchanged” households, these indicators remained almost the same or slightly changed.

Answering the second question, the chapter tested eight research hypotheses. In these tests, the improvement of living condition was considered as the dependent variable. The intended independent variables include socioeconomic status, labor force, education (personal resources), land size (natural resource), credit access, technology training (institutional resources), organizational membership, and frequent discussion of shrimp farming experiences (social resources) with neighbors, friends, and relatives.

The testing results show that structural advantages such as wealth, high educational achievement, sufficient labor force, and ownership of large size land benefited households from shrimp farming which, in turn, helped improve the households’ living condition. Beyond these structural advantages, attending shrimp farming technology training/s and discussing shrimp farming technology with neighbors, friends, and relatives were also meaningful to help farmers improve their living condition. Stated differently, a majority of beneficiaries from shrimp farming are those who are rich (or nonpoor), are highly educated, have sufficient labor, hold large size of land, have chance to attend technology training, and discuss frequently shrimp farming technology with others. On the contrary, credit access and participation in community organization/s are unhelpful for households to improve their living condition.

Yet the data also reveal that not all of those who have these advantages report improved living condition. Conversely, not all of those who lacked these

resources report a decline in their living condition. For instance, nonpoor households (5.6 percent) claim that their living condition has worsened, while of poor households (25.5 percent) report having improved. In terms of landholding, landless households (22.7 percent) express improvement in their living condition, while (4.7 percent) farmers with large size of land report a setback in living condition. What factor explains these cases? The following chapter answers the question through elaborating how households mobilize their resources.

CHAPTER 5

CAPITAL MOBILIZATION OF SELECTED HOUSEHOLDS

As the findings of the previous chapter reveal, most of the beneficiaries of shrimp farming are those who possess structural advantages such as wealth, sufficient labor, high education, large size of land, and access to shrimp farming technology. While these findings provide a good general picture, there is still a need to explain special cases when some households in advantaged positions failed to improve their living condition and some households who are not as privileged have improved their living condition. By conducting the "deviant case analysis," this chapter aims to discover other factors affecting change in households' living condition.

The chapter has two sections. The first section focuses on ways by which households' living condition improved. The second section looks at causes pulling a part of households downward, and eventually learns why these households failed at improving their living condition. In each of the two sections, four study cases are presented. These cases show the different levels of structural advantages from the given resources and different ways leading to the upward or downward change of living condition.

Improvement of Living Condition

This section describes the types of capital that households owned before they engaged in shrimp farming and the ways they mobilized capital during shrimp

farming time. The section ends with a discussion on a diagram that shows interrelations among different types of capital, as presented in the analytical framework.

Description of capital holding and capital mobilization in study cases

Case 1. Farmer Huynh Van Chanh, forty-seven years old, is one of the most successful farmers. He started to raise shrimp in 1996. Owing to shrimp farming, his family's living condition has improved dramatically, receiving an annual income of VND 100 million and above. In 2006 he earned VND 250 million. In 2003, he built a new house worth VND 300 million. Around that time, he also bought a lot of luxury goods with a total value of around VND 100 million. What contributes the improvement?

Before engaging in shrimp farming, he already had structural advantages in the form of land, capital, and education more than many other people in the commune. At that time, he had 8.2 ha of cultivated land which generated an annual rice income of about VND 30 million. With that amount, he was considered rich in the community. Relatively, achieving for himself high education is his other advantage. While the average educational attainment of farmers in the hamlet is at elementary school, he spent ten years in school.

During shrimp farming time, his money, land, and high education enabled him to mobilize other resources. His wealth expanded when he invested in shrimp farming. Moreover, it contributed to enlarge the size of his land, mobilized workers,

and enhanced social capital. With sufficient financial capital, he had no trouble converting his rice field into a shrimp farm. Consequently, good shrimp crops made him prosper more. In addition, his wealth enabled him to hire two permanent workers to take care of his shrimp farms. He was also able to buy additional 5 ha of land in 2001, which, in turn, increased his wealth. Moreover, a full pocket enabled him to enhance his social capital by attending almost all community activities such as weddings, death anniversaries, and other festivities when invited. From that, he learned more about shrimp farming experiences from other farmers. His higher education also helps him gain better access of shrimp farming technology through discussion with the others, learning from television and radio, and reading books and other materials.

Case 2. Farmer Ho Canh Hol, forty-four years old, married, and with two children, has achieved success in shrimp farming since he began raising shrimp since 1997. In the ten years, his family's living condition has improved substantially. In 2003, he bought 2.5 ha of cultivated land and 300 sq m of homestead land. In 2006, he built a new house worth VND 150 million. He also furnished his house with telephone, and other major purchases such as a motorbike and a new motorboat, a refrigerator. What contributes to his success?

When he engaged in shrimp farming in 1997, he did not have many structural advantages in comparison with other people. He only had 2.2 ha of land which he inherited from his parents at the time he started to live independently in the early 1980s. His family received a combined average annual income of about VND 15

million from rice production and handicraft trade. Earning the annual income classifies them as an average-income household. Education had not been advantageous for him and his wife as they only attained elementary schooling. It was social capital that brought about their success. Hol is actually the son of Ho Canh Dong, one of the richest people in the community, and a relative of the hamlet leader. The relationship of Hol with these people played a kind of social capital that enabled him to access land, capital (loan), and technology during the time he raised shrimp.

Being the son of farmer Ho Canh Dong, Hol was able to inherit 2.2 ha of land. In addition, he was able to borrow money when he was in need. In 1996, he borrowed VND 10 million from his parent so he could convert a rice field into a shrimp farm. In 2003, he again borrowed money, this time, not only from his parent but also from his brothers an amount of VND 70 million to add to an existing budget of VND 150 million to buy of 2.5 ha land. In the process, he also learned much about shrimp farming from the experiences of his relatives who often succeed in shrimp farming. He shares:

> Raising shrimp at “improved extensive” model like this is not easy as many people think. Experience is the most important. I often discuss with my relatives my experiences in shrimp raising and whenever I have a problem, I consult them.

Being a relative of the hamlet leader and being a member of a farmers’ organization, he was invited to attend technology training which, according to him, is helpful for his shrimp farming. He elaborates, “The shrimp farming technology

shared by aquacultural extension workers has been helpful in many ways as it taught us how to adjust water source, acidity, and salinity as well as how to detect symptoms of shrimp disease and how to treat them."

Aside from social resources, landownership, as earlier mentioned, also became another advantage as it enabled him to gain credit access. Owing to the certificate of landowning as collateral, he was able to loan VND 30 million from the bank. The loaned amount along with the borrowed amount of VND 70 million from relatives and VND 50 million from savings enabled him to buy 2.5 ha of additional land.

Case 3. Nguyen Van Nam, fifty years old, shares the story of his family which is a typical case of one that escaped poverty due to shrimp farming. His family's income increased dramatically since he started to raise shrimp in 2003. As a result, his family's living condition also improved.

In-depth interview revealed that social capital holds the key role for his success that enabled him to have access to land, credit, and technology as well.

Up to 2001, the household of Nam was poor. At that time, he only owned 0.52 ha of unproductive homestead land. His family's income depended largely on handicraft making that provided them just enough for food, clothes, and other basic needs. In general, their family found it difficult to survive.

In 2002, Nam became related to the hamlet leader when his daughter married the hamlet leader's son. Soon after, the hamlet leader facilitated for him a loan of 5 million from the Fund for the Poor. At the same time, the hamlet leader also

encouraged him to rent land. In 2003, he rented 1.3 ha of land where he began raising shrimp. The technical help of his son-in-law who had experiences in shrimp farming often prospered his crops. As a result, shrimp farming had significantly increased his family income. Since the time he engaged in shrimp farming, he has earned VND 10 million to VND 20 million per year. Shrimp income, along with handicraft income, pushed him out of poverty.

Case 4. Before 2002, Nguyen Trong Nam, forty-seven years old, was still poor. He had no land. At the time, his family lived in a temporary house constructed in borrowed land. Their livelihood was based mainly on handicraft making and off-farm works (hired labor). In 2002, he bought a hectare of cultivated land and a hundred square meter of homestead land. Since that time, he has engaged in shrimp farming. With an additional shrimp income of around VND 10 million per year, he escaped poverty in 2003. He had a quite stable life in 2006. How did he mobilize resources to improve his family's living condition?

Different from the case of Nguyen Van Nam's household whose success is based mainly on social capital, the successful case of Nguyen Trong Nam's household stems from personal qualities, which may be seen as another form of human capital. Owing to the personal qualities seen in terms of hard work, saving, appropriate spending, and increase of workers, he was able to buy land, engage in shrimp farming, and escape poverty. When asked why other poor people have not improved like him, N. T. Nam explains:

> They are lazy and they spend wastefully. While we make handicraft even 10 hours per day, they work only when their rice stock is nearly empty. While we try to save each *xu* (cent), they spend all of what they earn, even for drinking. In addition, two of my children have grown up and so they can now help us in handicraft making.

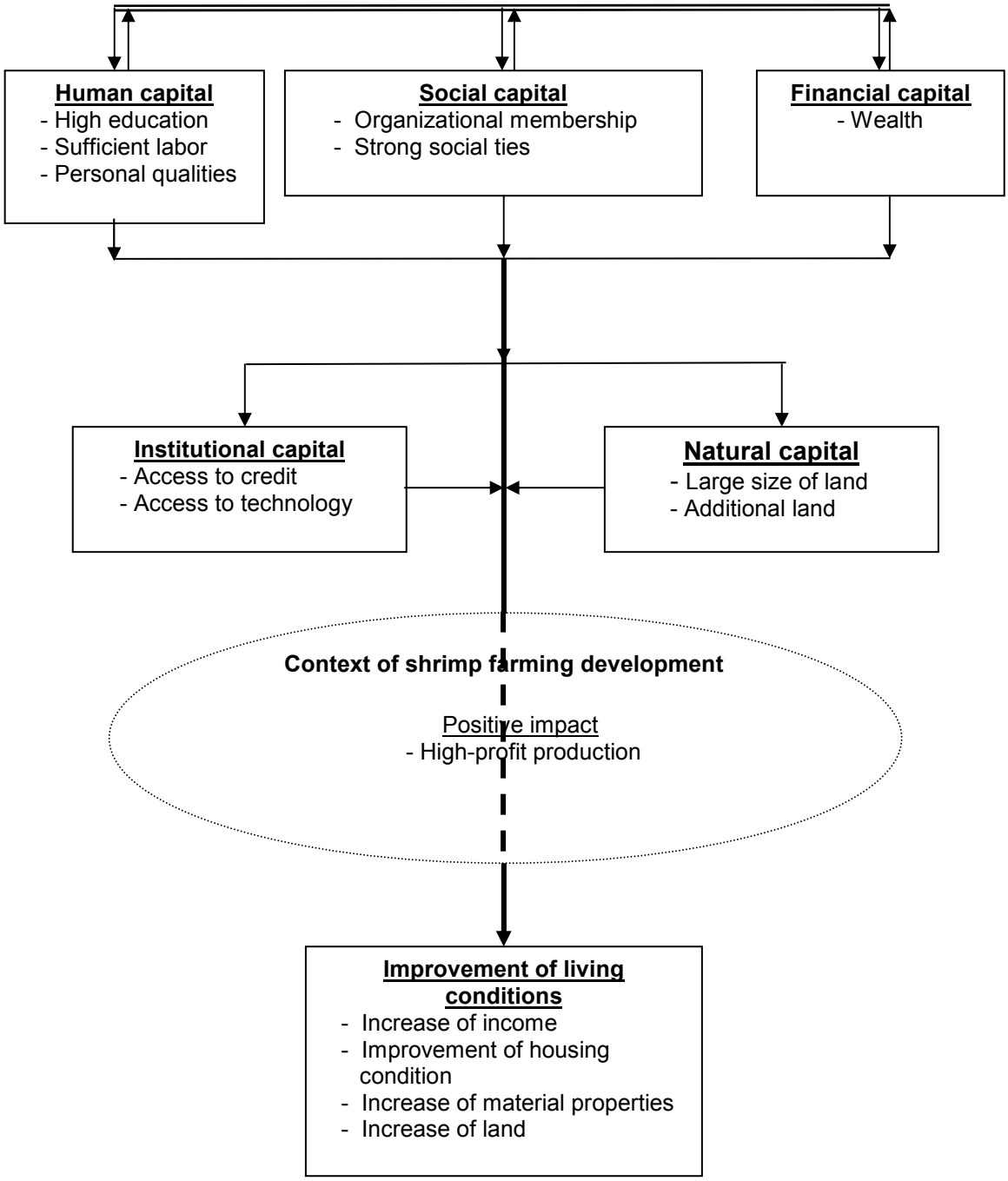
Discussion

The description of selected households, as also summarized in figure 17, shows that given five types of capital, including human, financial, social, institutional, and natural, all contributed to improve the living condition of households. The result verifies the findings made in the previous chapter.

More importantly, the description reveals that capital mobilization, as shown in mutual interrelations among different types of capital, also plays an important role in facilitating the improvement. Each type of capital is related to other types of capital. First, human capital (high education, labor, and personal qualities) are related to natural capitals and social capitals as in cases 1 and 4. Second, social capital (being a member of community organization, having relatives who are rich or powerful, and having constant communication with neighbors) is associated with institutional capital (cases 2 and 3) and natural capital (cases 2 and 3). Third, financial capital (wealth) is related to social capital (case 1) and natural capital (cases 1 and 2). Fourth, institutional capital (access to credit and access to technology training) are related to natural capital (case 2). Lastly, natural capital, especially land, plays an important role in mobilizing both social and institutional capitals (case 2).

FIGURE 17

WAYS TO MOBILIZE CAPITALS TOWARD THE IMPROVEMENT OF HOUSEHOLDS' LIVING CONDITION



In sum, again, structural advantages owing to possessing some types of capital are proved as important factors leading to the improvement of living condition of households. In addition, capital mobilization of households, being seen in interrelations among various resources, also contributes to the improvement. The role of capital mobilization implies that households who have little structural advantages may improve their living condition in the context of shrimp farming if they have a good strategy to mobilize capitals. The point is whether lack of capital mobilization strategy also causes unimproved living condition.

Causes of Unimproved Living Condition

This section aims to discover causes why some households failed to improve their living condition. It also starts with a description of four study cases[1] differing by socioeconomic status. Of these four cases, two have moved from poor to poorer, while the two other cases have worsened from nonpoor to poor statuses. Then, the section will be followed by a discussion and a diagram showing instances where households have failed to improve their living condition.

Description of study cases

Case 5. Le Van Ngoc was thirty years old in 2006. Since the time shrimp farming began in the community, his family's living condition has worsened due to three reasons. First, he lacked the resources needed for shrimp farming. Second, as

[1]Real names of household cases 5 to 8 have been replaced to protect the identities of the key informants.

a result of the resource shortage he was not able to mobilize his other resources. Lastly, he has lost work opportunities due to the proliferation of shrimp farming.

In 1995, Ngoc got married too soon at the age of nineteen. In 1996, he separated from his parents to build his own family. Because his parents were poor and landless, so was he. He has not inherited any land, except for the 650 sq m of homestead land where he later constructed a temporary house. Without a land to cultivate, he and his wife became off-farm workers. He also did fishing to improve their daily meals and to earn additional income. Despite the hard work, their income was insufficient to escape poverty. Off-farm income was seasonal following rice crop, while fishing income was also negligible.

In the period 1995-1997 when shrimp farming expanded rapidly, he had more job opportunities. Shrimp raisers needed workers for converting rice fields to shrimp farms. Accordingly, his family's income increased significantly. He narrates, "At that time, I earned about VND 60,000 per day for digging work, that's much higher than daily income of VND 20,000 received from rice farming." Unfortunately, his work opportunities reduced substantially in the following years. The reason was not only because farmers preferred to use machine for cultivating land but also because shrimp farming required fewer workers. In addition, his fishing was also restrained. He complains:

> Fishing is now difficult. Before shrimp farming began, I could go fishing anywhere, in channels or in rice fields, without any hindrances. Now, I am only able to go fishing on the channels because shrimp farmers prohibited fishing in their farm.

To be able to deal with the reduction of off-farm job opportunities, his family engaged in handicraft making in 2000. However, the new job could not create high and stable income because bamboo cane was unavailable most of the time. In 2002, he took a loan of VND 7 million from the Fund for the Poor to buy a boat for trading. However, instead of buying a boat, he used the loan to pay his debt from informal sectors and to pay for everyday living spending. Up to 2006, he was still in debt.

Case 6 (from poor to poorer). Similar to the case of Ngoc household, Vu Hoang Linh family has also been marginalized because of the lack of resources, lack of resource mobilization, and decrease of work opportunities when shrimp farming began.

Linh's household was poor and landless before shrimp farming started in the community. He did not also have any relatives who could give or lend him land. Without any land to cultivate, his family's livelihood solely relied on bamboo cane-handicraft making. In the early years of shrimp farming in the community, his family income from handicraft making was relatively stable. However, in the latter years when a large number of bamboo gardens were converted into shrimp farms, he found it difficult to buy bamboo for handicraft making. Thus, income from handicraft making was reduced and became unstable. As a result, his family often faced financial difficulty. He and his wife were too old to find other jobs, but were the two main workers in the family. Linh says:

> Because we have no land, we have not grown shrimp. Our family's livelihood is based only on handicraft which we have been doing for about thirty years. Before shrimp farming time began, it was easy to buy bamboo cane for

> handicraft making. We could work throughout the whole year. Our meager income was enough for everyday expenses. We seldom got into debt.
>
> Now, almost all bamboo cane gardens had been converted to shrimp farms and this situation has made difficult to buy bamboo cane. Thus, our work for handicraft making became irregular. In addition, the price of bamboo cane is also high now. These situations make our income low and unstable. We often have to borrow money from relatives to buy rice when we are out of work.

Although Linh faced difficulties in life, he did not want to loan the amount available for poor people like him. When asked why he did not take loan from the Fund for the Poor, he explains:

> What do I use loan for? We do not raise shrimp, and we do not run any other businesses (except handicraft making). We are too old. If I take loan, I must be able to pay up. I do not want to bear that responsibility.

Case 7 (from nonpoor to poor). Duong Van Toi, seventy-four years old, was the one who initiated shrimp farming in the area. Since he raised shrimp on his own land in 1994, his family's living has worsened. His family's income decreased and his material condition has not improved. In 2006, he was still in debt of VND 15 million which he borrowed from the bank in 2003. It is seen that lack of technology update due to keeping his conservative principles mainly caused his setback.

From 1990 to 1993, Toi raised shrimp on a rented land of 2 ha in Ca Mau Province where his annual income was about VND 40 million. He earned much higher than the other farmers in Chu Chot Hamlet at that time when his family was seen as a better-off household.

In 1994, he tried applying shrimp farming technology (which he had experienced in Ca Mau) on 1.5 ha of his own land in Chu Chot Hamlet. He

succeeded in the first crop and he continued to succeed in several other crops. In this period, he earned a yearly income of VND 20 million to VND 30 million. However, in recent years, he seldom succeeds in his crops just like he did before because his shrimp farming experiences have no longer been applicable in changing condition of water and soil. His income ranges from now VND 5 million to VND 10 million, even zero in some crops. Consequently, his family's living condition has worsened as he got into debt.

When asked why his family's living condition worsened, he points out "failure in shrimp farming" as the reason behind. He also believes that "fatality" caused him to fail, while some other farmers prospered. However, his neighbor counters:

> He often fails in his crops because he is conservative. He thinks of himself as an expert in shrimp farming; he never learns from or discusses with the others about shrimp farming technology."

Case 8 (from nonpoor to poor). To Van Quan was forty years old in 2006. Since he started to raise shrimp in 1996, he was pushed into poverty. His family income reduced and he got in debt. In addition, he had to release his land in order to pay his debt.

Before 1996, his family's livelihood was based on rice production and handicraft making. He had 1.56 ha (12 congs) of cultivated land for rice. In addition, his family members sometimes make handicraft to earn extra income. A total income of VND 8 million per year, as estimated, was sufficient for the expenditures of his family of four members at the time.

In 1996, he engaged in shrimp farming. In the initial crops, he initially had frequent good shrimp crops. His family's yearly income reached around VND 20 million that improved his family's living condition significantly. The high income from shrimp farming encouraged him to give up handicraft making.

However, in later crops, he usually incurred losses because he paid his farm less attention. To deal with decrease of income, he borrowed VND 10 million from the bank of agriculture and rural development in 2002. He used the loan for re-investment in shrimp farming and also for everyday expenditures. Unfortunately, he continued to lose in the next crops. As a consequence, he sold his land in 2004 and became landless and poor. In 2005, he loaned VND 5 million from the Bank for the Poor. He began reverting to handicraft making that earned him a yearly income of about VND 5 million. Until 2006, he still faced financial difficulty and was still in debt which was overdue.

When being asked why his family's living condition worsened, he says, "because of failure in shrimp farming." He adds that he does not know why he failed in shrimp farming while the other farmers have prospered. However, his mother, who lives nearby, offers an explanation:

> He drinks (wine) frequently. He does not care about his future. Since he initially succeeded in several shrimp crops, he became lax. I advised him many times to give up drinking, but he did not stop. Now, I do not want to deal with him anymore.

Discussion

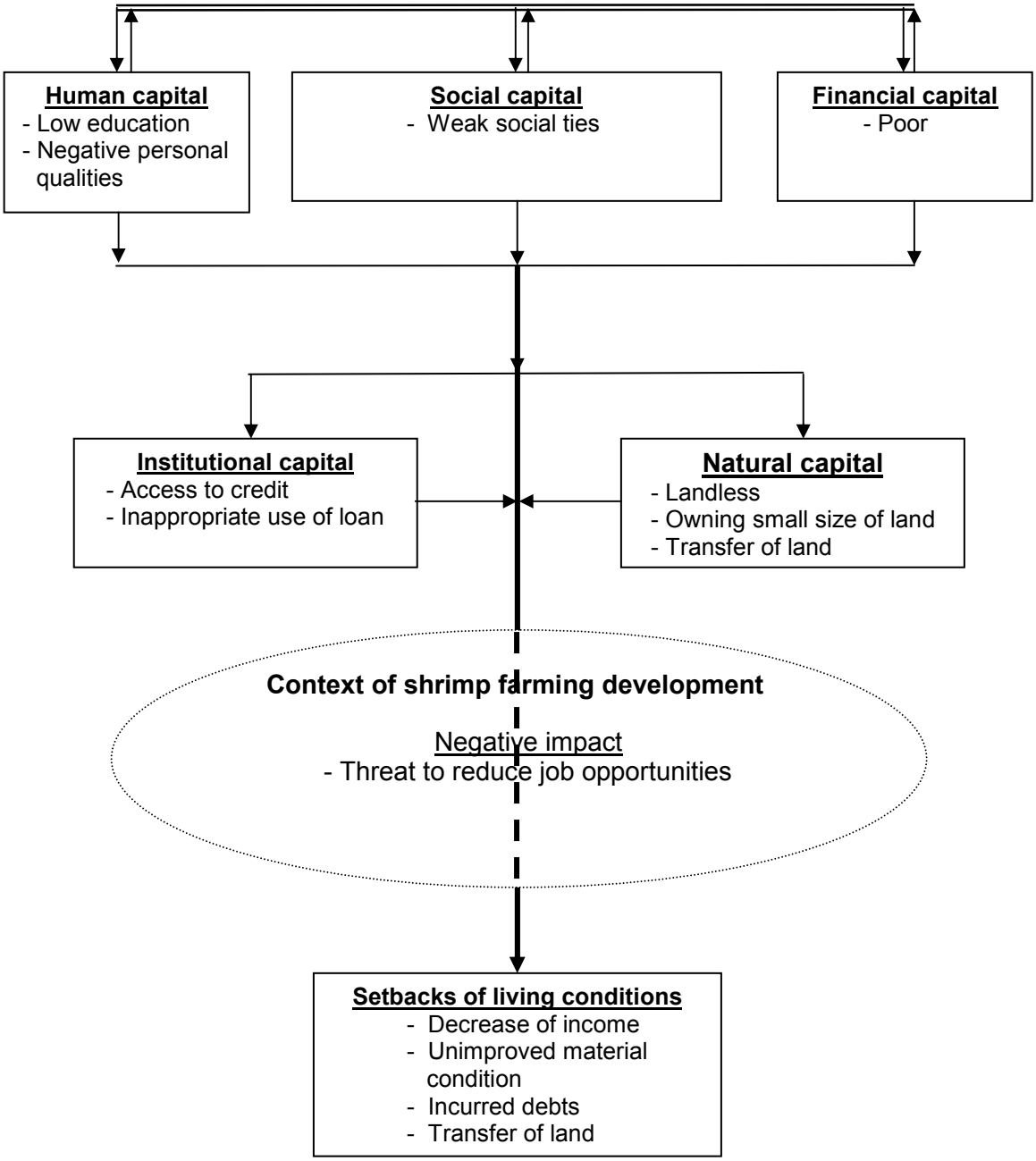
The description of the four study cases selected gives three reasons why households failed to improve their living condition. These reasons include lack of capital needed to engage in shrimp farming, inability to mobilize capital, and decrease of work opportunities due to adverse impacts of shrimp farming (see figure 18).

First, it is obvious that the worsened living condition of households, as described above and summarized in figure 18, has been brought about by lack of capitals. These households are either landless (cases 5 and 6) or have small parcels of land (cases 7 and 8). They are poor (cases 5 and 6) or average-income households (cases 7 and 8). They also lack social capital. Lack of capitals hindered households from being fully benefited from shrimp farming. In addition, personal problems, or negative personal qualities, such as a backward outlook in life and *khong lo lam an* attitude (lazy to work, wasteful in spending, and careless about the future) also contribute to the set backs (cases 7 and 8).

Second, a few or no interrelation among different types of capitals was seen in the four study cases. Or stated differently, these households lack a good strategy to mobilize capitals. The lack of capital mobilization stems in part from personal problems and in another part from lack of resources. Consequently, these households, including those who have some types of capital, failed to improve their living condition.

FIGURE 18

WAYS LEADING TO THE SETBACK OF HOUSEHOLDS' LIVING CONDITION



Third, work opportunities such as handicraft making, fishing, and off-farm jobs have decreased since shrimp farming began; thus, hindering poor households to improve their living condition. This is an adverse impact of shrimp farming that poor households are forced to face passively.

Yet, another important thing found in the study cases is that simplification of income sources made households more vulnerable to risks of shrimp crop failures. As shown in case 8, giving up handicraft making caused the household difficulties in facing financial problems owing to failures in shrimp crops.

Summary

The chapter describes the eight selected households' possession of different types of capital and interrelations among these types of capital.

The study cases show that structural advantages owing to the possession of some types of capital played an important role that help households improve their living condition. Households who posses more capital are more likely to succeed than those who lack capital. The result from the study cases echoes the findings of quantitative data analysis in chapter 4 as well the arguments in literatures.

Interrelations among different types of capital also show influence on the change in households' living condition. Successful households, for instance, are more likely to exhibit positive capital management; they have appropriate mobilization strategy in utilizing one type of capital to increase other types of capital. For instance, households use their wealth (financial capital) to build social relations

(social capital) and to buy land (natural capital). In turn, land enables them to be enriched further through production investment (financial capital), membership in farmers' union (social capital), and credit access (institutional capital). In contrast, "worsened" households show a lack of or no proper management of capital. This stems mainly from the fact that most worsened household condition are generally caused by the lack of capital.

Yet another factor that also influences the change in households' living condition arises unexpectedly in the study cases: personal qualities. Households that exhibit self-effort, hard work, a sense of saving and appropriate spending, and care for their future life are able to improve their living condition, even though they do not have as much structural advantages as the others. In contrast, households with negative personal qualities, also known as "khong lo lam an," are more prone to have worsened living condition. Moreover, a backward outlook in life, which restrains farmers from adapting to new technology, also hinders the success of shrimp farming.

CHAPTER 6

SUMMARY OF FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

The chapter summarizes the study's key findings, draws conclusions, and makes recommendations for program interventions and future researches.

Summary of Findings

The research findings are discussed in three sections. The first section summarizes characteristics of the study site, especially focusing on advantages and disadvantages for households' living condition and shrimp farming. The second briefly reviews shrimp farming development in the area and its socioeconomic impact. Finally, the third and last section shows the different patterns of changes in the households' living condition and identifies which factors bring about changes.

Advantages and disadvantages of the study site

The study site, Chu Chot Hamlet is located in Ninh Thanh Loi Commune, Hong Dan District, Bac Lieu Province. Its connection to both east and west seas by river and channel system had been disadvantageous for the local people's agricultural production because the intrusion of salt water damages rice crops. This was the situation that prevailed in the 1980s when the local people did not know how to raise shrimp. However, since shrimp farming first began in 1994, it was already seen as an advantage, as it brought livelihood for the local people. Salt water from

the seas has enabled local people to engage in shrimp farming which eventually became a high-earning economic activity.

Chu Chot Hamlet is a remote area, relatively far from the center of the commune, district, and province. It is for this reason that local people living in the community find it difficult to access not only governmental offices in times of need but also basic services such as health care, school, bank, and other public services.

Infrastructure is undeveloped. Up to 2006, electricity is unavailable for local people. Only elementary school is available for pupils. Nearest secondary school is about 7 km far from the hamlet while nearest high school is about 20 km. There is no market in the community and the nearest market (in Phuoc Long Commune) is 7 km away. However, local people can buy many kinds of goods or sell their products through “moving” market, sold and bought by “boat” trader. Although roads were constructed in 2004 and 2006, they are narrow, just passable for motorbike.

Natural characteristics and a channel system favor shrimp farming development. Seasonality of water’s salinity is suitable for both rice and shrimp cultivation. Farmers are able to cultivate rice during rainy season when water is fresh and raise shrimp when water becomes salty. In turn, availability of natural and man-made channels facilitates for irrigation.

Rich land resource is another advantage for shrimp farming. On average, a household holds 2.76 ha. The number is higher than in comparison with average land size per household in other areas. However, it is unfortunate that level of inequality in land distribution here is very high; the Gini coefficient is measured at

0.61. While 20 percent of households are landless, some households have more than 10 ha; especially, the largest land-size household has 52 ha. It means that not all households have land to raise shrimp since almost all portions of land belong to wealthy farmers.

Income is a source of capital needed to reinvest. From the view, yearly average income per households of US$3,171 or yearly average income per capita of US$667 is a grant capital source for farmers in shrimp farming. But, similar to land distribution, income distribution is also highly unequal; Gini is measured at 0.65. It implies that high proportion of capital is in the hands of rich farmers and that few households benefit from shrimp farming.

Demographic characteristics also show some advantages and disadvantages. While the work force is evaluated to be sufficient at 62.5 percent of the population in working age, education of workers, however, is low with only 7.6 percent reaching high school level.

Production supporting services such as bank, agricultural and aquacultural extension, production input providers, and the like are available for local people. Those who have certificates of land use are able to loan money from government and other commercial banks. For poor people, the Fund for the Poor is accessible. Government agricultural and aquacultural extension workers serve to consult farmers at station located at the district center; however, their field operation is almost considered negligible due to lack of human resources. Local people are able

to buy such as fingerlings, fertilizers, lime, and other kinds of inputs on the spot from local traders or “moving” market.

Social organizations such as farmers’ union, women’s union, and youth union exist in the community. However, operations of these organizations are weak. They, in general, failed to play the role of helping members, as expected.

Expansion of shrimp farming and its socioeconomic impacts

Black tiger shrimp is the unique specie of shrimp raised in Chu Chot Hamlet. Method of shrimp farming here, at “improved-extensive” level, is quite simple and easy to apply. To prepare shrimp farms, farmers dig water drains along borders of rice fields. In raising shrimp, farmers only put fingerlings at low density and may optionally add a few fertilizers and lime. Farmers do not need to feed shrimps because shrimps eat algae in the farm. The method, thus, requires minimum capital to start an investment; this applicable for almost all farmers, with varying financial capacity.

Shrimp farming first began in the area in 1994 and it has expanded rapidly in the following years. Its efficiency, estimated to be fourfold compared with the efficiency of rice production, prompted farmers gradually convert rice fields, pineapple fields, bamboo gardens, and timber gardens into shrimp farms year after year. By 1998, 50 percent of rice field was used to raise shrimp during dry season. Some farmers even practice the farming method called *con tom om goc lua* (raising shrimp and growing rice in the same field at the same time) during rainy season

when water becomes fresh water. In 2001, a hundred percent of rice field was converted to shrimp farms.

Income change as a result of shrimp farming expansion

The expansion of shrimp farming led to dramatic changes in income shares, actual income, and income distribution. It was found that shrimp farming replaced trade, handicraft making, rice cultivation, and other economic activities to be the main livelihood of a majority of households. In addition, shrimp farming generally contributed to significantly increase the size of household income. The rich people, however, generally reaped more benefit from shrimp farming than poor people. Thus, inequality in income distribution increased and the income gap between the rich and the poor widened.

Landholding and land distribution change as a result of income change

On average, land size of households increased from 20,665 sq m in 2001 to 27,646 sq m in 2006. The land size increase is due to “outside” land transfer which means that some rich households bought land outside the community. Moreover, it was found that there also existed land transfers among households inside the community. The “inside” land transfers were from small land-size households to large land-size households. Consequently, inequality in land distribution also increased; Gini coefficient increased from 0.54 in 2001 to 0.61 in 2006.

Household housing and material conditions as improved by income increase

Aside from income and land, households' housing and material condition generally improved as a result of income increase. A number of permanent houses increased significantly. Many households were able to furnish their houses with motorbikes, motorboats, television sets, cassette players and recorders, VCD/DVD players, and other luxury goods for their entertainment and transportation demands.

Heightened educational attainment as one of the outcomes of shrimp farming expansion

Another outcome of shrimp farming is increase in educational attainment among local people whose families could invest more for their children's education. The average number of schooling years of those who are in schooling age increased from 3.9 in 2001 to 5.7 in 2006.

Relationships as affected by shrimp farming

The study also found that family relationships and social relations among neighbors likely became worse since shrimp farming emerged in the area. Within family relationships, men paid less attention to their wives and children because they had to look after their farms at night during season time. Within the neighborhood, some shrimp farmers felt ashamed to communicate with others because they are poor or because they failed in shrimp farming.

Briefly stated, shrimp farming led to increases of income, assets, and educational attainment of local people in general. In contrast, it also produced class division, weakened family and neighborhood relations as well as the marginalization or exclusion of the poor.

Different patterns of change in the household's living condition and factors determining the difference

Although shrimp farming, in general, contributed to improve living conditions of households, not all households achieved the improvement. The study found that only 64.5 percent of households have obtained the improvement of living condition while 20 percent of households have remained unchanged, and the rest of 15.5 percent have even worsened.

Income, landholding, housing, and material properties had been the objective indicators used to compare differences among household groups. Accordingly, the "improved" group's income increased dramatically since shrimp farming appeared in Chu Chot while the "worsened" group's income reduced substantially. While some households of the "improved" group were able to enlarge their land size, some of the "worsened" group had to sell their land. While the "improved" households in general improved notably their housing and enjoyed new deluxe goods, the "worsened" households did not. For "unchanged" households, these indicators remained almost the same.

Determinants of the improvement of households' living condition

The study discovers that possession of different types of capital and possession of a strategy to mobilize capital played important roles in the improvement of households' living condition. Each type of capital not only contributed directly to the improvement through taking part in shrimp farming production but also helped mobilize other types of capital.

Wealth (financial capital). This factor reflects the household's sufficient financial capacity to invest in shrimp farming. The study shows that wealth is strongly associated with change in households' living condition and it enabled farmers to benefit from shrimp farming in five ways. First, with sufficient financial capacity, wealthy farmers did not face any financial troubles to engage in shrimp farming in both initial investment (digging shrimp farms). Second, thanks to sufficient financial capital, wealthy farmers have access to good sources of fingerlings. Third, without difficulty in financial capital, wealthy farmers obtained high yield and high shrimp price because they are not forced to harvest early when shrimps are still small, like poor farmers. Four, wealthy farmers invested sufficiently on their farms; thus, they generally achieved high shrimp yield. Lastly, wealth enabled farmers to increase other types of capital such as natural capital (land) and social capital (community activities) which, in turn, increase other types of capitals.

Labor force (human capital). Although shrimp farming required less labor, labor remained as an important factor influencing outcomes in shrimp farming and

then the improvement of households' living condition. As found in the study, availability of workers on farm at nighttime helps farmers reduce the probability of crop loss owing to both shrimp diseases and theft.

Education (human capital). In the context of shrimp farming in Chu Chot, the educational attainment has the role to improve farmers' shrimp farming technology which, in turn, helps farmers obtain good crops. It is found that the educational attainment is associated with frequency of learning shrimp farming via media and discussion with other farmers.

Land size (natural capital). Land is a very important factor in shrimp farming because shrimp farming is a land-based production. It has also been found that land size not only helped farmers obtain high return but also reduce probability of crop loss. Moreover, land enabled farmers to mobilize other types of capitals such as institutional capital (credit access) or social capital (farmers' union membership).

Credit (institutional capital). The study finds that credit contributed to improve households' living condition in some cases. Its role in part increased farmers' financial investment capital and in other part contributed to enlarge natural capital (land). Very few credit borrowers, however, achieve the improvement because a majority of credit borrowers use the loan inappropriately.

Attending shrimp farming technology trainings (institutional capital). Some farmers gained benefits from attending shrimp farming technology trainings. But the number of beneficiaries of the trainings was small because operation of aquacultural

extension is still weak and poor.

Organizational membership (social capital). The study finds that organizational membership, in general, was unhelpful to improve households' living condition (statistically insignificant). However, in some cases, the role of organizational membership helps farmers mobilize other types of capital such as institutional capital (participating in shrimp farming technology training).

Social ties (social capital). Social ties showed its role in helping farmers enhance shrimp farming technology, land, and credit. In quantitative analysis, the factor, as measured by frequency of discussion with neighbors, friends, and relatives about shrimp farming technology, contributed to enhance farmers' technology and experience, and then helped farmers have good shrimp crops. In addition, the case study method also discovers that social ties enabled farmers to access land, credit, and technology trainings.

Personal qualities (as a type of human capital). It is found that personal attributes such as self-effort and ambition also contributed to the success of farmers. Accordingly, farmers whose attitude in life encourages them to work hard, save, spend appropriately, and care for their future life may achieve the improvement of their living condition even if they do not have the advantage of possessing various types of capital. The findings echo an early argument that personal qualities or personal attributes that refer to ability, energy, ambition, and the like play a crucial role that determines the success or failure of farmers.

In sum, all these factors above are important to help farmers achieve the improvement of living condition. Among these factors, land size, undoubtedly, is the most important determinant because the factor showed strongest association with change in living condition. However, it does not mean that households, who earlier had been landless, have no more opportunities to improve their living condition. It is evident that some households have achieved the improvement of living condition even though they had no land before shrimp farming began in the hamlet. For these cases, the explanatory factors are social ties (social capital) and personal quality (human capital). Thanks to social ties and personal quality, the initially poor and landless households have had access to land (buying or renting) and other capitals. As a result, they were able to improve their living condition.

Conclusion

The section draws conclusions based on the three assumptions shown in the analytical framework.

First, it is evident that benefits from shrimp farming in Chu Chot Hamlet were distributed unequally among households. While some households succeeded to improve their living condition, some others were impoverished and excluded. Fortunately, a majority of households (64.5 percent) have improved their living condition and a minority of households (15.5 percent) have been left behind.

Second, undoubtedly households who have structural advantages owing to the possession of many types of capital such as human, financial, social, institutional

and natural capital achieved the improvement in their living condition more than households with capital shortages. The beneficiaries of shrimp farming or “improved” households were mostly those who had initial structural advantages such as wealth, high educational attainment, sufficient labor force, personal qualities (like energy and ambition) and possession of large-size land. Moreover, those who attended shrimp farming technology training/s (institutional capital) and had strong social ties (social capital) also achieved the improvement of their living condition more than those who did not. Despite that, lack of an appropriate strategy to mobilize capital may push households into poverty.

Third, the study reveals that interrelations among different types of capitals contributed to the improvement of household’s living condition. Successful households likely show more “positive” interrelations among capitals; they have appropriate strategies to mobilize capital, utilizing one type of capital to increase other types of capital. For example, households use their wealth (human capital) to build social relations (social capital), and to buy land (natural capital). In turn, land prospers them more through production investment (financial capital), enables them membership in farmers’ union (social capital) and credit access (institutional capital). In contrast, “worsened” households showed a few or no interrelations among capitals because they mostly lack capitals. Lack of some specific types of capital hindered them to mobilize other types of capital. Of interest here is that appropriate strategy to mobilize capitals might offset lack of some types of capital. Indeed, the study discloses that households with capital shortage were able to improve their

living condition. In the cases, social ties and personal qualities play the key roles. With strong social ties and personal qualities, poor-capital households might mobilize other types of capital and achieve the improvement; otherwise they are excluded from shrimp farming and marginalized.

In sum, shrimp farming benefited unequally among households. Aside from a majority of successful households who improve their living condition, some households were excluded. Sociologically, social exclusion, a social phenomenon discussed widely among social scientists (see Gore 1995; Byrne 2001; Haralambos, Holbron, and Heald 2005; Apospori and Millar 2003; Sen 2000; and Singharoy 2001), emerged in the context of shrimp farming in Chu Chot Hamlet. The appearance of social exclusion stems from lack of some types of capital and lack of an appropriate strategy to mobilize capital. Households who have few types of capital or none at all and have no appropriate strategy to mobilize capital were generally excluded from shrimp farming and then impoverished. However, some poor-capital households were able to improve their living condition if they have had strong social ties or personal qualities. Thanks to these strong social ties or personal qualities, these poor-capital households might mobilize other types of capital, and then improve their living condition. Otherwise, some nonpoor-capital households might fail to improve their living condition because they have weak social ties and bad personal qualities.

Recommendations

Drawing from the research findings, the study gives several recommendations which hopefully are necessary for policy makers, local government, farmers, and researches.

For policy makers and local government

Although shrimp farming impoverishes a part of households and widens the gap between the rich and the poor, it contributes significantly to the development of the community in general. Since shrimp farming first started in Chu Chot, the households' average income has increased dramatically. As a result of income increase, living conditions such as housing and possession of valuable assets as well as educational attainment of children and rural infrastructure have improved. Therefore, policy on shrimp farming development is necessary to keep it as a local economic strategy. The policy must also be followed by aquacultural extension, credit, and other shrimp farming-support policies. In these policies, it is necessary to consider both aims to improve shrimp farming and to reduce its negative effects on the poor.

As found in the study, shrimp farming technology is meaningful to help farmers gain good crops and improve their living conditions. However, aquacultural extension operation in the area is weak, responding only to a small number of farmers through infrequent technology trainings. Moreover, the knowledge given by the aquacultural extension staff is poor and, somehow, inapplicable to shrimp

farming practiced in the community. Thus, an aquacultural extension policy, as part of a shrimp farming-support policy, need to be improved in two ways: increase the number of aquacultural extension workers and update training knowledge. In turn, survey data also show that none of poor farmers participated in technological training programs. Therefore, it is suggested that aquacultural extension seek ways to involve poor farmers in training programs instead of inviting only well-to-do farmers. The involvement of poor farmers enables them not only to access knowledge from trainers but also to learn from the experience of other farmers.

Banking policy, another shrimp farming-support policy, also needs to be reconsidered. Credit given by banks is expected to help households improve their living condition. However, it has failed many times because some borrowers, mainly poor people, use loans inappropriately by spending loans for everyday household expenses instead of investing them in production. No association was seen between credit access and improvement of household's living condition. In some cases, credit even pushed poor people into the debt trap. Because of that, the study gives two suggestions. First, requirements for taking loan have to be stricter. More specifically, the borrowers are required to submit a detailed plan for spending loan as a part of the banking process. Second, monitoring the use of loan must be paid more attention. For this, banks need support from local government. Furthermore, banks can also learn and apply successful experiences of microfinance monitoring from NGOs, like group-based credit.

Inequality in land distribution measured in Chu Chot has been quite high in comparison with other rural areas in Vietnam. Moreover, inequality in land distribution has increased since shrimp farming was first practiced in the area. The difference of income, mainly from shrimp farming, between rich and poor households leads to the transfer of land from the poor to the rich. As a result, number of landless households has increased and the gap between the rich and the poor in terms of landholding has widened. This is seen as a negative impact of shrimp farming on poverty. Thus, the study suggests that legal measures to stop the transfer of land from the poor to the rich should be formulated in local land policy, as being applied in some communities in Vietnam where ethnic people live.

Because shrimp farming development leads to marginalization of the poor, policy for poverty reduction is needed to be paid more attention. Shrimp farming restricted the poor to engage in other job opportunities such as fishing, handicraft making, and off-farming jobs. Aside from that, credit for the poor, as mentioned earlier, fail to help in improving their living condition. Therefore, poverty reduction projects which combine the provision of financial support (credit) and off-farm job opportunities are necessary. For example, handicraft-making club with two roles of providing jobs and monitoring credit loan can be established. For this, the farmers' union, women's union, youth union and other social organizations must enhance their role and capacity because they operate weakly in the community.

For farmers

As mentioned in chapter 1, shrimp farming at high level of intensification, like “semi-industrial” model, practiced in surrounding areas, was highly risky and it, thus, impoverished a majority of farmers. In turn, shrimp farming practiced in Chu Chot is at low level of intensification, like “improved-extensive” model. Cultivating in the “improved-extensive” model enriched a majority of farmers. It is suggested that farmers should maintain shrimp farming at the “improved-extensive” model. It is therefore unnecessary to intensify into the higher level, like ”semi-industrial” model that requires feeding. If this is done, shrimp farming may become less sustainable because of water pollution; thus, it may harm farmers in some ways.

It is also discovered that shrimp farming knowledge learned from media, materials, and experiences of others is meaningful for farmers to gain good crops and then to improve their living condition. The study, thus, suggests that farmers should be more active in accessing shrimp farming technology via media materials as well as discussion with other farmers.

Some households discontinue other livelihood sources like handicraft making since they have engaged in shrimp farming. As a result, they find it difficult to cope with crop losses and, thus, they become impoverished. It is suggested that these households should maintain secondary occupations as an extra source of income to secure their life.

Some households who lack capitals are also able to brighten their living condition. In contrast, some households who have some types of capital are unable

to improve their living condition. The difference relies in both the attitude and the way households mobilize their capitals. Thus, households should have long-term plan for their future and appropriate mobilization strategies to enlarge their capitals.

For researchers

Most literatures on shrimp farming argue that lack of resources is a reason households are excluded from shrimp farming. More generally, theory of social exclusion also share the same argument that lack of resources, or types of capital, is a key cause that excludes people in various areas of life. The argument is able to explain almost all situations in the study when possession of resources, or some types of capital, is associated with the improvement of households' living condition. However, it fails to explain why some households with limited capital can achieve improvement of living condition while some households with abundant capital failed. Capital mobilization strategy and personal quality pose as answers to these questions. Thus, as a theoretical implication, the study suggests that future researches should focus on capital mobilization or interrelations among different types of capital. In addition, social researchers should also connect social sciences with economics, politics, psychology, and other sciences to explain social phenomenon.

On the other hand, experiences in doing the study show that quantitative method and qualitative method may lead different outcomes about one research issue. For instance, the results in chapter 4 show that membership in social

organizations has no significant association with change in households' living condition. In contrast, case study approach in chapter 5 finds that membership in social organizations has a role to contribute the improvement of households' living condition. The seeming contradiction thus requires an explanation that will help deepen an appreciation of the effect of social capital on living condition, as reported in chapter 4. Therefore, as a methodological implication, the study suggests that both quantitative and qualitative methods should be applied in a research in order to provide a better understanding of research issues.

Further researches in Chu Chot Hamlet. The study suggests that researches on poverty reduction, community organizing, credit, and aquacultural extension need to be done. There are several reasons for the suggestion. First, poverty and inequality in Chu Chot have worsened in the context of shrimp farming development. Second, organizations in the community operate weakly. Third, credit fails to help households improve their living condition. Last, the role of aquacultural extension is so limited in giving support to shrimp farmers. On the other hand, researches should also be conducted toward technical and economic solutions in order to help farmers reduce risk of crop loss but gain higher returns instead.

For all stakeholders. Some general problems such as the decrease of shrimp yield and the reduction of shrimp price emerged in the research. In this light, several suggestions are also given to all stakeholders.

It was found that water and soil pollutions affected the decrease of shrimp yield, and then led to a reduction of household income for the period 2001-2006.

Although ecological factors (water and soil pollution) no longer pose as a big problem in the context of “improved-extensive” shrimp farming model in Chu Chot. It is possible that the ecological factors may create long-term negative consequences for farmers. Thus, in order to make shrimp farming more sustainable, the research suggests that the ecological factors, specifically water and soil pollutions, must also guide or inform local policies of shrimp farming development, in households’ farming strategies as well as in further researches.

Another factor resulting in the decrease of households’ income is the reduction of shrimp price. This may result from changes of external market. The changes may be related to world market demand, measures of controlling shrimp quality, and so on. Thus, it is suggested that policy makers need to consider such external factors in formulating policies for shrimp farming development. For farmers, accessing and updating information about shrimp market, both internal and external, are necessary to make appropriate strategies in shrimp farming investment. On the other hand, more researches on shrimp markets including production and price also need to be done.

In sum, true to its research objectives, the study discovered several socioeconomic impacts of shrimp farming in Chu Chot Hamlet, found out the role of different types of capital, and learned households’ strategies to mobilize capital. The study also figured out some existing problems in banking, community organizing, and aquacultural extension operation in the community. Hopefully, the study becomes meaningful for policy makers and local government in formulating

development policies and in organizing community. In addition, it hopes to contribute to the literature on the socioeconomic impacts of shrimp farming, the role of different types of capital, and capital mobilization; through this, provide researchers and students a better understanding of relevant research issues. Moreover, if the researcher will be able to find a financial support to publish and deliver a shortened version of the thesis to local households, the study will hopefully help farmers recognize the role of types of capital and formulate an appropriate strategy to mobilize capital for improving their living condition.

APPENDIX A

GUIDELINES FOR SECONDARY DATA COLLECTION

Natural characteristics

- Community maps
- Natural resources in the village
- Climate
- Soil type
- Rainfall

Socioeconomic characteristics

- Total population and its structure by gender, age
- Labor force, occupational structure
- Total land area and structure of the production system (i.e., agrifarming, aquaculture, trade, service)
- Public services and infrastructure regarding education, health care, water supply, electricity, transportation, and others
- Existence of social institutions/organizations in the community and its activities

Policies on:

- Shrimp farming development
- Land use
- Economic development

- Poverty reduction

History of shrimp farming in the village, process of shrimp farming development and its following changes

- Natural changes
- Environmental changes
- Economic changes

Conducted and going-on projects

The 2001 survey data from IRRI

APPENDIX B

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY
ON SHRIMP FARMING

Household Number: _____

Hello, I'm Tran Minh Tri from Nong Lam University. I'm doing a survey on shrimp farming in this area and wish to ask a few questions. Can you help me with this survey?

GENERAL INFORMATION

Name of household head :_____

Name of interviewee :_____

Name of interviewer : _____

Date of interview : _____

Name of person who edited interview:_____

HUMAN RESOURCES

1. I'd like to start with your household. Can you give me the name of each member of this household? For each name, can you tell me:

    1a. What is his/her relation to the household head?
    1b. His or her gender?
    1c. How old he/she was in his/her last birthday?
    1d. Is this household member involved in any work directly related to shrimp farming?
    1e. What is the member's highest level or grade of schooling?

Id	Name	1a Relation with household head (1=Household head 2=Spouse 3=Son 4=Daughter 5=Others [specify])	1b Sex (1: male; 2: female)	1c Age	1d Does the member work on shrimp farming? (0: no; 1:yes)	1e Highest schooling grade of the member?
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						

SOCIAL RESOURCES

Household member's participation in community associations

2. Do any of your family members belong to at least one community association? …… (1: yes; 0: no).

3. Please tell me more about the participation of each member.

3a. Who is this household member?

3b. How many association(s) does this household member belong to?

3c. What is the name of the first association?

3d. What is the type of the first association? *(Read types from list below)*

3e. How often does this household member attend association meetings?

3f. What is the name of the second association?

3g. What is the type of the second association? *(Read types from list below)*

3h. How often does this household member attend association meetings? *(Read types from list below)*

3a Who are the household member? (code 1)	3b Number of associations	3c What is the name of the first association?	3d Type of association (Code 2)	3e How often does this household member attend association meetings? (code 3)	3f What is the name of the second association?	3g Type of Association (Code 2)	3h How often does this household member attend association meetings? (code 3)

Code 1	**Code 2**	**Code 3**
1=Household head 2=Spouse 3=Son 4=Daughter 5=Others (specify)	1=Communist party 2=People's Committee 3=Village officer 4=Farmer's Union 5=Veterans Club 6=Youth Club 7=Women's Union 8= Others (clarify)	1= more than once per week 2= except 1, at least once a month 3= about once per 3 weeks 4= about once a year 5 = less frequently than above

INSTITUTIONAL CAPITAL

4. Access to credit:

4a. Since shrimp farming began here, have you ever taken any kind of loan to invest in your shrimp farming activity? ……. (0: no [go to Q4b]; 1: yes [go to Q4c])

If no,

4b. Why did you not take loan? ……. (1: don't want to take; 2: not applicable; 3: others: (specify:……)

If yes,

4c. What sources have you taken from? (please tick all that applies)

- □ Formal banks
- □ Neighbors/relatives/friends without interest or low interest
- □ Moneylenders with high interest
- □ All

From Formal Sources (being asked if it is chosen in question 4c)

4d. Since shrimp farming began here, how many times did you take any loan from any formal banks? ……. (times).

For each time, can you tell me *(place answers in chart below).*

4d1. Which bank did you take that time?

4d2. How much did you take?

4d3. What was the interest rate of the loan?

4d4. When did you take the loan?

Loan number	4d1 Name of the bank	4d2 Amount of loan (VND)	4d3 Interest (percent)	4d4 Year
1				
2				
3				
4				

From neighbors/relatives/friends (being asked if it is ticked in question 4c)

4e. Since shrimp farming began here, how many times have you borrowed money from informal sources such as neighbors/relatives/friends without interest or low interest? (subequal to bank interest) ……. (times).

For each time, can you tell me

4e1. Who lend that time?

4e2. How much did you borrow that time?

4e3. What was the interest rate of the loan?

4e4. When did you take the loan?

Loan number	4e1 Source 1=neighbor 2=relative 3=friend	4e2 Amount of loan (VND)	4e3 Interest (percent)	4e4 Year
1				
2				
3				

From moneylenders (being asked if it is ticked in question 4c)

4f. Since shrimp farming began here, how many times have you borrowed money from moneylenders …….. (times)?

For each time, can you tell me

4f1. Who lend that time, lender inside or outside the village?

4f2. How much did you borrow that time?

4f3. What was the interest rate of the loan?

4f4. When did you take the loan?

Loan number	4f1 Source 1=village lender 2= "outside" lender	4f2 Amount of loan (VND)	4f3 Interest (percent)	4f4 Year
1				
2				
3				

5. Access to shrimp farming technology

5a. Since shrimp farming began here, have you ever attended technological trainings on shrimp farming given by government officials?…….(0: no [go to Q5b] ; 1:yes [go to Q5c])

If not,

5b. Why have you not attended technological trainings given by government officials?

……

……

If yes,

5c. How many times have you attended technological trainings on shrimp farming given by government officials since shrimp farming began here:…… (times)?.

For each time, can you tell me

5c1. What kind of technological training did you receive that time?

5c2. When did you take that training?

5c3. Was that training useful in your work?

5c4. In what way was it useful in your work?

Id No	5c1 Kind of technological training	5c2 Year	5c3 Assessment (1: useful 2: not useful)	5c3 In what way was it useful?
1				
2				
3				
4				

5d. Have you ever discussed with neighbors/relatives/friends about shrimp farming technology? ……(0: no [skip the extra question below and go to Q5e]; 1:yes [continue])

If yes, How often have you discussed with neighbors/relatives/friends about shrimp farming technology?……..(1= more than once a week: 2: except 1, at least once a month; 3= about once per 3 weeks; 4= about once a year)

5e. Have you ever learned shrimp farming technology via television? ……. (0: no [skip the extra question below and go to Q5e]; 1: yes [continue]).

If "yes", how often do you watch television to learn more about shrimp farming technology? ……..(1= more than once a week: 2: except 1, at least once a month; 3= about once per 3 weeks; 4= about once a year).

5f. Have you ever learned shrimp farming technology via radio? …….(0: no [skip the extra question below and go to Q5e]; 1: yes [continue])

If "yes", how often do you listen to the radio to learn more about shrimp farming technology? ……..(1= more than once a week: 2: except 1, at least once a month; 3= about once per 3 weeks; 4= about once a year).

5g. Have you read any kinds of print materials about shrimp farming technology? ……..(1:yes; 0: no)

NATURAL CAPITAL

6. How much land in square meters are you using or cultivating now? ……(m^2)

7. How many parcel/s is your present land divided into? …….(parcel/s).

Please add some information on each land parcel. For example (see table below)

ID of parcel	7aWhat is the land parcel used for? (Code 1)	7bHow large is the land parcel? (m2)	7cHow did you avail the land parcel? (1: buying; 2: being allocated; 3: rent)	7d When did you have it? (year)
1.				
2.				
3.				
4.				
5.				
Total				

Code 1
1 = Homestead area
2 = Bushes/forest/garden
3 = Land for rice farming
4 = Pond/ditches for shrimp cultivation
5 = Fallow land (not arable)
6 = Others (Specify)

FINANCIAL CAPITAL

1. Farm Income

STT.	Sector	Household consumption (000 Dong)	Cash income from sales (000 Dong)	Cost of production (Cash expenditure (000 Dong)
1.	Shrimp and other aquatic production			
2.	Rice			
3.	Fruits			
4.	Pig rearing			
5.	Poultry/duck raising			
6.	Tree/timber/fuel wood			
7.	Fish culture/pond			
8	Nipa leaves			
9	Others (specify)			

2. Off-Farm Income

STT.	Sectors	No. of family members employed in activities (person)	Approx income in 2005 (000Dong)	Expenditure on account of profession (000Dong)
1.	Employment in Agriculture			
2	Employment in nonagriculture			
3	Cottage industry/industrial labor/handicraft			
4	Trade			
5	Shop keeping/stores			
6	Driving/motorcycle			
7.	Pulling/van			
8	Navigating boat			
9	Construction and repair house			
10	Construction and repair roads			
11.	Services/teaching/ medical workers			
12	Any other occupation (specify)			

INFORMATION ON HOUSING AND MATERIAL PROPERTY CONDITION

1. Do you have …… (special kind of property)?
2. How many …….. do you have?
3. In your own assessment, how much is the estimated value of that/these property/ies

Sl. No.	Name of the equipment	Amount (unit)	Value estimated (VND)
Living assets			
1.	Houses		
2.	Television		
3.	Cassette		
4.	Radio		
5.	Motorcycle		
6.	Bicycle		
7.	Other 1 (Specify) …….		
8.	Other 2 (Specify) …….		
9.	Other 3 (Specify) …….		
Production assets			
1.	Instrument for irrigation (pumps)		
2.	Power-tiller/tractor		
3.	Rice mill		
4.	Threshing machine		
5.	Sprayer		
6.	Boat/trawler		
7.	Fishing net		
8.	Equipment for cultivating shrimp		
9	Valuable buffalo		
10	Others (specify)		

INFORMATION OF SHRIMP FARMING LAST YEAR

Items	1st crop	2nd crop	3rd crop
Land size (m^2)			
A. Technology and costs			
1. Fry			
Quantity (fingerling)			
Price (VND 000/ 1000 fingerling)			
2. Shrimp food			
Quantity (Kg)			
Price (VND 000/kg)			
3. Value of other food (VND 000)			
4. Total cost of fertilizer (VND 000)			
5. Total cost of lime (VND 000)			
6. Total of cost chemical (VND 000)			
7. Total cost of gasoline (VND 000)			
8. Total family labor (man-days)			
Land preparation			
Take care			
Harvesting and processing			
9. Total hired labor (man-days)			
Land preparation			
Take care			
Harvesting and processing			
Cost for tools and others			
B. Harvest			
1. Quantity of shrimp harvested (kg)			
2. Average price (VND 000)			
3. Value of fish, (other than shrimp), if harvested			

PERCEIVED CHANGE OF LIVING CONDITIONS

1. Has your family's living condition improved, worsened, or did not change much since shrimp farming began here (perceived change)?

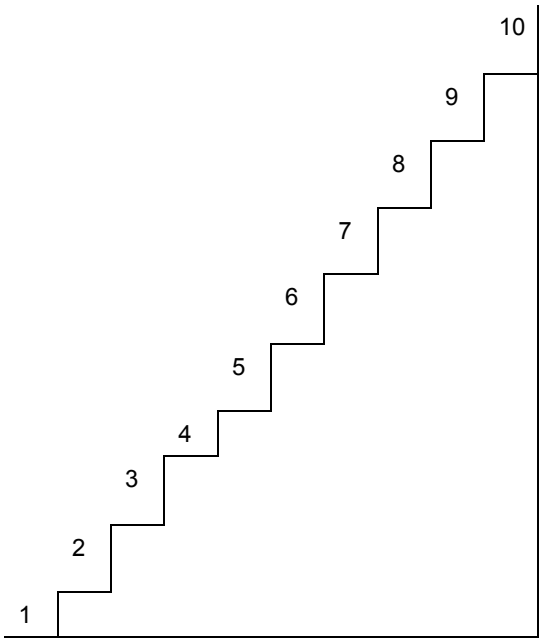
Has improved ☐ No change ☐ Has worsened ☐

2. In what ways has your family's living condition improved/remained unchanged/ worsened?

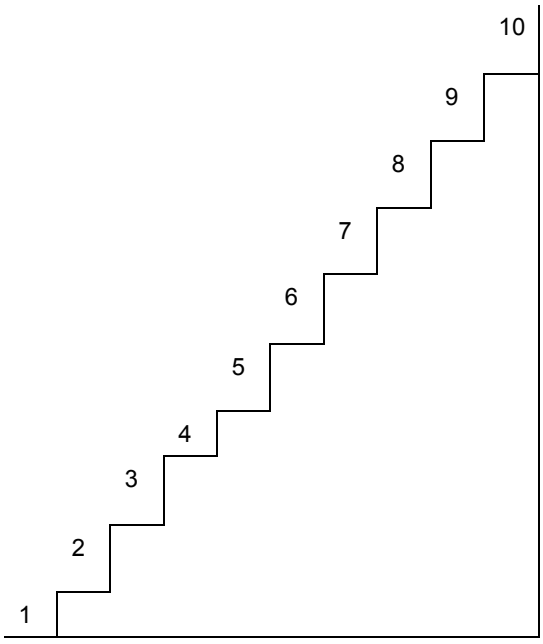
……

……

3. On a scale of 1 to 10, with 1 being the lowest and 10 the highest, how would you rate your living condition five years ago at the time when shrimp farming began here? And how would you rate your living condition now, in 2006?



Ladder at the early time



Ladder 2006

SOCIAL LOCATION

1. The line on the chart represents households that are on the poverty line as well as those who are above or below that line. How would you place your household in comparison to other households in this community? Would your household be on the line, above the line, or below the line?

Chart on subjective poverty

NOT POOR

_____

VERY POOR

2. Finally, please tell me what your aspirations for the future are? For yourself and your household?

……

……

……

……

Thank you very much!

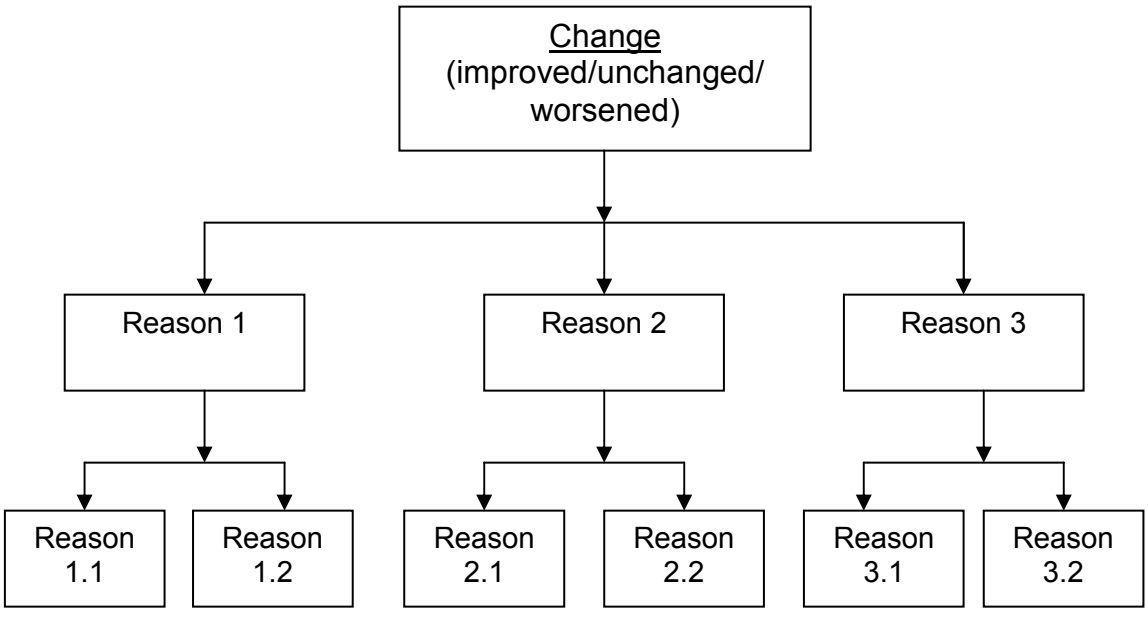
APPENDIX C

GUIDELINE FOR IN-DEPTH INTERVIEW
OF STUDY CASES

Information on household characteristics of study cases were collected in the survey. Thus, guideline questions for in-depth interview technique only focus on perceived reasons of various outcomes (improved, unchanged, or worsened) of selected household and ways households mobilize capital.

Reasons of Change of Living Condition
(Given by Key-Informants)

As you reported last time, your family's living condition have ……(improved, been unchanged, or worsened)[1], so please tell me in more detail what are reasons of the change? (Researcher shows the "problem tree" tool below to key-informants and discuss with them)



[1] Researcher knew it in the survey questionnaire which fulfilled before.

Change in Types of Capital and its Reasons
(Questions in the section were cross-checked
with longitudinal data from surveys)

Human capital

1. Have number of workers in your family changed since 1994 (when shrimp farming started to expand)? ……..(increased, unchanged, or decreased)/

   How and why have it changed?:

……..

……..……

……..……..……

……..……

2. Have your shrimp farming technology and knowledge changed since 1994 (when shrimp farming started to expand)? ……(increased, unchanged, or decreased)

3. How and why have it changed?.....

   ……..……

   ……..……..……

   ……..……

   …

Social capital

1. Have your social relations changed since 1994 (when shrimp farming started to expand)? ……..(better, same, or worse)

   How and why have they changed?:…….

……..……
……..……..……
……..……

Financial capital

1. Has your family's financial condition in terms of social relations changed since 1994 (when shrimp farming started to expand)? ……..(better, same, or worse)

   How and why has it changed?: ……..

……..……

……..……..……

……..……

National capital

1. Has your family's land size changed since 1994 (when shrimp farming started to expand)? ……..(increased, same, or decreased)

   How and why has it changed?: ……..

……..……

……..……..……

……..……

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