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Vulnerability and Risk Management for Sustainable Livelihoods of Farm Households in Northern Thailand- The Role of Health Insurance in Managing Risk

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PREFACE

During the last decade, the percentage of Thailand's population living below the poverty line has declined. However, the proportion of the poor who live in rural areas has increased. Thus, rural poverty is still a massive problem. In addition to poverty, households in rural areas are exposed to high levels of vulnerability because they face manifold risks and have insufficient means of risk management. Therefore, addressing the issue of poverty, vulnerability and risk management in rural Thailand is important.

The complexity of the poverty phenomena in developing countries is challenging. In this volume Thitiwan Sricharoen applies the concepts of poverty and vulnerability in the uplands of Northern Thailand to assess the impact of livelihood shocks and the reaction of the rural households in terms of adaptive and coping strategies vis-à-vis risks. Households, not yet poor but having low capacities in risk management may be confronted with a high poverty incidence in the future. Health risks are a major problem. Yet, poor rural households have limited access to quality health care. Health risks and subsequent expenditures are a prime cause of poverty. Therefore, poverty reduction policies should incorporate the provision of appropriate and adaptive risk management strategies, not the least in view of health risks.

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EXECUTIVE SUMMARY

This research attempts to explain the relationship between poverty, livelihood difficulties, risk and risk management and vulnerability to poverty of farm households in Northern Thailand. Furthermore, this study proposes a health insurance concept for reducing idiosyncratic risks and poverty of farm households. The survey underlying this study was conducted in Tambol Pong Yang, Mae Rim, which is a mountainous district of Chiangmai province and is representative of the northern mountainous region of Thailand. Nine villages were interviewed in the study area. Four of the villages where populated by Hmong hill tribes. Data were collected in two types of questionnaires: the first questionnaire was comprehensive and looked at all socio-economic aspects of the households; the second was related to health insurance. Data were collected for the first questionnaire by interviewing two groups of farm households: the hill-tribe Hmong and a local people known as Khon Muang. The random sample consists of 200 households: 142 local northern and 58 Hmong households. Primary data from the second questionnaire on health insurance was collected in the Mae Rim district. The survey covered 200 households, 146 of which are Thai and 54 Hmong.

The research started with the analysis of **poverty** and outlined the assessment of the empirical poverty index, using Principal Component Analysis (PCA). After the significant factors affecting poverty were identified, the next procedure applied participatory rural appraisal (PRA) approaches in order to know how households sustain their **livelihoods**. Then, individual farm households were examined to analyse how they manage **risks**. If they managed crises well, they were not exposed to severe consumption and income shocks. Health risks were at the center of interest. Apparently, **health insurance** can mitigate their risks so that demand and supply of health insurance was analyzed. Thereafter, a classification of the factors responsible for dynamic poverty and **vulnerable households** was done. This is important for policy makers to propose appropriate health insurance and poverty reduction policies. The analysis proceeded in six steps:

Firstly, the result of the PCA was utilized to determine the important factors affecting household poverty. Furthermore, a poverty index was developed. The PCA retained 16 out of 65 possible poverty determining variables. The explicit factors relevant for assessing poverty are the dwelling conditions, assets, human resources, and food security, respectively. The factor which can lead the poor to become even poorer is the human resource factor, where e.g. the number of dependents is comprised. The poverty comparison between farm households living in the highlands and lowlands found that Hmong households, which normally live in mountainous regions, are relatively poorer than the local northern households.

Secondly, PRA was used to explore livelihoods, risk and risk management strategies of farm households in Northern Thailand. Results of the

PRA showed that the most pressing problem plaguing households is their debt. Households try to honor their debt repayment obligations, but it appears that the frequent occurrence of income shocks and their low risk management capacities prevent them from doing so effectively. Land issues relate to the second most important problem area. Another pressing problem negatively influencing households' livelihoods are droughts, which lead to water shortages, higher fertilizer prices and middleman problems.

Thirdly, the risks which households experienced at different time periods were analyzed as well as the cost of risks, and the risk management strategies of households. Results of the risk and risk management analysis found that there are five major types of risks frequently encountered in rural areas: 1) natural risks; 2) theft risks; 3) production risks; 4) life-cycle risks/human risks; 5) health risks. Risk management strategies can be divided into coping and adaptive strategies. The former refer to short-term coping mechanisms and the latter to long-term adaptive strategies that households use in times of crises to maintain their livelihoods. The most often selected adaptive strategy that households use to manage risks is saving in cash, with 21.9%. Most of the risks (58.8% of all) can be managed within 12 months. However, 25.2% of risks are long-run risks.

Fourthly, this study examined health insurance for the poor in order to provide recommendations for reducing health expenditures at the household level. Respondents reported that the burden of health expenses became lower after they had signed up for state-administrated health insurance, the so-called 30 Baht Health Insurance. However, 42% of the respondents stated that the health expenses still represented a relatively high burden to their household budget. According to the logistic regression analysis of household demand for health insurance, the results indicate that the household health risks variable, the number of times that a household consults a doctor variable, the price satisfaction variable, the accessibility to health insurance information variable and the gender variable have a positive relation to the probability of purchasing health insurance.

Fifthly, conjoint analysis on health insurance aimed at providing concepts for new, alternative health insurance products to support the exiting health insurance system in Thailand. The price premium of 30 Baht (or about $0.8 or €0.6) was the lowest, having been selected in one third of all cased when it occurred. A premium of 60 and 90 Baht was less popular, having been selected 17% and 18% of all times it occurred, respectively.

Finally, the study examined the linkages between poverty and vulnerability to poverty by the classification of a vulnerable group of farm households. The results demonstrated that 42% of the populations in the study area were poor in 2003 and a significant share of these was chronically poor (11% of the population). Almost one-third of the population is transitorily poor i.e., 30.5% of the total population. It is 43.5% of households are in the

vulnerable group, while the rest of households (56.5%) are in the non-vulnerable group.

Appropriate health care policies can play a key role in alleviating health risks and poverty. In order to help the government reducing expenditures to support the health care system for the poor, it would be possible to slightly increase health insurance premiums. The premium of the existing health insurance system should not, however, exceed 60 Baht per doctor visit, and hospitals should increase the number of doctors and health staff so that patients receive faster service.

In conclusion, a better understanding of the relationship between poverty, livelihood difficulties, risk, risk management and vulnerability to poverty of households is important to improve the poverty reduction policies of Thailand. Furthermore, the proposal of a health insurance concept can reduce idiosyncratic risks and poverty of farm households.

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LIST OF ABBREVIATIONS

%	Percent
€	Euro Currency
ACA	Adaptive Conjoint Analysis
ADB	Asian Development Bank
ADBI	The Asian Development Bank Institute
BAAC	Bank of Agriculture and Cooperatives
BHT	Thai Baht (Thai Currency)
CA	Conjoint Analysis
CBC	Choice Based Conjoint Analysis
CSMBS	Civil Servants Medical Benefit/Welfare Scheme
FAO	Food and Agriculture Organisation
FGLS	Feasible Generalized Least Square
GDP	Gross Domestic Product
GLS	Generalized Least Square
GPS	Global Positioning System
HH	Household
i.e.	That is
IAAE	International Conference of Agricultural Economists
KMO	The Kaiser-Meyer-Olkin Measure
m^2	Square Metre
MFIs	Microfinance Institutions
MI	Microinsurance
NESDB	The National Economic and Social Development Board
NGO	Non-Government Organisation
NSO	The National Statistical Office
OLS	Ordinary Least Square
OTOP	One Tambon One Product Group
PC	Principal Component
PCA	Principal Component Analysis
PCU	Project Coordination Unit
PHE	Public Health Expenditure
PvtHE	Private Expenditure on Health
PL	Poverty line
PPA	Participatory Poverty Assessment

PPP	Purchasing Power Parity
PRA	Participatory Rural Appraisal
Rai	Land Measurement of Thailand (1 Rai = 1,600 Square Meters)
RI	Relative Importance
RM	Risk Management
SFB	Sonderforschungsbereich
Sig	Significant
SLF	Sustainable Livelihoods Framework
SNA	Social Network Analysis
SP	Share of Preference Model
SPSS	Statistical Package for the Social Sciences
SRM	Social Risk Management
SSS	Social Security Scheme
THB	Thai Baht
UC	The Universal Coverage or 30 Baht Health Insurance
UN	The United Nation
US$	US Dollar
WHO	World Health Organisation
WHOSIS	World Health Organisation Statistical Information System

1 INTRODUCTION

During the last decade, the percentage of Thailand's population living below the poverty line has declined by half to 11.4% in 1996. However, the proportion in rural areas has increased to 12.9%. Poverty is still being a massive problem (FAO, 2005). In spite of the success in economic growth, the degree of regional income inequality and wealth still high. Mostly households in rural areas are exposed to deep poverty and high levels of vulnerability. They face various types of risks: diseases, bad weather, and economic hardship. They encounter temporary poverty and face a high risk of falling into poverty. Therefore, taking account of the aspects of poverty is becoming increasingly significant.

The complexity of the poverty[1] phenomena in developing countries has been challenging. This study tries to include measurement aspects to capture the long-term welfare of the poor. Therefore, dynamic concepts of poverty will cover the circumstance of risks, shocks and vulnerability. The concept of vulnerability needs to consider multiple aspects of rural household in coping with various types of risks. Households, not yet poor but having low capacities in risk management may be confronted poverty incidence in the future.

Health risk is major problem of Thailand. Poor rural households have high expenditures for health care. Furthermore, the poor have limited access to quality health care because of limited financial means. Health risks are a prime cause of household poverty. Therefore, poverty reduction policies need to start with health cost reduction.

Overall, the health status of Thai people has improved greatly in the past three decades as judged by major indicators such as the infant mortality rate, maternal mortality ratio and life expectancy. Health care support follows closely the economic cycles in Thailand. For instance, following the 1997 economic crisis there was a fall in per capita gross domestic product (GDP) and devaluation of the national currency, which in turn caused the economy to shrink in 1998. However, since 2000 the country's economic conditions have improved steadily. The Ministry of Public Health (MOPH) budget, which decreased by 5% to 12% in 1998-1999, has increased by 21.2% over the period 2000–2003.

Nevertheless, the particular problem of health services for marginalized population groups such as hill tribes, internal migrants, undocumented aliens, and the urban poor requires special attention. Many of these groups have been severely neglected in the past. The Ninth National Health Development Plan (2002–2006) has been adopted with the goal of "building healthy conditions for

[1] Poverty means having insufficient food, income and other inputs to maintain an adequate standard of living. Poverty may mean vulnerability to shocks to the livelihood systems and inability to cope with and recover from them (FAO, 2005).

all Thai citizens include these population group" in a holistic manner in partnership with all sectors concerned. The universal coverage of the health care scheme was initiated in April 2001 and extended nationwide in October 2001. Thailand aims to deliver essential health services oriented towards building health rather than treating ill health (WHO Thailand 2006).

1.1 Problem Statement

Thailand has made substantial progress in providing health care to its population at large. Nevertheless, improving the coverage and effectiveness of the current social protection programs in Thailand is crucial to further reducing poverty and inequality across the country. This statement was made in the new draft report produced by the Government of Thailand and the World Bank entitled "Issues and Directions for Social Protection" (Versak and Sareenun, 2006).

Although Thailand has done well in the area of social development, there are still challenges. For example, the Risk and Vulnerability Analysis (RVA) of Versak and Sareenun (2006) found that formal social protection has very limited coverage: as low as 20% even among those in the top income decile are covered, and practically none from the lowest decile. Despite the 30 Baht Health Coverage Scheme[2] – that is widely available even in rural areas, the rural poor still suffer from the risk of falling sick and thus slipping even more into poverty.

The Universal Declaration of Human Rights (UDHR) was adopted by the United Nations (UN) in 1948 as a response to set a standard by which the human rights activities of all nations, rich and poor alike, are to be measured. The UDHR, Article 25.1 states that "Everyone has the right to a standard of living adequate for the health and well-being of himself and of his family, including food, clothing, housing and medical care and necessary social services, and the right to security in the event of unemployment, sickness, disability, widowhood, old age or other lack of livelihood in circumstances beyond his control" (UN, 1948).

For this reason, the Thai Government is determined to create a system that provides public health services and health insurance to the public so that the people of Thailand can reach that fundamental right and may enjoy good health. In this connection, the Government will undertake to reform the public health system in order to reduce the country's total public health expenditures as well

[2] Scheme means project or plan. The 30 Baht Health Coverage Scheme is a government project to provide health insurance for poor people in Thailand. Under the new program, the "30 Baht health plan", people register as patients with local health care providers and can then obtain all needed medical care for a co-payment of 30 Baht. The system is financed jointly from taxes and contributions by workers and employers, while health care providers are reimbursed on a capitation basis (WHO 2003).

as to reduce the health care expenses incurred by the public. Furthermore, it will also create guarantees and opportunities for access to medical and health care services that meet an appropriate standard for all the people on an equal basis (Royal Thai Embassy, 2001). For the first time, the notion of health for all, which is another basic right for human security, has been implemented fully on a nation-wide basis. The Thai Government's 30 Baht Health Coverage (or about $ 0.8 or € 0.6[3]) Scheme, put into practice in June 2001, has now guaranteed health for all, to both the Thai citizens as well as non-citizens such as migrants and illegal workers who have registered themselves with the concerned authorities (MFA, 2002). The National Economic and Social Development Board (NESDB) of Thailand indicate that about 96% of Thai people were covered by health insurance in 2004. Out of this number, 75.4% benefited from the 30-Baht Health Care Scheme, 13.8% obtained health insurance from the Social Security Program, and 6.6% from the Government Welfare Fund (PRD, 2006).

However, presently, the Thai government has to support high per capita costs for health insurance and the health insurance card is not reaching the poor in distant rural areas. Therefore, to assess rural poverty, vulnerability and risk management is important. It may help to save health insurance supporting cost and may reduce poverty and vulnerability problems. Furthermore, the design of health insurance products which are adapted to the needs of rural poor households will help to develop the quality of health care system. Furthermore, assuming that the government will increase the health insurance premium slightly and that the households can afford also slightly higher premiums consistent with their wealth, it will release the burden of local hospitals deficit.

This study has key research questions: Who is the target group for the government to implement poverty reduction policy? Which kinds of risks threaten households and which strategies do households apply to cope with risks? Which factors prompt households to purchase insurance? Which kinds of insurance products satisfy rural poor households the most?

1.2 Objectives and Hypotheses

The livelihood framework is applied to observe, analyze and better understand the highly diverse livelihood strategies of vulnerable rural households in Northern Thailand (Bernstein, Crow, and Johnson, 1992). The general objective of the research is to examine the risks and risk management of farm households in Northern Thailand, particularly as it relates to health. More specially, this study attempts to address the following interrelated objectives:

1. To identify major factors determining rural household poverty and to describe the incidence of household poverty.

[3] This calculation is at exchange rate US$ 1 = 38 Baht and €1 = 48 Baht.

2. To analyse the livelihoods, the difficulties and strategies of rural farm households.
3. To appraise risk and risk costs occurring to farm households and to identify risk management strategies.
4. To estimate the demand for health insurance as one crucial risk to livelihood and to describe the incidence of illness incidence of household and the health care service development.
5. To design health insurance concepts which correspond to the household demand.
6. To measure household vulnerability to poverty and to classify the group of vulnerable and non-vulnerable rural farm households.

The central hypotheses of this research proposal on livelihood strategies such as health micro-insurance are that they (1) have the potential to reduce livelihood vulnerability such as food insecurity and that (2) the differentiated knowledge of livelihood strategies is crucial for a better understanding of the reasoning behind the exploitation of livelihood assets, such as natural resources or physical assets in the form of livestock despite the negative medium and long-term effects.

1.3 Organization of Dissertation

In this dissertation, vulnerability and risk management of farm households is proposed in the context of Thailand's ongoing analysis of poverty and its suggestion of formal social protection schemes. It is structured in twelve chapters. Chapter 1 introduces the objective, hypotheses and background information on the problem statement of livelihood, poverty, risks and risk management. Chapter 2 explains poverty and vulnerability in Thailand. After the second chapter, a thorough literature review presents the sustainable livelihood framework, the difference between poverty and vulnerability, the different methods of measuring vulnerability, risk management strategies, micro insurance. It also presents Thailand's social welfare and health insurance system. In Chapter 4, the different methods are empirically applied on a cross-sectional household data base from nine villages in Northern Thailand collected in 2004. The remaining chapters of the dissertation are concerned with the econometric analysis. Chapter 5 gives an overview of the poverty status of Thailand and outlines the assessment of the empirical poverty index in relation to socio-economic and demographic household characteristics, using Principal Component Analysis. It investigates the significance of factors affecting poverty of Thailand. Chapter 6 analyses the livelihood difficulties of farm households, using participatory rural appraisal approaches. Based on the results of the previous chapter, Chapter 7 examines how households manage risks when faced with or when anticipating shocks. Risk management strategies are presented in

order to help households manage risks. Thereafter, Chapter 8 is taken up exclusively with an overview of household demand on health insurance. The econometric tool analyses the factors affecting household's decision to purchase insurance by using logit analysis. In addition, Chapter 9 goes on to explore the prospect of Conjoint Analysis on health insurance for rural households. Then, Chapter 10 provides the quantitative assessment of vulnerability to poverty. Chapter 11 draws the summary, conclusions and gives policy recommendations. The last chapter of the dissertation ends with a German summary.

2 POVERTY AND VULNERABILITY IN THAILAND

Poverty and vulnerability issues in Thailand have implications that last for decades. Various national strategies have been employed to achieve sustainable development. This chapter explains the significance of economic growth, poverty and inequality in section 2.1. Section 2.2 goes into details about the characteristics and situation of the poor and vulnerable group. Section 2.3 describes the development plan and poverty policy. Finally, section 2.4 ends with poverty reduction strategies movements.

2.1 The Significance of Economic Growth, Poverty and Inequality

Poverty has been a major problem of Thailand for many decades. When the first National Economic and Social Development Plan was launched in 1961, Thailand was a typical agricultural economy. More than 80% of the population were engaged in agricultural pursuits. At that time, the basic development policy was to accelerate and support investment initiatives of the private sector. For the past three decades, a satisfactory GDP growth rate has been achieved. During the 1960s, the economy grew by 7.9% per year, slowing to 6.9% per year during the 1970s. In the first half of the 1980s, because of difficulties associated with the energy crisis, the growth rate averaged 5.5% per year. The growth rate in the second half of the 1980s stood at about 11% per year, placing the country among the fastest growing economies in the world. From 1991 to 1994, financial policies were tightened so that domestic demand increased less rapidly and economic growth returned to a more sustainable pace. The economy still expanded by 8.3% annually, increasing to about 8.7% in 1995. In the 1960s, the share of the agricultural sector in GDP was 39.8%, compared with 13.7 and 6.5% of the industrial and service sectors respectively. The share of agriculture decreased to 28.3% in the 1970s, and 18.7 and 15.2% in the first and second half of the 1980s respectively and finally to 10.3% in 1995. Currently, although the agricultural sector's share of GDP has become much smaller, the majority of the population is still engaged in farming activities (Sinthuvanich and Chuenyong 1995). According to the 2001 report from The National Economic and Social Development Board of Thailand, it is estimated that 55.7% of Thailand's labor force is engaged in agriculture. Consequently, Thailand's economy is highly dependent on agricultural production (Sompolvorachai 2004). This situation could increase unemployment and underemployment in rural areas if employment in industrial and services sectors are unable to rise fast enough to absorb a larger proportion of labour from the agricultural sector (Sinthuvanich and Chuenyong 1995). Thus, this labour force could fall into poverty.

The poverty situation in Thailand expects to be more severely in the next decade due to the increasing number of population. The population of Thailand

reached 64.86 million in 2004, of which approximately 25% are under the age of 15. With a growth rate of 1.2 to 1.4% per year, the population is projected to exceed 70 million by 2010 (BOI 2005). The impact of population growth made a relevant contribution to increase the incidence of poverty.

In the mid-1990s Thailand embarked on a new development path - to reduce inequality and poverty and to institute a more decentralized and participatory governance structure. Until the mid-1990s Thailand had one of the highest rates of economic growth in the world -well over 7% a year between 1977 and 1996. Poverty reduction followed suit - with the share of poor dropping from 33% in 1988 to 11% in 1996. But in the wake of the country's financial crisis the share was back up to 13% in 1998. Lacking effective social protection, about a million Thais were thrown back into poverty. The crisis exposed weaknesses in the Thai development model: the failure to install safeguards against adverse shocks from erratic international capital flows and, especially, to regulate the financial sector, which had fuelled a debt-led investment boom.

Thailand also became convinced that the country's development strategy was not balanced or equitable enough. The poor were left behind. The poorer rural areas of the country had been spurned, in effect, by the miracle of economic growth. Although the country had a series of development plans after the early 1960s, none made poverty reduction a major objective. Planning focused on growth, assuming that the benefits would seep down to everyone. This rosy assumption seemed close to reality - but only for a while. Inequality remains a major challenge: throughout the 1990s the share of income going to the poorest 20% of the population stayed below 5%. With the prospects for slower growth, lowering inequality will have to assume more importance in efforts to reduce poverty. Already the government's allocations to rural development, particularly in the poorer north and northeast, appear to be moderating inequality (UNDP 2000).

2.2 The Characteristics and Situation of the Poor and Vulnerable Group

In Thailand, poverty has fallen from a level of almost 40% during the mid eighties to about 15% at the turn of the century. However, persisting regional disparities in the distribution of wealth disturbs the generally positive picture in the development. People living in remote rural households have benefited proportionately less from the high average growth performance. More severely, these people are most vulnerable to the impact of various economic, ecological, and political shocks such as financial crises, epidemics like the avian flu, SARS, and natural disasters like a tsunami. The number, extent, and impact of macro shocks have increased considerably in recent years. Such events are adding further burdens to the lives of poor people who are also frequently confronted

with idiosyncratic shocks such as unemployment, illness, or death of family members or the household head. Therefore, shocks can drastically upset the process of economic growth and cause those who had already escaped poverty to fall below the poverty line again. Perhaps the most prominent recent economic shock was caused by the Asian financial crisis of 1997-98. Per capita income declined, and poverty and inequality increased rapidly after the crisis. The crisis hit Thailand severely because of Thailand's advanced integration in the global financial markets. It has been observed that the poverty impact of the crisis was most severe among poor farmers living in remote rural areas, who frequently migrate to urban areas for supplementary employment and income. The household income of these farmers heavily depends on non-farm income from temporary or permanent employment in the industrial or service sectors in the urban agglomerates. Although the crisis has meanwhile recovered, such external shocks may occur again in the future (Waibel 2006).

The original United Nations poverty yardstick classifies poor people as people living on or below the "poverty line" as persons whose income is US$ 1 per day or less (42 - 44 Baht per day or 1,338 Baht per month). Ultra poor people are persons earning less than 80% of the poverty line income level (for Thailand this is 35 Baht per day or 1,070 Baht per month). Almost poor are persons earning between 100% and 120% of the poverty line income level (for Thailand this is 53 Baht per day or 1,606 Baht per month). According to a United Nations report issued in 2000, Thailand has 9.8 million poor people, 5.8 million ultra poor people and 3.4 million almost poor people. The total figure is 19 million, or 29.9% of the population, and is concentrated in provinces along the borders in the West, North, and Northeast regions. However, The United Nations Development Program measures poverty in terms of access to basic social services such as health, education, employment, income, housing and environment, transport and communications. By this yardstick, Thailand fairs much better with an "official" poverty figure of less than 5% (LS 2001).

Meanwhile, national statistics of Thailand reflect the grim reality of poverty, which very much exists in country. Using the poverty line of an income of 922 Baht per person per month (which is about US$ 23) in 2002, there are still 6.2 million people out of approximately 62 million in poverty. That is, 10 percent of Thailand's total population falls under this poverty line. This number of 6.2 million people in extreme poverty has decreased from 7.9, 9.9, and 8.2 million in the years of 1999, 2000, and 2001, respectively.

Where are these people? The rural poor make up about 11.3% of all the rural people and the urban poor about 4%. The Northeastern region is the poorest, followed by the North, the South, the Central Region, and Bangkok and its vicinity, respectively. While the average per capita income has increased nationally to about US$ 2,140, the gap between the rich and the poor has also increased. As of 2002, the top 20 percent of the population, by income, earned 56.2% of the national income while the lowest 20% earned only 4.2%.

These poor, for example, are mostly landless and without much education—no education, or only a grade 4 or grade 6 level of elementary education. Generally, these people have no skills; they are daily laborers, unemployed, or underemployed; they receive only a minimum daily wage or less; their employment is unstable; they have many children and/or support elderly or chronically ill family members; they may have people with disabilities depending on them; and they have substantial debts. There was a study on debt which found that in 2002, the average household debt was 84,603 Baht (about US$ 2,100); the average debt of the poor household was 24,876 Baht (about US$ 622); and for very poor households, defined as having income below 80% of the poverty line, the average debt was 11,830 Baht (about US$ 294). Most of these households owe their debts to loan sharks, who usually charge interest of at least 1% per month, and sometimes up to 10% per month. Therefore, the characteristics and situations of the poorest people should be taken into serious consideration. (Chutikul 2004).

2.3 Development Plan and Poverty Policy

During the early 1960s, a military government adopted the top down approach and relied on the Five-year Plan as a blue print for national social and economic development and became a master plan for public investment in infrastructure. The Second Plan became more sectoral and focused on manufacturing and services. Its emphasis was still in the Bangkok area without much diversification to other provinces. The Third Plan (1972-76) - the first one that added social elements to the development plan - began to address the uneven development between rural and urban areas and between Bangkok and cities in other regions. It was top-down approach. The most significant and successful element in this plan was to reduce population growth, which was viewed as a major factor that impeded the struggle to escape from the vicious circle and rural poverty. The Fourth Plan (1977-81) changed from being a blue print for infrastructure investment to problem-oriented planning to address important development issues. The Fifth Plan (1982-86) includes specific programs for poor rural areas. The plan stated the need to have development with full participation—the concept initiated by a World Bank mission that visited rural Thailand in 1980. The Sixth Plan (1987-1991) aimed to maintain growth and stability, as well as addressing education and manpower issues, which were viewed as the main obstacles for structural adjustment toward industrialization and export-led strategy. The Seventh Plan (1992-96) was the first plan that attempted to embrace the concept of sustainable development. The plan includes economic growth, income distribution, human resource development, enhancing quality of lives and environment (Poapongsakorn, NaRanong and Israngkul Na Ayudhaya 2003).

The Eighth Plan (for 1997-2001) started a more people centered strategy. It addressed the increasing social and environmental problems of Thailand and began to tackle poverty. The plan did not include a poverty reduction strategy, but it set a target of reducing the share of poor to less than 10% by 2001. The plan reformed the system of public administration to allow more decentralized decision-making and participation. The United Nation Development Program (UNDP) has supported the devolution of power to local government, by building the capacity of districts to raise their own revenues and decide how to use them. The United Nations Collaborative Action Plan, which in 1996 launched demand-driven initiatives to reduce disparities and poverty and build the capacity of local organizations and communities. Thai government has not provided much social support to vulnerable groups. In 1998 social services accounted for only 12% of government budget, and only a small part went for direct assistance to the poor. The new Social Investment Fund - backed by the World Bank, Japan and UNDP - targets more assistance to the poor through projects to create jobs and provide social services (UNDP 2000).

The Ninth Plan (2002-2006) adopts the philosophy of sufficiency economy bestowed by His Majesty the King as the guiding principle of national development and management. It builds on the Eighth Plan that advocated a holistic people-centred development approach. The major emphasis is placed on balanced development of human, social, economic, and environmental resources. A priority goal is pursuance of good governance at all levels of Thai society in order to achieve real sustainable people-centred development.

Thailand's development vision for the next 20 years focuses on the alleviation of poverty and the upgrading of the quality of life for the Thai people, so that "sustainable development and well-being for all can be achieved" (TISC 2002: page 1).

2.4 Poverty Reduction Strategies Movements

Government responses have included a variety of measures, some of which reach the target groups and some of which only reach the at-risk groups. These measures are, for example, a health security program where people pay only 30 Baht for treatment (about 75 cents); a village fund for income generating activity, which holds about one million Baht per village (about US $25,000); scholarship and educational loans; school lunches for children; a social security program; welfare for the elderly; loans for agriculture; and micro-credit programs from a state bank.

With the beginning of 2004, the government requested that poor people to "register" themselves with the government, indicating who they are, their income level, their debts, and other details such as their amount of need, the percent of interest they pay on their debt, who has given them their loans, and

what they would like to do to earn their living, etc. Government tried to eradicate poverty. There have also been a lot of discussions going on at the national and local levels on possible strategies for poverty eradication. Many business and non-governmental organizations have been involved in poverty alleviation (Chutikul 2004).

However, it is realized that poverty alleviation is a difficult task. Poverty reduction achievements remain fragile with a high number of "near poor" living just above the poverty line and therefore vulnerable to shocks. Furthermore, future poverty tends to be concentrated among the rural population and ethnic minorities, especially in peripheral regions. Hence, economic growth alone will not be sufficient to markedly reduce poverty. Recent shocks (such as avian flu and the tsunami) underline the need to include vulnerability in the concept of sustainable development and in strategies for long-term reduction in poverty. Poor households are at risk of being confronted with major shocks, mass and idiosyncratic shocks. The implementation of risk-reducing development strategies is important. Poverty and vulnerability are more pronounced (Waibel 2006).

3 THEORETICAL FRAMEWORK AND INSTITUTIONAL ENVIRONMENT

The literature review on risk, poverty and vulnerability is both, broad and extensive. It is therefore natural that differences exist in how one defines a concept such as vulnerability or even poverty, and how one explores the relationship between risk and poverty. This chapter defines these concepts. To better understand the literature, it is structured in six sections. First, the sustainable livelihood framework is explained in order to give an overview the linkages between risk and livelihood assets, livelihood strategies and outcome. Second, this chapter will dwell on the concept of poverty and vulnerability. The terms 'vulnerability' and 'poverty' are commonly used, but with different meanings. Third, the concept of vulnerability - how it is defined and measured - is examined from different perspectives. Fourth, risks as a source of vulnerability are explained as the key to reduce household vulnerability. Fifth, rural household risk and risk management strategies, both ex-ante and ex-post risk management strategies, are examined. The chapter ends with the review literature on micro-insurance, including Thailand social welfare and social insurance system, experience with micro-insurance in Thailand and the national universal health care scheme.

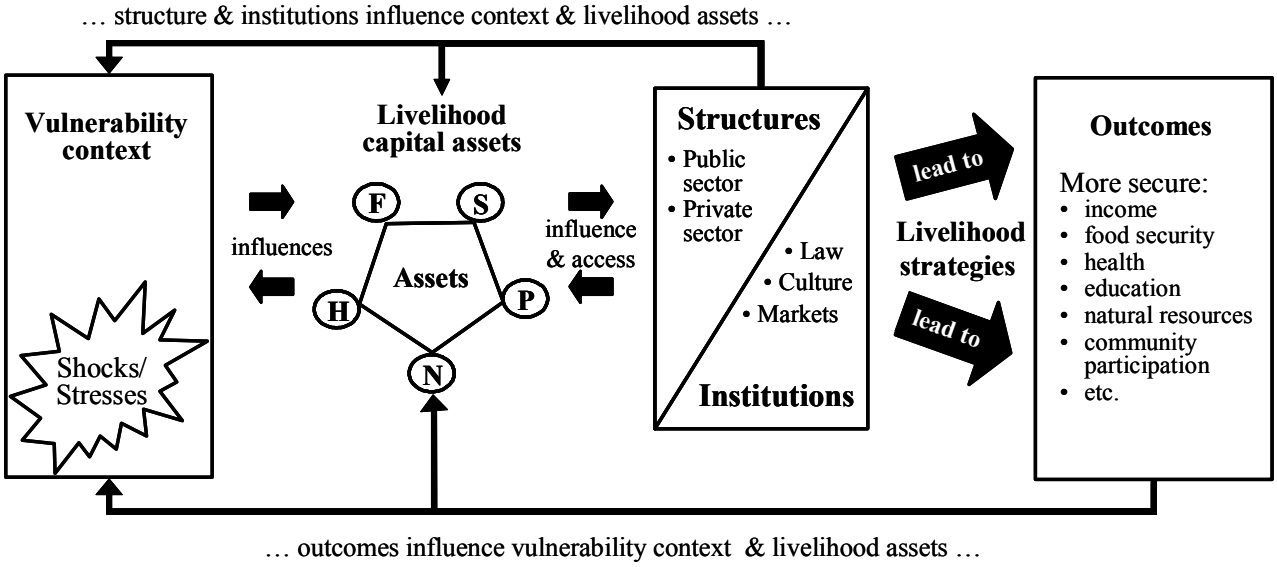
3.1 The Sustainable Livelihood Framework

The sustainable livelihoods framework (SLF) is a diagnostic tool that provides a better understanding of the systems and strategies of livelihoods developed by communities and their interaction with policies and institutions. The analytical framework is applied to a specific context, which evolves over time. The SLF is based on the concepts of poverty and vulnerability, where vulnerability is the susceptibility of people to poverty. It is necessary to understand that these people may not be poor at present but their livelihoods, or the external environment may have features that increase their susceptibility (SFLP, 2005).

The sustainable livelihood framework can be used as an analytical tool to identify and assess internal and external factors to the household that affect its socio-economic survival (see Figure 3.1). It looks into livelihood strategies (i.e. the sum of all different activities that people are doing in the context of their livelihood) in a given vulnerability context (the frame conditions). Vulnerable livelihoods have developed sophisticated *(ex-ante)* risk-management and *(ex-post)* risk-coping strategies. They may adopt production plans or employment strategies to reduce their exposure to the risk of adverse income shocks *(ex-ante),* even if this entails lower average income. In addition to such efforts to smooth income, they may try to smooth consumption *(ex-post)* by creating buffer stocks,

withdrawing children from school and developing informal insurance and credit arrangements. Formal and semi-formal insurance schemes do not yet contribute to reduce rural income risk and its consequences (Dercon, 2002; Fafchamps, 1999; Kanbur and Squire, 2001).

Figure 3.1 Sustainable Livelihood Framework and Vulnerability Context



Source: adapted from Carney (1998), Drinkwater and Rusinow (1999), Carney *et al.* (1999), Korf (2002)

Notes: 'H' represents human capital, i.e. the skills, knowledge, ability to work and health, important to pursue different livelihood strategies

'N' represents natural resources, i.e. the natural resource stock from which livelihoods are alimented (e.g. land, forests, water, wildlife, bio-diversity, other environmental resources)

'P' represents physical capital, i.e. the basic infrastructure (e.g. transport, shelter, energy, communications) and the productive assets that enable people to pursue livelihoods

'S' represents social capital, i.e. the social resources (e.g. social networks, membership of groups, relationships of trust, access to wider institutions of society such as political associations) upon which people draw in pursuit of livelihoods

'F' represents financial capital, i.e. the financial resources, which are available to people (e.g. savings for self-insurance, supplies of credit, access to insurance, regular remittances or pensions) and which provide them with different livelihood options

People have access to five forms of capital assets, i.e. natural, physical, human, social, and financial assets.[4] The livelihood assets influence and determine access to the socio-economic structure of society at large and their formal and informal institutions. Kanbur and Squire (2001) clearly state that human capital, particularly health and education, are essential building blocks to help the poor increase their income and thus reduce vulnerability (Gumber and Kulkarni, 2000). Building savings is a form of self-insurance that can be relied upon when credit and insurance markets are imperfect and/or non existent (Brown and Nagarajan, 2000; Deaton, 1991; Dercon, 2002). The capital assets of the people in combination with the structures and institutions determine the available set of livelihood strategies and achieve certain outcomes (Sanderson, 1999). These outcomes as well as the societal structure and institutions can have positive or negative impacts on the livelihood, thus the feedback loops in Figure 3.1. There are five main parts in the SLF.

First, *the vulnerability context* is the group of factors operating in the external environment in which people exist which may affect their susceptibility to poverty (source). It comprises *trends* (i.e. demographic trends; resource trends; trends in governance), *shocks* (i.e. human, livestock or crop health shocks; natural hazards, like floods or earthquakes; economic shocks; conflicts in form of national or international wars), and *seasonality* (i.e. seasonality of prices, products or employment opportunities).

Second, the SLA focuses on poor and vulnerable communities and begins by understanding the strengths of the communities and then using these to build up their capacities. SLF sees the community strengths, as "capital assets". There are five types of livelihood assets– human, natural, physical, social and financial (source):

Human capital (H) represents the skills, knowledge, ability to work and good health that together enable people to pursue different livelihood strategies and achieve livelihood objectives (DFID, 2000). Without human capital, people are unable to effectively use the other four types of capital.

Natural capital (N) is the term used for the natural resource stocks from which resource flows and services (such as land, water, forests, air quality, erosion protection, biodiversity degree and rate of change, etc.) useful for livelihoods are derived. Within the framework a particularly close relationship exists between natural capital and the vulnerability context and many of the devastating shocks for the livelihoods are natural processes that destroy natural capital (e.g. fires, floods, earthquakes).

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[4] Clearly, equating 'assets' theoretically with varieties of 'capital' through the 'asset pentagon' in Figure 3.1 distorts the understanding (1) of capital and (2) of poverty. On the first point, capital is properly a social relation between people, not an attribute of rich and poor, respectively. On the second point, attention is displaced from the inequalities of power that must surely be invoked to explain the persistence or the worsening of poverty (Murray, 2001). For a powerful critique of the notion of 'social capital' and 'human capital' see Fine (2001).

Physical capital (P) comprises the basic infrastructure and producer *goods* needed to support livelihoods, such as affordable transport, secure shelter and buildings, adequate water supply and sanitation, clean, affordable energy and access to information.

Social capital (S) refers social resources upon which people draw in seeking for their livelihood outcomes, such as networks and connectedness, that increase people's trust and ability to cooperate or membership in more formalised groups and their systems of rules, norms and sanctions.

Financial capital (F) denotes the financial resources that people use to achieve their livelihood objectives and comprises the availability of cash or equivalent that enables people to adopt different livelihood strategies. Two main sources of financial capital can be identified: *Available stocks* comprising cash, bank deposits or liquid assets such as livestock and jewellery, etc. *Regular inflows of money* comprising labour income, pensions, or other transfers from the state, and remittances, which depend on others and need to be reliable.

Among the five assets, financial capital is the most versatile as it can be converted into other types of capital or it can be used for direct achievement of livelihood outcomes (e.g. purchasing of food to reduce food insecurity). However, it tends to be the least available asset for the poor, what makes other capitals important as substitutes.

Third, *transforming structures and processes* represents *the institutions, organisations, policies and legislation* that shape livelihoods. They are of central importance as they operate at all levels and effectively determine access, terms of exchange between different types of capital, and returns to any given livelihood strategy (Shankland, 2000; Keeley, 2001). *Structures* can be described as the hardware (private and public organisations) that set and implement policy and legislation, deliver services, purchase, trade and perform all manner of other functions that affect livelihoods (DFID, 2000). *Processes* constitute the "software" determining the way in which structures and individuals operate and interact. Transforming structures and processes occupy a central position in the framework and directly feedback to the vulnerability context, while influencing and determining ecological or economical trends through political structures, while mitigating or enforcing effects of shocks or keeping seasonality under control through working market structures; or they can restrict people's choice of livelihood strategies (e.g. caste system) and may thus be a direct impact on livelihood outcomes.

Fourth, livelihood strategies comprise the range and combination of activities and choices that people undertake in order to achieve their livelihood goals. When considering livelihood strategies to the SLF, it is important to recognise that people compete (for jobs, markets, natural resources, etc.), which makes it difficult for everyone to achieve simultaneous improvements in their livelihoods. The poor are themselves a very heterogeneous group, placing different priorities in a finite and therefore disputed environment. An application

of the SLF offers the advantage to be sensitive for such issues in a differentiated manner.

Fifth, *livelihood outcomes* are the achievements of livelihood strategies, such as *more income* (e.g. cash), *increased well-being* (e.g. non material goods, health status, access to services), *reduced vulnerability* (e.g. better resilience through increase in asset status), *improved food security* (e.g. increase in financial capital in order to buy food) and a *more sustainable use of natural resources* (e.g. appropriate property rights). Outcomes help us to understand the 'output' of the current configuration of factors within the livelihood framework and demonstrate what motivates stakeholders to act as they do and what their priorities are and give an idea of how people are likely to respond to new opportunities and which performance indicators should be used to assess support activity. Livelihood Outcomes directly influence the assets and change dynamically their level.

The potential for applications of the SLF is manifold and not restricted to livelihood thinking only, as the approach includes ideas of other recent theoretical approaches. Its flexible design and openness to changes makes it adaptable to diverse local settings, where it can be applied to different extents associated to the development research or project objectives. Prior to any development activity the SLF might serve as an analytical tool for the identification of development priorities and new activities in order to understand the way a socially constructed environment works and to find potential beneficiaries or partners in practice. The uses of the SLF are diverse and flexibly adaptable to many settings, but it does not represent a magic tool being able to eliminate problems of poverty with a single sign, nor is it a complete new idea that will be revolutionary for development research and cooperation. Still, the SLF delivers a good tool to structure development research and increase efficiency of development projects. Rooted within the strengths of the approach quite often its weaknesses can be found too: On the one hand a differentiated livelihood analysis requires enormous financial, time and personal resources often lacking in practical projects. Moreover, the claim to be holistic leads to a consideration of very many aspects, what inevitably delivers a flood of information hardly possible to cope with. The decision about what to consider with priority leads us to a normative dilemma. Further problems may arise with the analysis of the livelihood assets, as for example the difficulties to measure and to compare social capital. Additionally, the asset status of a person is highly associated with the amount of dependence from a certain resource, varying according to the local context, as for instance some actors might be able to satisfy their needs with a low level of financial capital, whereas others with more financial capital show by far less ability to do so (NCCR, 2002).

3.2 Poverty and Vulnerability

Poverty and vulnerability are not synonymous, but are closely related. Many households that are now not poor are certainly vulnerable to fall into poverty. Poverty is static but vulnerability is dynamic. A thorough understanding of the characteristics, constraints and priorities of the poor and vulnerable is crucial to formulate an effective strategy for reducing poverty and for designing social protection programs (Alayande, 2004).

Like poverty, vulnerability is a multi-dimensional concept, based on both monetary (consumption and income) and non-monetary concepts (such as inadequate levels of nutrition, health, or education). The definition of the future over which shortfall in welfare could be, represents one of the major differences between poverty and vulnerability. The choice of the period over which to measure vulnerability affects the level and magnitude of vulnerability. The longer the period, the higher is the probability of a household falling under the threshold (Tesliuc and Lindert, 2002). Vulnerability is used as the magnitude of the *threat* of poverty, measured ex-ante, before the veil of uncertainty has been lifted. This can be compared to poverty, which is the magnitude of low welfare outcomes, as observed without uncertainty and whereby low welfare is defined as outcome levels below some accepted poverty line (Calvo and Dercon, 2005). Thus, vulnerability as the probability that a household would find itself consumption poor in the future bears a strong testimony to the effect that it is a forward-looking measure of household welfare. On the other hand, poverty is an ex-post measure of household's well-being. Vulnerability defines within the framework of poverty eradication as the ex-ante risks that a household which currently non-poor will fall below the poverty line or if a household is currently poor will remain in poverty (Chaudhuri, Jalan, and Suryahadi, 2002.).

Alwang, Siegel, and Jorgensen (2001) outline the concept of poverty and vulnerability. They review first, economics literature, which defined vulnerability in the concept of asset-based literature, livelihoods literature, and food security literature. Second, they look into sociology literature and third, disaster management literature. Finally, they consider environmental and health/nutrition literature.

First, the economics literature conceptualizes vulnerability as an *outcome* of a process of household *responses* to *risks,* given a set of underlying conditions. Vulnerable households are those that have moved or are likely to move into a state of poverty or destitution as a result of the cumulative process of risk and response. The outcome (poverty status) is an ex-post state that is assumed to be the primary concern of policy makers. This conceptualization has led some economists to use measures of variability in outcomes (e.g. income variance. especially downside shocks) as the measurement of vulnerability. Much of the economics literature is concerned with finding a metric that is comparable across different outcomes. A recurring criticism of the economics

literature is its use of money metrics and the underlying presumption that all losses can be measured in monetary terms.

A relatively large body of literature exists on poverty dynamics, this literature tends to focus on the static *outcome* of vulnerability: ex-post movement into (and out of) a state of poverty. This line of thinking is related to the concept of vulnerability in the sense that poverty is recognized as the *outcome* of a dynamic process. The outcome of the process—poverty—is assumed to be the primary policy focus, and not the process itself. Use of specific benchmarks for outcomes (e.g., a poverty line) and reliance on money metrics narrows the focus, and makes the analysis more tractable. Some economists classify poverty as either chronic or transitory. The distinction depends on the time reference. If the household is poor for the entire reference period, it is deemed chronically poor. Alternatively, if, during the period the household moves in and out of poverty, it is said to suffer from transitory poverty. Transitory poverty may be caused either by structural factors (low education, headship, etc.) and lifecycle events (e.g. divorce) or by risk. Most economists distinguish between poverty related to risk and non-risk poverty by calling the former *stochastic* poverty. Stochastic poverty occurs when current consumption falls below the poverty line which is also below permanent income. Stochastic poverty arises because it is not possible to borrow against future income for reasons such as imperfect credit markets (Morduch, 1994). Structural poverty occurs when permanent income is below the poverty line, perhaps due to a shock associated with household structure. The key problem with structural poverty is that because permanent income is below the poverty line, it is not possible to escape current poverty for a sustained period. In the context of structural and stochastic poverty, vulnerability means being vulnerable to risky events in the sense that a bad outcome could move the household below the poverty line, and the household needs to decrease current period consumption in order to survive. Numerous studies have examined the determinants of households moving into, and out of, poverty by using panel data sets and define economic poverty in terms of consumption relative to a poverty line. A paper by Pritchett, Suryahadi, and Sumarto (2000) is an example of poverty dynamics literature that demonstrates how vulnerability to poverty can be defined and measured. Vulnerability defines as the risk a household will fall into poverty at least once in the next few years. Vulnerability is measured as a probability, and households have greater or lesser degrees of vulnerability. Another paper is Mansuri and Healy (2000). Like Pritchett, *e. al*. (2000), vulnerability is defined as an ex-ante and forward-looking probabilistic measure. Vulnerability can be measured with cross section data and other time series data, which is used to generate a probabilistic forward-looking measure. A study of movement in and out of poverty by Jalan and Ravallion (1998) decomposes chronic and transient poverty households are below the poverty line. The logical

consequence is the need to measure the *probability* associated with future states to compute *current* vulnerability.

In the asset-based literature, poverty is thought of as being caused by inadequate access to tangible and intangible assets. Poverty is implicitly treated as a dynamic state, with vulnerability being associated with the probability of falling below a benchmark level of current period consumption and the loss or degradation of assets. Thus, the *outcome* of risky events is a state where losses create current welfare losses and lower future expected income flows, consumption, and investment (Reardon and Vosti, 1995; Moser, 1998; Rakodi, 1999). Longer-term effects can be caused by transactions costs associated with the use of assets to manage risk. A major conceptual focus of this literature is the ability of households to manage risk through enhanced *responses* to risk. Households with more income- and other welfare-generating assets are considered to be less vulnerable to welfare losses associated with risky events. Investments in assets can reduce vulnerability. Assets can be used to avoid welfare downswings through improved risk management, and investment over time can increase expected income. Several concepts related to vulnerability are widely used in this literature. *Susceptibility* is the probability that a household will experience a welfare loss from a given event, and is a function of risks faced, the household's assets and its response history. *Resilience* is the household's ability to resist downward pressures and ability to recover from a shock. Resilience depends on the effectiveness of the risk response and the capability to respond in the future. *Sensitivity* is the extent to which the household's asset base is prone to depletion following responses to risk. Some households that are not consumption poor might be *investment poor* because their asset base declines over time and they are unable to generate sufficient surpluses to protect, maintain or enhance their assets (Reardon and Vosti, 1995). This concept of investment poverty is forward-looking and dynamic. Relationships between risks and assets are highlighted in the asset-based literature.

Vulnerability in the sustainable livelihoods literature refers to the probability that livelihood will occur with stress or a higher probability implying increased vulnerability. Vulnerability might be denoted "livelihood vulnerability", which is forward looking and an ongoing state. Vulnerability has two sides: an external side of risks, shocks, and stress; and an internal side, which is defenselessness, meaning a lack of means to *mitigate* or *cope* without incurring losses (Chambers, 1989). This literature considers both *risks* and *responses*. The *outcome* of interest is loss of livelihood and continued "vulnerability" to subsequent shocks. It is not clear how one would specifically measure this vulnerability as there is little discussion of "a minimum level of livelihood." Other strands of this literature (e.g. Davies, 1996) distinguish between "structural vulnerability" and "proximate vulnerability". Households that exhibit underlying characteristics that make them vulnerable (such as

headship, age, households with old and infirm members - similar to concepts of structural poverty) - are called structurally vulnerable. The sustainable livelihood focus on structural vulnerability addresses risk responses over time. Structural vulnerability is related to stochastic poverty and chronic poverty. Structurally vulnerable households have mean levels of well-being (perhaps measured by consumption) that fall below a cut off—on average, they are poor—thus they also suffer from chronic poverty. The livelihoods approach focuses on how can resources be managed in a sustainable manner to increase the mean levels of well-being, which is a forward-looking of vulnerability. It may be contrasted with typical poverty analyses, which examine causes and solutions to states, which can be short or long term, below a poverty line.

Vulnerability as a concept in the food security literature, food production or consumption is the most important component of a livelihood. Vulnerability defined as the combined effects of risk and of the ability of an individual or household to *cope* with risks and to recover from shock or deterioration of current status (Maxwell et *al*., 2000). The concept "food security" is difficult to operate; such studies often examine the relationship between proxies, such as child malnutrition, consumption, standard measures of poverty, and the proposed "indicators." Indicator evaluation requires comparison to benchmarks, which are presumed to be accurate measurement of the true concept. A second broad avenue of food security research involves mapping. Vulnerability mapping uses a number of analytical techniques to examine the degree of correspondence between the indicators and the concept of food security or insecurity. In vulnerability mapping, the typical approach is to construct an index of "vulnerability" and identify geographical areas, social sub-groups, etc. with high levels of vulnerability. Several analytical techniques have been used to create the index, including principal component analysis (Vella and Vichi, 1997; FEWS, 1996), cluster analysis, simple rankings across components of the index (Eilerts, 1994; Keogh, 1997), and arbitrary weights applied to the index elements (Keogh, 1997). Variables included in such efforts generally represent the components of risk, response and outcome without considering interactions between the components. This failure leads to vagueness about their relationship to the underlying concept, which is the dynamic, forward-looking state of food insecurity (Barrett, 1999b). The maps provide informative displays can be used to produce aggregate "indices" of poverty or vulnerability.

Second, threads of the vulnerability in sociological literature have supported the use of participatory methods to identify the poor and quantify poverty (e.g. Chambers, 1989; Narayan *et al*., 2000). Many sociologists have adopted the term "vulnerability" as an alternative means of characterizing the dimensions of poverty not captured by money-metric measures. In fact, sociologists often discuss "social vulnerability" as opposed to "economic vulnerability" (e.g., Loughhead and Mittai, 2000). Sociologists identify vulnerable groups such as children at risk, female headed households, elderly

and disabled. This focus is similar to the food security literature that tries to identify vulnerable groups based on broad household characteristics, not specific measures of economic outcomes. Several authors note that individual vulnerability cannot be separated from the concept of "social vulnerability" (e.g., Dilley, 2000; Morrow, 1999). Because of ties between individuals, there is a collective nature of vulnerability. Institutional arrangements count, and measurement is complicated by imperfect information about social ties, social capital and social vulnerability. Social vulnerability is a combination of social factors and environmental risk. (Siegel and Alwang, 1999).

Third, a large body of vulnerability in disaster management literature addresses the relationship between human vulnerability and natural disasters. Vulnerability is defined *with respect to natural disasters*, and people, households, communities, etc. are vulnerable to damages from a natural disaster (Kreimer and Arnold, 2000). This literature often includes discussions of poverty only in general terms, using such ideas as the poor are most vulnerable to natural disasters. This literature usually breaks vulnerability into two components: risk mitigation or disaster preparedness, and disaster relief. Risk reduction, mitigation, and some coping activities are usually lumped together into "mitigation activities" and the remaining coping activities are referred to as disaster relief, especially coping resources obtained from sources external to the disaster area. This literature stresses that characteristics of a household are essential determinants of vulnerability because these characteristics affect the "mitigation" and "coping" components of the vulnerability equation. The tautological nature of these definitions—risk determines vulnerability, but vulnerability also determines risk—invites confusion. Imprecise use of terms has affected communication in this branch of literature.

Fourth, the key notion of vulnerability in environmental literature is to recognize vulnerability with respect to an outcome, which is based on ecologic-centric concerns as opposed to other approaches that are usually human-centric. This literature focuses on *risks* and *outcomes*. Risk assessments and valuation techniques to help provide an analytical basis for benefit and cost analyses. Environmental economists value risk inherent from an activity by focusing on hazard and exposure. Hazard means the capability of a risky event to cause damage (O'Brien, 2000).

Fifth, the review of vulnerability in the concept of health and nutrition literature is concerned with the sensitivity and specificity of indicators of *nutritional status*. Vulnerability refers to *nutritional vulnerability*, usually taken as a probability of inadequate food intake needed to live a normal and active life (National Research Council, 1986), or the probability of suffering nutrition-related morbidity or mortality (e.g. Davis, 1996). A major theme in this literature examines the implications of malnutrition (as indicated by anthropometry) for outcomes such as educational attainment, probability of mortality, adult productivity, etc.

To sum up, vulnerability is an *ex-ante* (forward-looking) rather than an *ex-post* concept. Poverty status can be observed at a specific time period, given the welfare measure and the poverty threshold. By contrast, household vulnerability is not directly observed. Poverty and vulnerability (to poverty) are two sides of the same coin. The observed poverty status of a household (defined simply by whether or not the household's observed level of consumption expenditure is above or below poverty line) is the ex-post realization of a state, the ex-ante probability of which can be taken to be the household's level of vulnerability (Chaudhuri, Jalan, and Suryahadi, 2002). Thus, vulnerability is underscored by the following principles: First, it is forward-looking and defined as the probability of experiencing a loss in the future relative to some benchmark of welfare. Second, a household can be said to be vulnerable to future loss of welfare and this vulnerability is caused by uncertain events. Third, the degree of vulnerability depends on the characteristics of the risk and the household's ability to respond to the risk. Fourth, the poor and the near-poor tend to be vulnerable because of their exposure to risks, limited access to assets and limited abilities to respond to risk (Alwang, Siegel and Jorgensen, 2001).

3.3 Approaches for Measuring Vulnerability

Vulnerability is difficult to measure: anticipated income or consumption changes are important to individuals and households before they occur and even regardless of whether they occur at all as well as after they have occurred. The probability of falling into poverty tomorrow is impossible to measure, but one can analyze income and consumption dynamics and variability as proxies for vulnerability (World Bank, 2001).

However, constructing such a measure of vulnerability implies a number of steps. First, the time horizon over which one will assess the potential of future shortfalls must be defined. The probability that a person will become poor one period ahead will be focused on. Second, in assessing vulnerability, an indicator of well-being must be chosen. Consumption is taken as indicator of well-being. Other indicators of well being include educational achievements, health outcomes, malnutrition. Third, an ex-ante probability distribution of ex-post outcomes regarding well being indicators must be estimated. Fourth, a threshold for well-being must be defined, i.e. a consumption poverty line. Fifth, to classify households in vulnerable and non vulnerable groups, a probability threshold such that a household will be considered vulnerable if its probability of shortfall exceeds must be determined (Christiaensen and Subbarao, 2004).

In the area of vulnerability there is an emerging body of literature that intends to present a summary measure of vulnerability (Table 3.1). Various measures have been proposed, including: vulnerability as expected poverty (VEP) (Chaudhuri et al., 2002; Christiaensen and Subbarao, 2004; Pritchett et

al., 2002), vulnerability as low expected utility (VEU) (Ligon and Schechter 2002, 2003) and vulnerability as uninsured exposure to risk (VER) (Tesliuc and Lindert, 2002).[5]

In the vulnerability as expected poverty (VEP) approach, vulnerability is defined as the probability that a household will fall into poverty in the future. Specifically, welfare is defined in terms of consumption so that vulnerability of household h at time t (V_{ht}) is the *probability* that the household's level of consumption at time $t + 1$ (c_{ht}+1) will be below the consumption poverty line (Chaudhuri, Jalan, and Suryahadi, 2002; and Christiaensen and Subbarao, 2001).

Vulnerability as low expected utility (VEU) measures the welfare consequences of risk. Vulnerability is defined with reference to the difference between the utility derived from some level of certainty-equivalent consumption at and above which the household would not be considered. Vulnerability is analogous to a poverty line and the expected utility of consumption. Vulnerability depends not only on the *mean* of a household's *consumption*, but also on *variation in consumption*. The balance between poverty and risk in a measure of vulnerability can decompose the measure into distinct components reflecting poverty and risk. This risk measure can decomposed into two distinct measures of risk, one aggregate, and the other idiosyncratic (Ligon and Schechter, 2003).

Vulnerability as Uninsured Exposure to Risk (VER) indicated that shocks could be either covariant (as a rainfall shock) or idiosyncratic, such as illness. In the absence of effective risk management tools, such shocks impose a welfare loss to the extent that they lead to a reduction in consumption. VER is similar to the VEP and VEU approaches in that it is concerned with assessing welfare and welfare losses in a world where some risks are at best partially insured. It differs from VEP measures in that it is backward looking; it is an *ex-post* assessment of the extent to which a negative shock caused a welfare loss rather than an *ex-ante* assessment of future poverty. Moreover, it differs from VEP and VEU measures in that there is no attempt to construct an aggregate measure of vulnerability. VEP and VEU measures make reference to a benchmark for a welfare indicator and enumerate a probability of falling below this benchmark (Tesliuc and Lindert, 2002).

[5] See Hoddinott and Quisumbing (2003) for a detailed discussion of these measures.

Table 3.1 Definition and Approach to Measure Vulnerability by Expected Poverty, Expected Low Utility and Uninsured Exposure to Risk

	Vulnerability as expected poverty	**Vulnerability as expected low utility**	**Vulnerability as uninsured exposure to risk**
Definition	Vulnerability of household h at time t, Vht is the *probability* that the household's welfare (consumption) at time t + 1 (c_{ht+1}) will be below the benchmark (consumption poverty line, z): $V_{ht} = Pr(c_{ht+1} = z)$	Vulnerability is the difference between the utility derived from some level of certainty-equivalent consumption, zCE at and above which the household the household would not be considered vulnerable and the expected utility of consumption. $V_h = U_i(zCE) - EU_h(c_h)$ or $V_h = [U_h(zCE) - U_h(Ec_h)] + [U_h(Ec_h) - EU_h(c_h)]$	An *ex-post* assessment of the extent to which a negative shock caused a welfare loss
How calculated	1. Predict consumption for each household. 2. Derive the variance of consumption for each household. 3. Make assumptions regarding the distribution of consumption, the poverty threshold and the threshold probability value above which a household is considered vulnerable.	1. Make an assumption regarding the functional form regarding U. 2. Specify a conditional expectation of consumption Ec_h as a function of covariate and idiosyncratic/household characteristics 3. Calculate the two parts of the vulnerability measure (the risk component can be further broken down into covariate, idiosyncratic and unexplained/measurement error components).	1. Define Δlnc_{htv} as the change in log consumption between t and = t-1, $S(i)_{tv}$ denote covariate shocks, $S(i)_{htv}$ idiosyncratic shocks, D_v be community dummy variables, X household characteristics, *d*, *b*, g, d, and l are parameters to be estimated and $\Delta\varepsilon_{htv}$ is the error term 2. Estimate: $\Delta lnc_{htv} = \lambda\, S(i)_{tv} + b\, S(i)_{htv} + d\, D_v + dX + \Delta\varepsilon_{htv}$
Advantages	1. Produces a "headline" vulnerability figure 2. May identify households "at risk" who are not poor 3 Relatively straightforward to calculate 4 Can be estimated with a single cross-section	1 Not vulnerable subject to the perverse implications of the VEP measure 2 Provides clean disaggregation between vulnerability due to poverty and vulnerability due to uninsured risk 3 Can also be used to calculate an aggregate measure of vulnerability	1 Provides *prima facie* evidence that existing risk management mechanisms are doing a poor job in protecting households from income shocks. 2 Can indicate whether covariate or idiosyncratic shocks are the principal cause of welfare losses. 3 Can be adapted to determine whether shocks have different effects across different groups. 4 Easy to estimate.

Table 3.1 Definition and Approach to Measure Vulnerability by Expected Poverty, Expected Low Utility and Uninsured Exposure to Risk (Continue)

	Vulnerability as expected poverty	**Vulnerability as expected low utility**	**Vulnerability as uninsured exposure to risk**
Disadvantages	1. *If* estimated using a single cross-section, must make strong assumption that cross-sectional variability captures temporal variability 2. Can, in principal, generate 'perverse' policy recommendations, that exposing households to increased levels of uninsured risk does not make them more vulnerable, and could make them less vulnerable	1. Probably the hardest measure to calculate 2. Units of measurement somewhat difficult to convey to individuals with little formal training in economics.	1. Does not produce a "headline" vulnerability estimate (though it can be adapted to estimate "cost of shocks") 2. Is *ex post* rather than *ex ante* 3. Really requires panel data (with three or more rounds) to be credibly estimated
Sample reference	Chaudhuri, S., et.al. 2002. "Assessing Household Vulnerability to Poverty: A Methodology and Estimates for Indonesia," Columbia University Department of Economics Discussion Paper No. 0102-52.	Ligon, E. and L. Schechter, 2003, "Measuring vulnerability" *Economic Journal*.	Skoufias, E. and A.R. Quisumbing (2002) "Consumption Insurance and Vulnerability to Poverty" Draft, IFPRI.

Source: Hoddinott and Quisumbing (2003)

Furthermore, there are many other approaches to estimate vulnerability. Dercon and Krishnan (2000) measure 'vulnerability' in rural Ethiopia by *estimating determinants of consumption levels* and predicting the degree of households suffering severe consumption shortfalls given particularly poor rainfall. Vulnerable populations are those that have a risk of falling below the poverty line. While, Pritchett et al. (2000) estimate the *standard deviation of consumption changes in the cross-section* and then, predicting households which have the income level below 50% are likely to be poor next period. A limitation is that the problems with the standard deviation are unavoidable in this framework. Kamanou and Morduch (2001) measure vulnerability to poverty by using the 1985-88 rounds of the Cote d'Ivoire Living Standards Survey to draw on related studies of consumption patterns, poverty, and household behaviour. Vulnerability is measured by comparing *standard deviations of consumption*

and income changes. Households are more vulnerable if standard deviations of past consumption changes are higher. Another approach was presented in the World Bank (2000), vulnerability is measured by *estimating assets* rather than consumption patterns. Vulnerability is associated with the ability to smooth idiosyncratic shocks, more assets generally makes coping mechanisms easier.

Hence, measures of vulnerability are being *developed.* Work on *poverty dynamics*, including on transient poverty has highlighted the limitations of current static poverty measures. However, these alternative approaches remain *backward-looking*. They describe the past consequences of shocks and fluctuations. While information on the characteristics of those experiencing poverty transitions may assist in identifying those most at risk for consumption shortfalls, this is not quite the same as measuring vulnerability to poverty. Such a measure should be *ex-ante*, i.e. forward-looking. One could define 'vulnerable households' as those liable to fall under an agreed poverty line over time with a particular high probability. Measures are proposed in Christiaensen and Boisvert (2000), Chaudhuri et al. (2002), Pritchett et al. (2000), and Alwang, et al. (2001). More in general, beyond a headcount of vulnerability, one could construct *measures of vulnerability for different dimensions of poverty* (such as health or nutrition); or measures taking into account the extent to which households are likely to fall below the poverty line (Kamanou and Morduch (2001). Some have proposed measures purely based on cross-section household data (Chaudhuri et al. 2002), but the assumptions needed to identify common and idiosyncratic risk are very strong (Dercon, 2002).

Yet, to this date, satisfactory vulnerability indicators have not been developed. First, there are conceptual problems, using a measure based on the variability of consumption (or another outcome indicator), rather than an ex-ante measure that takes into account the cost of taking risk reducing measures. Gunning and Elbers (2003) deal with this aspect by constructing a stochastic, structural dynamic model of a household's inter-temporal consumption and savings decisions. The measure of vulnerability is theoretically well defined, but practically hard to implement. Second, there are large numbers of methodological and econometric issues (a discussed in Hoddinott and Quisumbing, 2003). Ligon and Schechter (2004) conduct Monte Carlo experiments designed to explore the performance of different vulnerability indicators proposed in the economic literature, under different assumptions about the underlying economic environment. They find that when the environment is stationary and consumption is measured without error, the best estimates are the ones proposed by Chaudhuri et al (2002). If the vulnerability measure is risk-sensitive, but consumption is measured with error, the estimate proposed by Ligon and Schechter (2003) generally performs best. However, when the distribution of consumption is non-stationary and there is measurement error, all estimators perform poorly. But since measurement error is a reality and to assess whether the distribution is non-stationary, relatively long time series

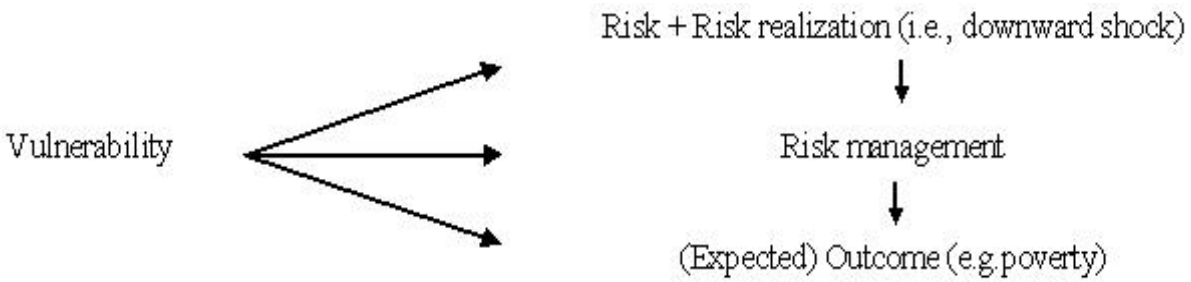
are needed, this implies that methodologically sound *practical* applications may still be some time away, even though work in this field is rapidly expanding. (Hoogeveen et al., 2004).

3.4 Risks as a Source of Vulnerability

What are the sources of vulnerability? The identification of major risks will be the first step in conducting a risk and vulnerability analysis. Whether a risk should be considered major depends on the characteristics of risk. Risks differ, depending on whether they are natural (floods) or the result of human activity (conflict). Risks can affect individuals in an unrelated manner (idiosyncratic). Risks can be correlated among individuals (covariate), across time (repeated) or with other risks (bunched). Risks differ by their frequency and welfare impact (for example catastrophic or non-catastrophic) (Hoogeveen et al., 2004). Households face risks. If these are realized they can generate adverse outcomes, leaving households more vulnerable than before to manage future risks. Whether or not this happens depends on the assets of households, the risks they face, the characteristics of the risks, once they are realized, and the households' responses to these challenges. "Vulnerability reduction thus requires a better understanding of risks and risk exposure, the outcomes that are likely to be generated by shocks, and the most efficient means of managing risks*"*, which are not least contingent on a household's assets (Alwang, Siegel, and Jorgensen, 2001, p.2).

Vulnerability of households can be decomposed into three components of a *"risk chain"* (Figure 3.2). First, the *risk*, or uncertain events, Second, risk management or *risk responses,* and third, the *outcome* in terms of welfare loss.

Figure 3.2 The Relationship Between Risk and Vulnerability: The "Risk Chain"



Source: IFPRI (2002)

First, vulnerability begins with a notion of *risk*. Risk is a probability distribution of events which might cause a welfare loss. This welfare loss can be substantial enough to push non-poor households below the poverty line or poor households deeper into poverty. All individuals, households, communities or nations face multiple risks from different sources, whether they are natural (e.g., earthquakes, illness) or man-made (e.g., unemployment, environmental degradation, war). Examples of risks are shown in Table 3.2. These risks are characterized by their magnitude (including size and spread), their frequency and duration, and their history – all of which affect household's vulnerability from the risk. A shock is a risky event that can cause significant negative impacts. Social actions can reduce risk or exposure to risk, and thereby potentially lessen the damage associated with shocks.

Table 3.2 Example of Risks by Categories

Categories of risks	Examples of risk
Natural risks	e.g., heavy rainfall, landslides, volcanic eruptions, earthquakes, floods, hurricanes, droughts, strong winds, etc.
Health risks	e.g., illness, injury, accidents, disability, epidemics (e.g., malaria), famines
Life cycle risks	e.g., birth, maternity, old-age, family break-up, death, etc.
Social risks	e.g., crime, domestic, violence, terrorism, gangs, war, social upheaval, etc.
Economic risks	e.g., unemployment, harvest failure, business failure, resettlement, output collapse, balance of payment shock, financial crisis, currency crisis, technological or trade induced terms of trade shock, etc.
Political risks	e.g., discrimination, riotes, etc.
Environmental risks	e.g., pollution, deforestation, land degradation, nuclear disaster, etc.

Source: Holzmann and Jorgensen (2000)

Second, risk management comprises all actions taken to respond to risks, shocks and adverse outcomes. Households often face constraints to adopt efficient *risk management*. These constraints are related to problems of asymmetric information, incomplete or missing financial and insurance markets, cognitive failures in the assessment of risks, the inability of informal mitigation efforts due to covariate risks, and exclusion from social networks. Risk management can be applied before a risk materializes (*ex-ante* risk management), or after it has been materialized (*ex-post* risk management) (Holzmann and Jorgensen, 1999 and 2000).

Third, risk combined with the household responses relates to the *outcome*. The household is said to be *vulnerable from* the risk or *vulnerable to* an outcome. The outcome is the change in welfare that results from the realization

of risk and from the success or failure of the risk management. A household might be able to mitigate or cope with a risk or set risks in a given period (e.g., a seasonal decline in income), but the process can result in limited ability to manage risk in subsequent periods, especially when assets are degraded (see Holzmann and Jorgensen, 1999 and 2000; Siegel and Alwang, 1999). Vulnerability is the forward-looking state of *expected* outcomes, which are determined by the assets of a household, the correlation, frequency and timing of realized risks, and the risk responses (Heitzmann, Canagarajah and Siegel, 2002).

In summary, it is important to note that vulnerability is derived from exposure to risks and shocks, and an inability to manage these risks and shocks due to inadequate assets and social protection mechanisms (such as social insurance and assistance). *Risk* refers to uncertain events that can damage the well-being of people. *Risk exposure* signifies the probability that a person will be affected by such risky events. For example, the standard of living of a person residing in a drought prone area who derives his income from nonagricultural activities has indirectly exposed to drought risks. In addition to risk exposure, *vulnerability* also reflects the lack of capacity to cope with a shock ex-post. It concerns the ex-ante potential of a decline in well-being in the future *Poverty* on the other hand, is usually treated in static, non-probabilistic terms (Ravallion, 1996). If vulnerability is defined as the welfare loss due to poverty and the welfare losses due to risk (Ligon and Schechter 2002), it makes sense to identify the proximate causes of vulnerability as they relate to structural poverty and consumption volatility (Chaudhuri and Christiaensen 2002). Negative shocks combined with poor risk management are a principal source of vulnerability. Vulnerability as welfare losses arising from uninsured exposure to risk—represents one method for identifying sources of vulnerability (Hoddinott and Quisumbing, 2003). Identifying these causes would enable policymakers to distinguish between those who would not be vulnerable in the absence of consumption vulnerability and those who are structurally poor. For the former group, interventions that reduce consumption volatility by reducing their exposure to risk or by enhancing their ex post coping capacity could be sufficient. However, for the latter, risk reducing interventions alone may be inadequate, and must be accompanied by interventions to increase mean consumption.

3.5 Rural Household Risks and Risk Management Strategies

Households can manage risks in several ways by using formal and informal risk management instruments depending on their access to these instruments. Risk management involves *ex-ante and ex-post* actions. Ex-ante actions are taken before a risky event takes place and ex post management takes place after its realization. Ex ante measures allow households to eliminate or reduce risks, lower risk exposure, and mitigate against the losses. In contrast, *ex-post* risk management actions only respond to realized risk-related losses (Table 3.3).

Table 3.3 The Purpose of Risk Management Strategies and Its Important Points

Ex ante risk management, i.e., actions taken before the risk is realized.	
Risk prevention or reduction	Prevents or **reduces risk**
Lowering risk exposure	Lowers **exposure to risk**
Risk mitigation	Provides compensation against the **expected loss**
Ex post risk management, i.e., actions taken after the risk is realized.	
Risk coping	Copes with the **realized losses** caused by shocks

Source: IFPRI, 2002.

3.5.1 Ex-ante Risk Management Strategies

Ex-ante risk management strategies consist of three types of strategies. First, risk prevention strategies are strategies implemented before a risk event occurs. Reducing the probability of an adverse risk has intrinsic welfare benefits and increases people's expected income and reduces their income variance. Preventive interventions designed to reduce risks in the labor market (the risk of unemployment for instance), preventive health care (such as vaccination, use of mosquito nets or information campaigns) or standards (such as building standards in areas prone to earthquakes). Second, lowering risk exposure strategies is taken to reduce exposure to risk. Third, risk mitigation strategies aim to address the risk before it occurs. Whereas preventive strategies reduce the probability of the risk occurring, mitigation strategies help individuals reduce the impact of a future risky event. Risk mitigation can be taken ex-ante to provide compensation in the case of a risk-generated loss (e.g., social contracts, holding of savings, and purchase of insurance). Risk mitigation (e.g., health insurance) could provide compensation for the expected welfare losses. For

example, a household could purchase health insurance that would cover various health-related costs such as medicines.

The goal of ex ante measures is to avoid the risk from occurring (risk prevention), or to reduce its impact (risk mitigation). If risk prevention and mitigation do not work, it leaves households with the residual option of coping with the shock once it occurs (ex-post). Ex ante risk reduction can reduce risk (e.g., eradication of malaria-bearing mosquitoes) or lower exposure to risks (e.g., malaria pills, mosquito nets). It is also possible for a household to take ex-ante risk mitigation actions that provide for compensation in the case of loss such as purchase of insurance. Risk mitigation includes formal and informal responses to expected losses such as self-insurance (e.g., precautionary savings), building social networks, and formal insurance based on expansion of the risk pool.

3.5.2 Ex-post Risk Coping Strategies

Ex-post risk coping strategies are designed to relieve the impact of the risk once it has occurred. It includes responses that are taken *after* a risk has been realized. Risk coping involves activities to deal with actual losses, such as the selling of assets, seeking "emergency" loans (from relatives, friends, banks), removing children from school, migration, seeking temporary employment. To help some individuals and households cope, governments sometimes provide formal safety nets such as public works programs, food aid, and other types of transfers. The main coping strategies that households use when faced with a particular shock are (Holzmann, 2001):

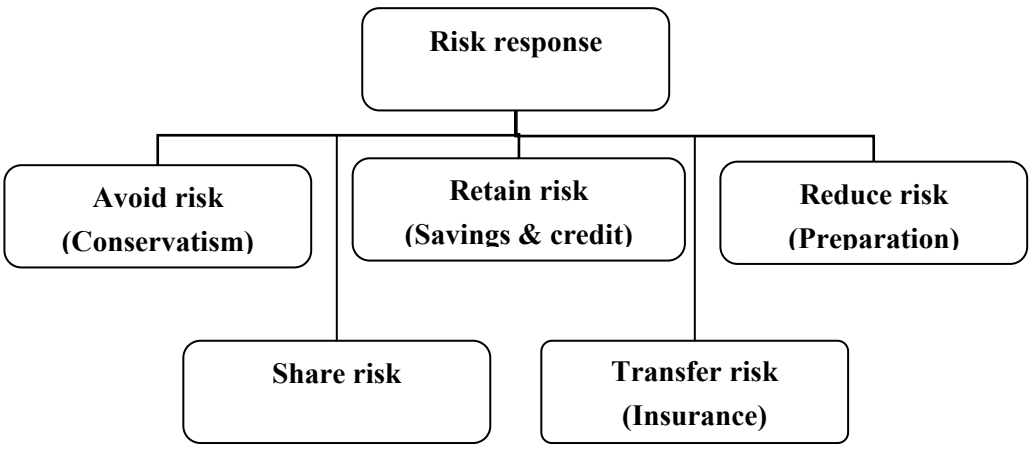
- *Self-help or self-insurance*. These strategies involve selling, pledging, or mortgaging their assets, using their assets to generate more income, or supplying more work or augmenting the labor supply of those already employed.
- *Informal insurance.* This consists of households borrowing from friends, relatives, or moneylenders, or from the workplace or receiving help from friends, relatives, or neighbors; or using other social capital networks;
- *Market insurance or use of credit*. This involves the household using market-based mechanisms, such as credit (borrowed from banks, sold harvest in advance) and private insurance (cashed in the insurance premium).
- *Government help.* Some households' main coping strategy is relying on government help in the form of disaster relief, aid, or social assistance services. Some governments provide formal safety nets, such as public works programs and food aid, that help households cope with risk.
- *Help from NGOs* or other private or international organizations.

Risk-coping strategies involve self-insurance (through precautionary savings) and informal group-based risk-sharing. They deal with the consequences (*ex-post)* of income risk (consumption smoothing). Alternatively, informal arrangements can develop between members of a group or village to support each other in case of hardship. These mechanisms are often observed operating within extended families, ethnic groups, neighborhood groups and professional networks (Hoogeveen et al., 2004).

In the coping strategies, there are five options in risk management (Figure 3.3). The three boxes on the upper row of the risk responses, avoid risk, retain risk and reduce risk, all represent strategies that provide the poor with something to fall back on when faced with a risk event. In the context of *risk reduction*, the range of actions that the poor take is varied. It may include, for example, diversifying income sources; building up assets by saving, stocking food, and investing housing and health care. It might also include strengthening social networks and participating in reciprocal borrowing and lending systems. Another *risk reduction* strategy is to manage money by controlling consumption, budgeting income and expenditures, and maintaining access to multiple sources of credit. Participation in funeral societies and other informal insurance systems are forms of *risk sharing* while formal insurance programmes, pension schemes, or other formal social security systems involve *risk transfer*.

After a shock or economic stress event hits, individuals and households use various strategies for coping with the loss. They include *sharing risk* (receive support from informal groups or informal insurance systems), *transferring risk* (receive support from formal insurance systems) or *risk retention* which includes a range of individual mechanisms such as modifying consumption, raising income by mobilising labour, selling assets, using savings; borrowing; receiving help from individuals.

Figure 3.3 Risk Response Options



Source: McCord (2001)

In coping with risk another distinction can be drawn between precautionary strategies implemented ahead of time (ex-ante) and coping strategies used to manage a loss after the shock (ex-post). Both, ex-ante strategies (precautionary) and ex-post strategies (managing a loss) that are dealing with risk, involve a mix of intra-household measures (self-insurance) and inter-household, group-based measures (informal and formal insurance). The types and mix of ex-ante and ex-post strategies, that an individual or household use at a given time, reflect the level of vulnerability or economic status (Cohen and Sebstad, 2003).

Social risk management (SRM) can take place both before and after the risk occurs. It distinguishes three main categories: 1) informal; 2) market based; and 3) public arrangements. In an ideal world with perfectly symmetrical information and complete and well-functioning markets, all risk management arrangements can be market based. In reality, the various risk management arrangements will all play their role. With major risks and focal groups identified, one aim of risk and vulnerability analysis is to identify the most appropriate mix of risk management strategies (prevention, mitigation and coping) and arrangements (informal, market-based and publicly provided or mandated). Table 3.4 provides an illustrative example of such strategies and arrangements (Hoogeveen et al., 2004).

Table 3.4 Examples of Social Risk Management Strategies and Arrangements Classified by Informal, Market Based and Public Services

Arrangements/ strategies	Informal	Market based	Public services
Risk Reduction			
	• Less risky production • Migration • Proper feeding and weaning practices • Engaging in hygiene and other disease preventing activities	• In-service training • Financial market literacy • Company-based and market-driven labour standards	• Labour standards • Pre-service training • Labor market policies • Child labor reduction interventions • Disability policies • Good macroeconomic policies • AIDS and other disease prevention
Risk Mitigation			
Portfolio	• Multiple jobs • Investment in human, physical and real assets • Investment in social capital (rituals, reciprocal gift-giving)	• Investment in multiple financial assets • Microfinance	• Multi-pillar pension systems • Asset transfers • Protection of poverty rights (especially for women) • Support for extending financial markets to the poor
Insurance	• Marriage/family • Community arrangements • Share tenancy • Tied Labour	• Old-age annuities • Disability, accident and other personal insurance • Crop, fire and other damage insurance	• Mandated/provided insurance for unemployment, old age, disability, survivorship, sickness, etc.
Risk Coping	• Selling of real assets • Borrowing from neighbours • Intra-community transfers/charity • Sending children to work • Dis-saving or reduce saving in human	• Selling of financial assets • Borrowing from banks	• Transfers/Social assistance • Subsidies • Public works

Source: Holzmann (2003)

Informal arrangements have existed for a long time and still constitute the main source of risk management. In the absence of market institutions and public support, individual households respond to risk by protecting themselves through informal and personal arrangements. Nonetheless, the introduction of market or public arrangements may have negative consequences for the functioning of informal arrangements.

Market based arrangements have great potential. Households and individuals take advantage of the financial products offered by insurance companies and banks. In practice many of these financial instruments are not available due to market failures, so that their usage is restricted until financial markets become more developed. Because formal market institutions have difficulty to lend to households (or to provide insurance) without secured earnings and improved access to information, micro-credit and insurance arrangements are potentially interesting instruments for social risk management.

Public arrangements take various forms. When informal or market-based risk management arrangements do not exist, the government can provide or mandate (social) insurance programs for risks such as unemployment, old age, work injury, disability, widowhood and sickness. Additionally, governments have a whole array of instruments to help households cope after a shock hits, such as direct assistance, free medical care, subsidies on basic goods and services and public works programs. Through its legislative abilities, government is also able to introduce prevention strategies (such as building codes in disaster prone areas; protection of widows' rights to assets). Many sectoral government programs (health, education, infrastructure), finally, also play an important role in risk prevention (Christiaensen and Subbarao, 2004).

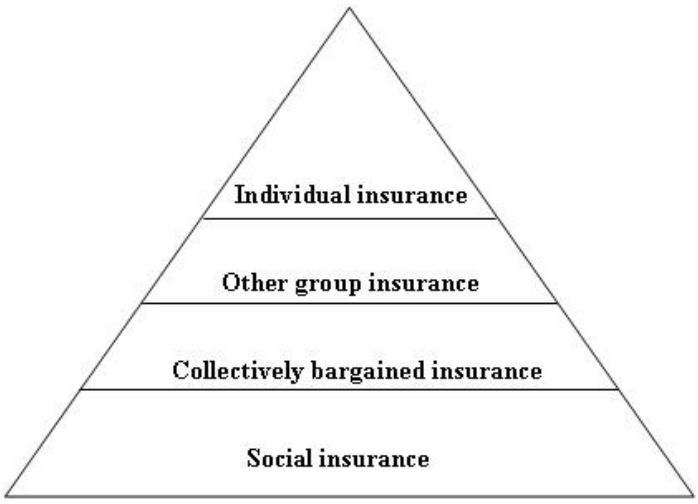
In brief, the concept of SRM is a new means of looking at poverty, risk, and risk management. The SRM perspective addresses how vulnerable households can be helped to better manage risks and become less susceptible to welfare losses. Individuals and households play a vital part to manage risks. Their choices are restricted if: 1) risk management instruments are not available (e.g., if insurance or financial markets do not exist), 2) they are denied access to insurance or financial instruments, 3) they do not utilize existing instruments for other reasons (e.g., high insurance premiums or interest rates), or they lack information and knowledge about the value of a specific instrument (Heitzmann, Canagarajah and Siegel, 2002). Risk management is achieved by allocating assets before and after a negative event. Ex-ante risk management takes the form of risk reduction (e.g., diversifying asset bases or migrating), or investments in risk mitigation (e.g., precautionary savings, purchasing insurance). Ex-post risk management involves risk coping activities (e.g., sales of assets, using underemployed labor).

3.6 Public Welfare and Health Insurance for the Poor

Vulnerability for the poor is an everyday reality and is both a cause and a symptom of poverty. It resides in many shocks that pervade the lives of the poor. Their frequent occurrence can easily erode and force households quickly back into poverty. To cope with shocks, poor people use many different risk management strategies. They draw on informal group-based and self-insurance mechanisms such as borrowing, saving and drawing down productive and non-productive assets. A relatively new option for the poor to manage risk is micro-insurance. *Micro-insurance (MI) is the protection of low income people against specific perils in exchange for premium payments proportionate to the likelihood and cost of the risk involved.*

Insurance is a mechanism that uses risk pooling to compensate individuals and groups adversely affected by a specified risk or event. As such, it is a way to transfer risk from an individual to a group so that each individual only pays the average of the loss for all members of the group. It divided into four types (Figure 3.4).

Figure 3.4 The Insurance Pyramid



Source: CGAP (2003)

Individual insurance offered by public and private insurance companies. Individual insurance covers life, health, auto and other individual needs.

Other group insurance is offered through various types of affinity groups-trade unions, professional associations, cooperatives, church groups and others.

Collectively bargained insurance: Many employee groups are covered by various insurances-for group life, supplementary accident and sickness,

retirement benefits and others. Workers in informal economy usually do not have access to these services.

Social insurance is a tool of social protection, which is defined as the set of policies and program designed to reduce poverty and vulnerability by promoting efficient labor markets, diminishing people's exposure to risks, and enhancing their capacity to protect themselves against hazards and interruption or loss of income. Social protection involves five major kinds of activities: labor market policies and program, social insurance program, social assistance, micro and area-based schemes, and child protection (CGAP, 2003).

MI is a subset of insurance that provides protection to the poor in a way that reflects their cash constraints and coverage requirements. MI, if designed appropriately, offers the poor an opportunity to be more proactive in managing risk by reducing the chance of a loss resulting from unanticipated risk events.

Thus, MI has a role in providing the poor with enhanced risk management options. Yet, the effectiveness of these strategies is limited. Factors such as lack of timeliness, limited coverage and high costs suggest an insurance landscape that is far from perfect. In addition, poverty impedes many gaining access to what is on offer or taking risks. By contrast, when people feel more protected against risk, they are more comfortable in taking risks. (Cohen and Sebstad, 2003). Low income people can use MI as one of several tools to manage risks. Other tools include community-based mutual support systems; risk avoidance and reduction; access to other risk managing financial services such as savings and emergency loans and social protection options available through the state. Together, these tools form a complex matrix through which low-income people manage risks (CGAP, 2003).

3.6.1 Thailand's Social Welfare and Social Insurance Systems

Thailand has social welfare and social insurance systems (Table 3.5). Social welfare involves welfare services aimed at the poor, persons with disabilities, children, the elderly, women, minority hill tribes, and other disadvantaged individuals. The social insurance system provides sickness, maternity, disability, death, dependent child, old age, and unemployment benefits. There also is a social security system for private-sector employees and medical security and pension systems for public-service employees, employees of national enterprises, and military personnel (Federal research division, 2005).

Table 3.5 Legal Framework of Social Security, Coverage, Source of Funds and Percentage of Labour Force Insured by Social Security

	Detail of Social Security
Social Security Legislation	1954: First Social Security Act 1974: Announcement No. 103, setting up the *Workmen's Compensation Fund* 1990: **Social Security Act** (*Social Security Fund*, covering illness, injury, disability and death which are not related to work, maternity, child allowance, old-age pension, unemployment benefits (started in 2004)) 1994: **Workmen's Compensation Act** (replacing announcement 103), covering work related injuries, diseases, loss of organ(s), disability, death or disappearance. **State enterprises, civil servants, teachers,** and the **army** each have their own special social security system. For people not covered by any of these systems, there exists a **30-Baht Universal Health Programme** which provides access to medical services for a fee of 30 Baht. Several institutions offer assistance free of charge to the very poor.
Coverage (Exclusions)	**Social Security Fund***:* Employees in **private-sector** enterprises with one or more employees. Self-employed and informal-sector workers if they pay both employer and employee contributions to the Fund. Unemployed can apply to become voluntary members, contributing 280 Baht a month. 6,696,562 employees were actually insured by the Fund in June 2002. *Not covered*: Public-sector employees (except temporary workers), state-enterprise employees, private school teachers and headmasters, employees of foreign governments or international organizations, employees stationed abroad, employees of the Red Cross Council, employees in industries that do not employ employees all year long (e.g. agriculture), other employees that are employed temporarily or seasonally. **Workmen's Compensation Fund***:* Employees in private-sector enterprises with one or more employees. 6,348,358 workers were insured in June 2002. *Not covered*: State enterprises, government officials, private school teachers and headmasters, non-profit organizations, temporary or seasonal employees in agriculture, forestry, fishery, and livestock. **Social security schemes outside the private sector**: Covering 1.3 million civil servants and around 320,000 state-enterprise workers. In some schemes, family members are also covered.

Source: FES (2005).

Note: Last updated on 2 December 2005

Table 3.5 Legal Framework of Social Security, Coverage, Source of Funds and Percentage of Labour Force Insured by Social Security (Continue)

	Detail of Social Security
Source of Funds	*Social Security Fund*: In 2003, contributions paid monthly by employer (4% of wage), employee (4% of wage), and government (2% of wage). *Workmen's Compensation Fund:* Employers pay between 0.2% and 1% of worker's annual earnings (depending on risk category) *Social Security and Welfare for civil servants and state enterprises:* Funds come directly from government budget; no worker contributions
Percentage of Labour Force insured by Social Security System, 2004	23.0% of labour force insured by Social Security Fund 23.0% of labour force covered by Workmen's Compensation Fund 4.84 % of labour force insured by Public Social Security schemes.

Source: FES (2005).
Note: Last updated on 2 December 2005

3.6.2 Development of Health Insurance in Thailand

Health insurance provides two basic functions: access to effective health care services when needed, and effective protection of family income and assets from the financial costs of expensive medical care (Kutzin, 1998). Tax-based welfare schemes are also considered health insurance. Health insurance schemes in Thailand classified into four categories according to their nature and objectives (Supachutikul, 1995).

First, **Medical Welfare Scheme (MWS)** provided free medical care for indigence, for example, the poor, the elderly and children up to secondary school and the disabled. It also extends to monks, community leaders, health volunteers and their families.

Second, **Civil Servant Medical Benefit Scheme (CSMBS)** is a fringe benefit to government employees and dependents to compensate low public salary.

Third, **Compulsory Social Insurance comprise** of 1) *Social Security Scheme (SSS)* is a tripartite contribution scheme by the employer, the employee and the government ensures health security for formal sector employees. 2) *Workmen Compensation Scheme (WCS)* is an employer liability scheme to protect the employee from work-related injuries, illnesses and funeral grants. 3) *Traffic Accident Insurance* ensures access to care by traffic accident victims through compulsory premium paid by all car owners to private insurance firms (Nittayarumphong et al, 1995).

Fourth, **Voluntary Schemes:** 1) Private Health Insurance is a voluntary risk related premium contribution covers mainly the better off (Suraseangsung, 1998). 2) Government Health Card Scheme (HCS) is a voluntary alternative for the uninsured, e.g. rural informal sector workers who are not eligible for low income scheme, the self-employed and employee in small firms of less than 10 employees who are not eligible for the social insurance scheme (Singkaew, 1993). 3) Several small-scale communities financing saving schemes provide limited health benefits to its members. Payments are made retrospectively to members at the end of the year according to the funds available. Self-help funeral grants are more common than health benefits. The chronological events covering the various scheme developments are summarized in Table 3.6 (Tangcharoensathien, Srithamrongsawat, and Pitayarangsarit, 2002).

Table 3.6 Chronological Events Covering the Health Insurance Development in Thailand Between 1929 and 2000

Year	Important Event of Health Insurance Development	SW	FB	CI	VI
1929	Private insurance business				/
1954	First Social Security Act (but not implemented)			/	
1974	Workmen Compensation Fund			/	
1975	Free medical care for the poor	/			
1978	First private health insurance company				/
1980	Royal decree on CSMBS		/		
1981	First insurance of low income card	/			
1983	Maternal and Child Health Fund (phase 1)				/
1984	Health card project (phase II)				/
1990	Social Security Act covered enterprises with 20 and more employee			/	
1991	Heath Card Project- insurance based pilot (phase III)				/
1992	Free medical care for elderly	/			
1993	Traffic accident victim protection insurance			/	
1994	Social Security Act extension to enterprises with 10 or more employee			/	
1994	Health Card Scheme (phase IV), equal matching fund provided by government, reinsurance policy and cross- boundary card				/
1994	Health Card extension to community leader and health volunteer, full government subsidy		/		
1994	Medical Welfare Scheme, expansion of the free medical care for the poor to cover other indigent groups, elderly and children up to 12 years	/			
1998	New financial regulation for the Medical Welfare Scheme: management by national and provincial committees, per capita budget allocation to provinces, introduce reinsurance policy for high cost care by using Diagnostic Related Groups and global budget	/			
1998	CSMBS: Introducing copayments by CSMBS beneficiaries, only drugs quoted as essential drugs are reimbursed, limited hospital stays in private room and board		/		
2000	The Social Security Scheme expanding to cover old age pension and child benefits			/	

Source: Adapted from Supachutikul (1995)

Note: SW = Social Welfare;
FB = Fringe Benefits;
CI = Compulsory Insurance;
VI = Voluntary insurance.

Table 3.7 present the coverage of health insurance in Thailand between 1991 and 2003. Since October 2003, the government has embarked on a universal access to Antiretroviral drugs (ARVs). Until September 2004, 50,000 patients have been registered into the system. These two policies rapidly increase the demand for health services in the public sector (Pachanee, C. and S. Wibulpolprasert, 2004).

Table 3.7 Percentage of Coverage of Health Insurance Scheme Between 1991 and 2003

Health Insurance Scheme	1991	1996	2001	2003
Universal coverage	-	-	-	74.7
Social Welfare	12.7	12.6	32.4	-
Civil servants (CSMBS)	15.3	10.2	8.5	8.9
Social security	-	5.6	7.2	9.6
Voluntary health card	1.4	15.3	20.8	-
Private health insurance	4.0	1.8	2.1	1.7
Total insured	33.4	45.5	71.0	94.9
Uninsured	66.6	54.5	29.0	5.1

Source: National Statistical Office, *Reports of health and welfare surveys 1991, 1996, 2001, 2003*.

There are three main health insurance schemes in 2004, which cover the entire population.

First, *the Civil Servant Medical Benefit Scheme (CSMBS)* covers civil servants, public employees and their dependants. The scheme is paid totally from the general tax revenue based on a fee-for-services retrospective reimbursement system. The public facilities are the main providers under this scheme.

Second, *the Social Security Scheme (SSS)*, a tripartite system contributed by employers, employees and the government on an equal share basis. It covers private employees and temporary public employees. Public and private facilities have approximately equal share of the insurers. This scheme pays the providers by the contract capitation system.

Third, *Universal Coverage Scheme (30 Baht scheme)* Since October 2001 the universal coverage of health insurance system was implemented by combining the previous social welfare health services and the voluntary health card scheme, and further expands the coverage to 18 million more people. This scheme covers 74.7% of the population. It is financed solely from the general tax revenue. Public hospitals are the main providers, cover more than 95% of the insurers. About 80 private hospitals join the system and register around 4% of the beneficiaries.

3.6.3 The National Universal Health Care Scheme: 30 Baht Health-Care Program

Health expenditure in Thailand has dramatically increased since 1980 from 3.82% of GDP to 6.21% in 1998. During this period the health expenditure per capita increased from 544.90 Baht in 1980 to 4662.83 Baht in 1998 (Thailand Health Profile 1997-1998). In the mean time, about 20 million or about 30% of the total 60 million Thai populations remain uninsured. The poor confronted with high cost care for their illness. Section 52 of Thailand Constitution (1997) states that "All Thai people have an equal right to access the quality health services" However, after the declaration of the new Constitution, no law has been enacted to support this Article. Later on, a legal process was initiated which will soon be completed to serve as a vehicle toward the implementation of the Constitutional health policy. Further more, due to the problems with asymmetric information and imperfect health care market, consumers cannot make rational choices and in other instance, they do not have adequate choice of health services. At the same time the cost of health care is rising rapidly even if the health system has not been able to provide equal access and equitable financing to all. Therefore there is a need for institution of universal healthcare coverage.

Many developed countries, such as United Kingdom, Canada, Australia, France, Sweden, and Netherlands have already launched policies of universal healthcare coverage. Such a policy provides their people with access to high standard health services and in many cases their personal health expenditure has become more affordable than before. The main objectives for universal coverage are as follows:

Equity: An equal sharing of health care expenditure and equity of access to the same quality of health services.

Efficiency: Efficient use of resources by good administrative and management practices.

Choice: People have the right to choose their health services in order to reduce the problem of an imperfectly competitive market.

Good health for all: Universal healthcare coverage aims not only to provide curative care but also to provide disease prevention and health promotion where appropriate.

The Universal Coverage (UC) comes from the three possible alternatives toward universal health care coverage, as follows:

First, *expansion of existing systems*: there are several health insurance/welfare schemes in Thailand, for example, Voluntary Healthcare Card Scheme, Civil Servants Medical Benefit/Welfare Scheme (CSMBS), Social Security Scheme (SSS; compulsory scheme for formal sector) and Health Welfare for the low income group, the elderly, children under 12 and other underprivileged groups. Although these schemes have covered various

population groups, they have not yet covered 100% of the total 60 million Thai populations. Besides, there are still some weaknesses in terms of efficiency and equity. The expansion of the previous health schemes would be cost saving from the adaptation in the initial stage and would not greatly affect the structure of government services. Furthermore, another strong point is the comparability between health schemes. However, these advantages cannot be used for adaptation because of their existing limitations, for instance, the basis of their capitation and their philosophy. There are the weaknesses of the expansion concept. Firstly, there is inequity in health care access and financing systems between the differing health schemes. Secondly, there are differences in health cover efficiency because each scheme is an individual independent system administered by different Ministries. Some schemes are mandatory, other are not. Still many people are not eligible for insurance. Yet, some people may belong to more than one health scheme to provide necessary gap coverage because of practical difficulties on both consumer and provider sides. Lastly, some commercial groups may oppose and try to block the legislation to make possible the necessary changes seen as blocking their benefits.

Second, *single-payer system*: The philosophy of this system is a national health insurance, which is managed by government. This system is suitable for starting when there are no existing health insurance schemes. In this system, the government can organize health legislation so all people can access the same basic health services, with pooling of risks for providers and vertical equity of health financing. The difficulty in a country which already has health insurance schemes is in the transition stage and the question of how to integrate all existing health insurance schemes together, since each scheme has their own funding, concept, package and payment methods.

The strength and weakness of the single-payer system should be analyzed in three parts, namely equity, efficiency and choice/quality of system. The strong point lies with equity, in that all people can access in the same basic of health services. With respect to efficiency, such a system can reduce the adverse selection problem, reduce the overlap/gaps between previous health schemes and introduce a standard to administration and to information systems. Lastly, with respect to choice and quality of care, it offers a way to stimulate the providers to compete with each other in order to increase the quality of services. A weakness is that, if the administration of the legislation is not adequate, it will lead to equitably poor care. This system would possibly fail if the administration were not appropriate since it is based on a centralized funding system. Moreover, there is no competitive pressure to help maintain adequate quality or contain the budget.

Third, *dual health insurance system for formal and informal sectors:* In this system, there is a parallel between the formal sectors, (e.g. civil servant and state enterprise officers health insurance) and the informal sector (e.g. farmers, self-employed, elderly, monks children health insurance). For the formal–sector

health insurance, the methodology is the same as previously, but it should expand to include spouses and children less than 18 years in the Social Security Scheme. The system of Civil Servant and State Enterprise Medical Benefit Scheme should change to the same direction as the Social Security Scheme with respect to part contribution to funding. The informal-sector health insurance should be managed under the universal health fund with support of government, locality organization and resident co-payment. Poor groups may need to be exempted from co-payment.

A strong point of this system is that, by reducing the weakness of the single payer system, for example, it can be compared with each existing health schemes and adjusted accordingly to save costs and to improve the system. However, even though this system seems to be appropriate, it still has some weaknesses. Thus, it might encompass some of the inequity and inequality in benefits and budget present in the existing health schemes. Secondly, the lack of administrative experience in the informal sector funding may lead in the initial stages to overlap of benefits to the families of formal sector health insurance recipients. Lastly, it is very difficult in the political and administrative sense to bring each system of funding together (Sreshthaputra, N. and K. Indaratna, 2001).

Thailand Universal Coverage (UC) is a general tax financed public mandatory scheme. It replaces the previous insurance schemes: tax financed free care for the poor, the elderly and children under 12 operated since 1975, the subsidized public voluntary insurance for the non-poor operated since 1983, and covers the previously uninsured 30% of total population. Altogether UC Scheme covers 47 million people (75% of total). There are two other public schemes, (1) the Civil Servant Medical Benefit Scheme (CSMBS), a general tax finance, non-contributory scheme for the government employee and their dependants (including parents, spouse and children under 20 years) covers 9% of total population, and (2) the Social Health Insurance (SHI), a tripartite payroll tax financed scheme for the private sector employee (excluding dependants) covers 13% of total population (Tangcharoensathien et al., 2002).

Under 30 Baht Universal Coverage Policy, the insured will receive the same quality health services as offered by other health schemes. The service package includes most health services except cosmetic care, obstetric delivery beyond two pregnancies, drug addiction treatment, hemodialysis, organ transplantation, infertility treatment, and other high cost interventions. However, with more resources and disease priorities, the inclusion can expand further over time. From the government side, the funding of the system is paid by capitation. The total payment per capita paid from tax revenue is 1,404 Baht (US$ 37) per year, parts of which are paid to the health care facilities, according to the number of local residents who are registered with them, hence to be served.

In conclusion, at present Thailand is in the transitional stage of establishing universal healthcare coverage. The success of this program

depends on many factors and many players: consumers, providers and third parties/payers/purchasers. Beside the Ministry of Public Health, other Ministries and Public/Private Enterprise are also providers or funders in health sector in Thailand. With the existing multiple schemes, funders and providers, the harmonization process toward a new scheme will take time. The road toward a full implementation of the Universal Coverage Policy will be long which requires assessment, re-assessment, improvement and dynamism over time. However, once the health policy has recently become, for the first time in Thailand, a political agenda with strong political commitment, it is possible to anticipate a health system which will provide quality health services more efficiently, equitably and accountably (Sreshthaputra, N. and K. Indaratna, 2001).

4 ANALYTICAL MODELS, RESEARCH METHODOLOGIES AND STUDY AREA

This chapter covers the characteristics of study area, analytical models and research methodology. The chapter is organized as follow. Firstly, an overview of methodology in overall research issues is presented in section 4.1. The details of research methodologies are discussed in section 4.2. Next, the research area is shown in section 4.3. Finally, the population and data sampling are given in section 4.4.

4.1 Overview of Methodologies Used [6]

Livelihoods research, of its nature, is essentially carried out at the micro- as well as the meso- level that is at the level of households and communities as well as at the institutional level of local governments and regional markets line.[7] At the micro-level, it involves empirical investigation of different livelihood system models and, above all, the analysis of the relationship between and the weight of different livelihood strategies (Ellis, 2000; Murray, 2001):

The circumspective approach aims at understanding the diversity of livelihood system models and the array of livelihood strategies at a moment of time by applying survey tools, Participatory Rural Appraisal (PRA) tools, and a Choice based Conjoint Analysis (CBC). PRA tools will allow mapping the rural households according to the relative robustness of income contributions from different livelihood strategies. These qualitative data will be crosschecked on the basis of quantitative survey data. The hypothetical demand analysis for semi-formal or formal micro-insurance will be based on CBC. CBC is the original Conjoint Analysis.[8] CBC will use a stratified cross-sectional sample of about

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[6] Section 4.1 is applied from Buchenrieder (2003).

[7] National policy making at the macro-level may also pay a role as it comes to the functioning of the institutions at the meso-level.

[8] Conjoint Analysis has become one of the most widely used quantitative methods in marketing research. It is used to measure the perceived values of specific product features, to learn how demand for a particular product or service is related to price, and to forecast what the likely acceptance of a product would be if brought to market. The demand for micro-insurance is dependent on numerous economic and no-economic (cultural and social) attributes of the insurer and insured. Research on the adaptive and coping strategies with shocks will have to consider a wide range of attributes of the supply and demand side. Respondents may then be provided with too much information to be considered thoroughly. The quality of the research is also constrained by limitations in the respondent's time and attention. CBC move beyond those limitations by adapting the interview for each respondent and focus on each respondent's values to focus on those areas of importance to that

200 individuals (all adults of the participating households are interviewed). The data are analyzed applying a segmentation multi-nominal logit analysis (segmented along livelihood clusters).

The retrospective approach analyses the change over time as it concerns the proportional importance of different livelihood system models and strategies. Apart from sample surveys, it also requires participatory empirical investigation at the micro-level using retrospective reconstruction of processes of change through intersecting life histories.[9] This methodological approach allows identifying household trajectories[10] of accumulation and impoverishment and thence particular structural of vulnerability to poverty.

At the meso-level of analysis, the prospective research approach becomes prominent: The prospective approach illustrates the increasing awareness of academics to derive policy recommendations for institutional development, here in the area of rural financial market development, specifically micro-insurance. In order to derive policy recommendations, a better understanding of the links and tensions between the micro- and the meso-level are important. The results of the CBA will serve as baseline for micro-insurance schemes in rural areas, which account for specific cultural needs.

The results from logit analysis on health insurance will be explored the willingness to pay for micro-insurance services. Institutional analysis of micro-insurance services of the rural financial market call for a comprehensive revise of secondary data as it concerns existing formal rural insurance schemes in Thailand and the past and current policy flux in this regard. Table 4.1 summaries the research issues and methodological instruments.

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respondent. This results in broader scope since more relevant attributes can be tested. Even more important, the data are often of higher quality, since respondents are more interested and involved in the task (Skim, 2002; Orme, 1998).

[9] The intersection of life histories is chosen over longitudinal comparison of household livelihoods due to the lack of longitudinal data.

[10] Livelihood trajectories provide insights into the changing welfare and capabilities of individuals, households and other groups. They illuminate the process of change by revealing the ways in which negotiation and bargaining cal alter the livelihood circumstances (Bagchi et al., 1998).

Table 4.1 Summary of Research Issues and Methodological Instruments

Livelihood Component	Content	Methodological approach	
		Principle tool	**Secondary tool**
Livelihood models & strategies	Type of activities (income creating, reproductive) undertaken by each household member; level of contribution to household economy; access to financial services (credit, savings, insurance); gender roles; adaptive & coping strategies, etc.	Household interviews based on stratified sampling	Livelihood profile, Key informant interviews, secondary data
Vulnerability to poverty	Current status of household; barrier to recovery; recursive stresses; financial capital; chronological poverty profiles; transient poverty profiles	Feasible generalized least square (FGSLS) model	Livelihood profile; key informant interviews; household trajectories; secondary data
Household assets			
1.Social	Exchange of goods and services; assistance to or from family& friends' network; membership in community groups; access to remittances; gender; poverty position related to other families in community	←Household interview based on snowball sampling →	←Livelihood profiles→
2.Physical	Housing; productive implements; water and sanitation facilities		
3.Human	Education level; dependency ratio; health; gender		
4. Financial	In-kind savings (livestock); remittances; access to financial services (formal & informal)		
5. Natural	Land, access to common property resources; water		

Source: Buchenrieder (2003)

Table 4.1 Summary of Research Issues and Methodological Instruments (Continue)

Livelihood Component	Content	Methodological approach	
		Principle tool	Secondary tool
Livelihood context			
1.Institutions	Presence and importance of community level institutions; interaction with external institutions; formal and informal institutions at community & neighborhood level; attitude towards and demand for new institutions in the area of insurance	Choice based Conjoint Analysis (CBC)	Venn diagram; household interview; focus group discussions; key informants
2.Policies	Broader policy context as it concerns rural insurance; insecurity at household and community level	Secondary data	Venn diagram; key informants

Source: Buchenrieder, 2003.

Vulnerability is a useful concept if it is defined as vulnerability to a measurable loss (the metric) that is put in relation to a minimum level (the benchmark) (World Bank, 2000). Furthermore, Dercon (2002) proposes to define vulnerable households as those liable to fall under and agreed poverty line (e.g. the national poverty line of Thailand could be applied here) over time with a particular high probability (for example more than 50% or more than the current regional/national poverty rate) to quantify vulnerability. Christiansen and Boisvert (2000), Pritchett et al. (2000), and Alwang et al. (2001) also indicate vulnerability measures. Wright et al. (1999) suggest the following core indicators to assess vulnerability: (1) money management, (2) asset management, (3) diversification of assets, (4) balance of physical assets, (5) asset retention, (6) financial savings, (7) degree of bargaining power of women in household decision making, (8) expenditures on education and health, (9) extent of social networks and group membership, and (10) quantity of labour.

Based on the prior discussion, it becomes evident that individual indicators are not sufficient to reflect vulnerability. Therefore, this research will develop a composite index of poverty per average adult-household member by using principal component analysis (PCA). In essence, the PCA aims to replace a large set of variables by a smaller set that best 'summaries' the larger set.[11]

[11] More formally, the principal components display the eigenvalue decomposition of the sample. The first principal component is computed as a linear combination of the series in the group with weights given by the first eigenvector, and so on. The higher the degree of co-movement existing among the

Besides, vulnerability to poverty will be analysed by using feasible generalized least square technique (FGLS). This "vulnerability to poverty" will be defined such that an increase represents greater vulnerability to risks.

Poverty and sustainability oriented research using a livelihoods system approach must be responsive and participatory, that is poor people themselves are crucial in filling the research gaps outlined in the objectives of this research. Therefore, participatory research processes are important (Carney et al. 1999; Ellis 1998a, 1998b, 2000). Ellis (2000) advocates various different PRA methods. Table 4.2 gives and overview of the research issues in relation to the applied survey, the target groups in the research and the anticipate contribution of the PRA tools.

Table 4.2 PRA Tools Applied in Vulnerability Research

	Who with	**Brief description**
Venn diagram	Mixed groups of men & women	Groups draw village, neighborhood, or informal insurance network on large sheets of paper, highlighting particular points of interest, e.g. meeting places, important events etc.
Focus group discussion	Depends on research issue	Groups recount history of important events related to research issue (risk/vulnerability, risk management strategies), record keepers record the participants conversations
Livelihood profiles	Separate groups of men & women; different household member groups	Describes perceptions & characteristics of poverty and wealth; characteristics are used to describe livelihood system models & clusters
Livelihood trajectories	Household members	Household members draw a timeline to the present day; key dates are noted and discussed as it concerns vulnerability; record keepers record the participants conversations

Source: Buchenrieder, 2003.

The methodology suggested for the research at hand will thus not only apply quantitative research tools but also supplement these through PRA and other qualitative data generating tools to integrate cultural, sociological, and particularly gender aspects. This methodological approach also allows crosschecking information gathered by means of different tools, which will allow drawing conclusions on the comparative advantage of different tools for

original set of series, the fewer will be the number of principal components needed to explaining a large potion of the variation of that set.

particular research issues. Moreover, it will yield less contradictory evidence than presently seems to be found when on relies on the one or the other approach (Dercon, 2002).

4.2 Details of Methodologies and Models

This section explains the detail of methodology of the analytical results concerning risk management and vulnerability in Northern Thailand. The methodology divides into 5 main methodologies. First, section 4.2.1 PCA is applied to analyze poverty in Northern Thailand. Afterwards, section 4.2.2 PRA is applied to analyze the livelihood and difficulties of farm household. Furthermore, section 4.2.3 logit analysis is applied to analysis factor effecting on purchasing or not purchasing health insurance. Section 4.2.4 conjoint analysis for health insurance is considered as a formal risk management. Additionally, section 4.2.5 feasible generalized least square is applied as the quantitative assessment of vulnerability to poverty.

4.2.1 Principal Component Analysis of Poverty

In this section, principle component analysis (PCA) is utilized to analyze the factors determining on household poverty. The result will illustrate in chapter 5.

Generally speaking, PCA is a statistical technique to identify commonalities among different variables, and to aggregate these variables into various components (Basilevsky 1994; Sharma 1996). The PCA method is applied to determine which subset of indicators can, in combination, most effectively measure a household's relative poverty. The end result of PCA is the creation of a single index of relative poverty that assigns to each sample case a specific value representing that household's poverty status in relation to all other households in the sample. The index is created from the combination of individual indicators that have been found to be significantly correlated with one another, on the basis of the shared underlying poverty component.

The PCA method in essence identifies important indicators and calculates appropriate weights. Specifically, PCA isolates and measures the poverty component embedded in the various poverty indicators and creates a household-specific poverty score or index. Relative poverty comparisons are then made between client and non-client households based on this index.

PCA is thus used to provide "orderly simplification" of a number of interrelated measures. In this assessment, we use it to combine a number of inter correlated poverty indicators into a relatively small number of underlying

components. Each component is assumed to capture a unique attribute shared by households. Not all revealed components will reflect aspects of relative poverty. For example, components underlying the data collected in this study may also relate to the rural or urban setting of households; to specific regional conditions; and to other commonalities, such as education, occupation, or cultural practices. Among the components created by PCA, the component that correlates associates most consistently and strongly with what the analyst expects to closely measure relative poverty can be selected as a "poverty index."

The PCA method, when used as an aggregation procedure for the computation of a poverty or wealth index, identifies important indicators and calculates the weights. Specifically, PCA isolates and measures the poverty component embedded in the various poverty indicators and creates a household-specific poverty score or index. Relative poverty comparisons are then made between client and non-client households based on this index. Basically, the principal component technique slices information contained in the set of indicators into several components. Each component is constructed as a unique index based on the values of all the indicators. The main idea is to formulate a new variable X* that is the linear combination of the original indicators such that it accounts for the maximum of the total variance in the original indicators. That is, X* is computed as

$$X^* = w_1 X_1 + w_2 X_2 + w_3 X_3 \qquad (4.1)$$

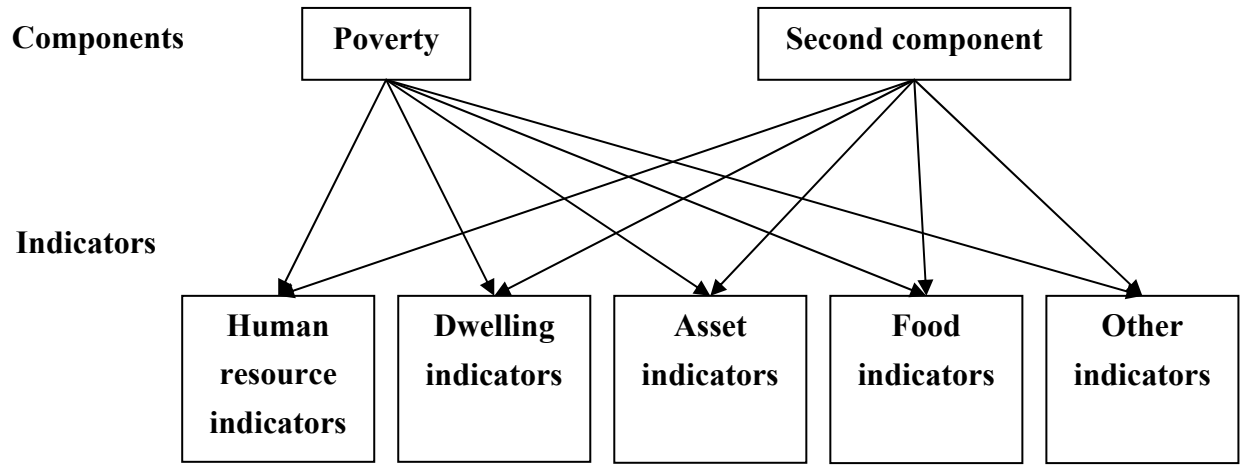
where the weights (the w_i) are specified such that X* accounts for the maximum variances in X1, X2, and X3. This index has a zero mean and a standard deviation equal to one (Basilevsky 1994; Sharma 1996).

The PCA thus extracts underlying components from a set of information provided by summary indicators. In the case of a poverty assessment tool, information collected from the questionnaires make up the "indicators," while the underlying component that is isolated and measured is "poverty." The first principal component accounts for the largest proportion of the total variability in the set of indicators used. The second component accounts for the next largest amount of variability not accounted by the first component, and so on for the higher order components.

In the example presented in Figure 4.1, PCA uses information on the co-movement among the indicators to isolate and quantify the underlying common components, i.e., poverty and demography. The poverty component is expected to account for most of the movement in the indicators and will thus be the "strongest" of all the components. The poverty component can be easily identified by analyzing the signs and size of the indicators in relation to the new

component variable. For example, according to theory, education level should contribute positively – not negatively – to wealth.

Figure 4.1 Indicators and Underlying Components



Source: Zeller et al. (2001), Henry et al (2003).

PCA can be used to compute a series of weights that mark each indicator's relative contribution to the overall poverty component. Using these weights, a household-specific poverty index (or poverty score) can be computed based on each household's indicator values. Principal component analysis is the statistical technique used by the CGAP PAT to identify and aggregate various poverty indicators into a multidimensional index of relative poverty (Zeller, et.al, 2004).

4.2.2 Participatory Rural Appraisal Analysis of Risk Management

Participatory rural appraisal analysis uses as a qualitative methodology to analyze risk management of farm household in Northern Thailand, which will present in chapter 6. Therefore, the details learning of this method is also important.

Participatory rural appraisal (PRA) is a label given to a growing family of participatory approaches and methods that emphasize local knowledge and enable local people to make their own appraisal, analysis, and plans. PRA uses group animation and exercises to facilitate information sharing, analysis, and action among stakeholders. Although originally developed for use in rural areas, PRA has been employed successfully in a variety of settings. The purpose of PRA is to enable development practitioners, government officials, and local people to work together to plan context appropriate programs.

Participatory rural appraisal evolved from rapid rural appraisal-a set of informal techniques used by development practitioners in rural areas to collect and analyze data. Rapid rural appraisal developed in the 1970s and 1980s in response to the perceived problems of outsiders missing or miscommunication with local people in the context of development work.

In PRA, data collection and analysis are undertaken by local people, with outsiders facilitating rather than controlling. PRA is an approach for shared learning between local people and outsiders, but the term is somewhat misleading. PRA techniques are equally applicable in urban settings and are not limited to assessment only. The same approach can be employed at every stage of the project cycle and in country economic and sector work.

PRA is an exercise in communication and transfer of knowledge. Regardless of whether it is carried out as part of project identification or appraisal or as part of country economic and sector work, the learning by doing and teamwork spirit of PRA requires transparent procedures.

For that reason, a series of open meetings (an initial open meeting, final meeting, and follow up meeting) generally frame the sequence of PRA activities. Other tools common in PRA are, for instance, focus group discussions, preference ranking, mapping and modeling, and seasonal and historical diagramming (World Bank 2006).

4.2.3 Econometric Model for Analyzing the Impact of Demand Factors: The Logistic Regression Model

Logistic regression is part of a category of statistical models called generalized linear models (Agresti, 1996). Binomial (or binary), which is a categorical variable that has two values such as "yes" and "no". Logistic regression is a form of regression which is used when the dependent is a dichotomy and the independents are of any type. Logistic regression allows one to predict a discrete outcome, such as group membership, from a set of variables that may be continuous, discrete, dichotomous, or a mix of any of these. Generally, the dependent or response variable is dichotomous, such as presence/absence or success/failure. Discriminant analysis is also used to predict group membership with only two groups. However, discriminant analysis can only be used with continuous independent variables. Thus, in instances where the independent variables are a categorical, or a mix of continuous and categorical, logistic regression is preferred.

In this research, the logistic regression model to analyze the factors affecting a household's decision on purchasing or not purchasing health insurance. The result will appear in chapter 8.

The Model:

The dependent variable in logistic regression is usually dichotomous, that is, the dependent variable can take the value 1 with a probability of successθ, or the value 0 with probability of failure 1-θ. This type of variable is called a Bernoulli (or binary) variable. Although not as common and not discussed in this treatment, applications of logistic regression have also been extended to cases where the dependent variable is of more than two cases, known as multinomial or polytomous (Tabachnick and Fidell (1996) use the term polychotomous).

As mentioned previously, the independent or predictor variables in logistic regression can take any form. That is, logistic regression makes no assumption about the distribution of the independent variables. They do not have to be normally distributed, linearly related or of equal variance within each group. The relationship between the predictor and response variables is not a linear function in logistic regression, instead, the logistic regression function is used, which is the logit transformation of θ:

$$\theta = \frac{e^{(\alpha+\beta_1 x_1+\beta_2 x_2+...+\beta_i x_i)}}{1+e^{(\alpha+\beta_1 x_1+\beta_2 x_2+...+\beta_i x_i)}} \quad (4.2)$$

Where

α = the constant of the equation

β = the coefficient of the predictor variables

x_i = Independent variables

θ = Probability of the occurring event

An alternative form of the logistic regression equation is:

$$\log it[\theta(x)] = \log\left[\frac{\theta(x)}{1-\theta(x)}\right] = \alpha + \beta_1 x_1 + \beta_2 x_2 + ... + \beta_i x_i \quad (4.3)$$

The goal of logistic regression is to correctly predict the category of outcome for individual cases using the most parsimonious model. To accomplish this goal, a model is created that includes all predictor variables that are useful in predicting the response variable. Several different options are available during model creation. Variables can be entered into the model in the order specified by the researcher or logistic regression can test the fit of the model after each coefficient is added or deleted, called stepwise regression.

There are two main uses of logistic regression. The first is the prediction of group membership. Since logistic regression calculates the probability or success over the probability of failure, the results of the analysis are in the form of an odds ratio. The coefficients demonstrate the effect of each explanatory variable on log of odds as follows:

$$\ln\frac{\theta(x)}{1-\theta(x)} = \text{log-odds ratio} \quad (4.4)$$

The process by which coefficients are tested for significance for inclusion or elimination from the model involves several different techniques. Each of these will be discussed below.

Wald Test:

A Wald test is used to test the statistical significance of each coefficient (β) in the model. A Wald test calculates a Z statistic, which is:

$$z = \frac{\hat{\beta}}{SE} \tag{4.5}$$

This z value is then squared, yielding a Wald statistic with a chi-square distribution. However, several authors have identified problems with the use of the Wald statistic. Menard (1995) warns that for large coefficients, standard error is inflated, lowering the Wald statistic (chi-square) value. Agresti (1996) states that the likelihood-ratio test is more reliable for small sample sizes than the Wald test.

Likelihood-Ratio Test:

The likelihood-ratio test uses the ratio of the maximized value of the likelihood function for the full model (L1) over the maximized value of the likelihood function for the simpler model (L0). The likelihood-ratio test statistic equals:

$$-2\log\left(\frac{L_0}{L_1}\right) = -2\left[\log(L_0) - \log(L_1)\right] = -2(L_0 - L_1) \tag{4.6}$$

This log transformation of the likelihood functions yields a chi-squared statistic. This is the recommended test statistic to use when building a model through backward stepwise elimination.

Hosmer-Lemshow Goodness of Fit Test:

The Hosmer-Lemshow statistic evaluates the goodness-of-fit by creating 10 ordered groups of subjects and then compares the number actually in the each group (observed) to the number predicted by the logistic regression model (predicted). Thus, the test statistic is a chi-square statistic with a desirable

outcome of non-significance, indicating that the model prediction does not significantly differ from the observed.

The 10 ordered groups are created based on their estimated probability; those with estimated probability below 0.1 form one group, and so on, up to those with probability 0.9 to 1.0. Each of these categories is further divided into two groups based on the actual observed outcome variable (success, failure). The expected frequencies for each of the cells are obtained from the model. If the model is good, then most of the subjects with success are classified in the higher deciles of risk and those with failure in the lower deciles of risk. (Connor, 2006).

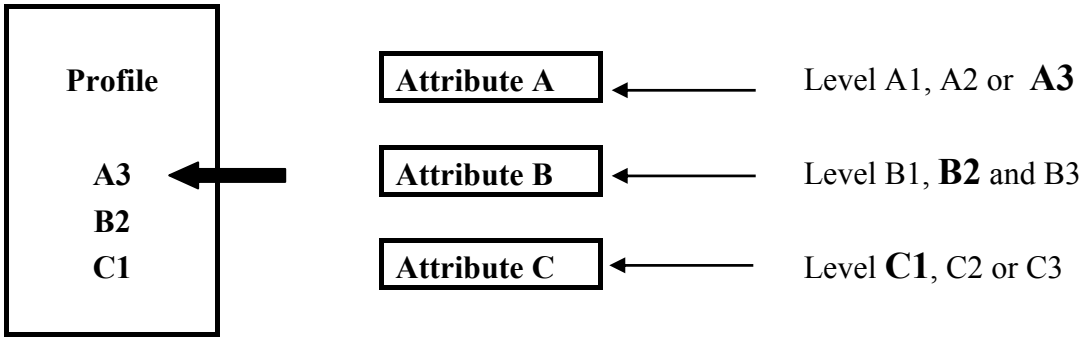
4.2.4 Conjoint Analysis Model and Multinomial Logit Estimation: Analyzing the Supply Characteristics

In this topic, the Choice-Based Conjoint (CBC) analysis will be applied in the analysis of supply for health insurance. The result will explain in chapter 9.

Conjoint analysis (CA) is a multivariate technique used to estimate or determine how respondents develop preferences for products or services (Hair et al., 1998). It is widely used in marketing research and is based on the premise that consumers evaluate the value of a product by combining the separate amounts of value provided by each attribute of the particular product or services. According to a survey by Cattin and Wittink (1982), approximately sixty percent of all conjoint studies are related to consumer goods, twenty percent to industrial goods, and the remaining 20 % are performed for transportation and financial services. These applications were used primarily for new product/concept evaluation and pricing decisions. Conjoint analysis has also proven very successful in market segmentation (Green and Srinvasan 1978).

CA provides valuable information about bundles of attributes that represent potential products or services for consumers. CA therefore provides researchers with insight into the composition of consumer preferences by examining the attributes that are most or least important to the consumers. These attributes form the basis for a decision criterion that a respondent uses to choose products or services**.** In CA, products or services are referred to as profiles, treatments, or a stimulus. Consumer preferences, needs, and attitudes are reflected in their choices among product profiles. A profile is defined as a hypothetical product consisting of different attribute - levels as shown by figure 4.2 below (Mclennon, E.A. 2002).

Figure 4.2 An Example of the Relationships Among Profile, Attributes and Levels of Conjoint Analysis



Source: Mclennon, E.A. (2002).

Conjoint Analysis (CA) seeks to quantify and predict client preferences for various levels of multi-attribute financial services. For this purpose, CA employs frequently additive models. The models discussed here are:

$$Y = \sum_{i=1}^{n}\sum_{j=1}^{m} \beta_{ij} Xij \qquad (4.7)$$

$$Y = \sum_{i=1}^{n}\sum_{j=1}^{m} \beta_{ij} Xij + \sum_{i=1}^{n}\sum_{k=1}^{m} \gamma_{jk} Z_k + \varepsilon \qquad (4.8)$$

Y denotes the clients' overall preference for respectively choice of a financial service profile (construct) under investigation. The alternative profiles are described in terms of j-levels for i-attributes. β_{ij} is the part-worth utility[12] associated with the J^{th}-level of the i^{th}-attributes. The part-worth utility measures the relative importance[13] of X_{ij}, in estimating the dependent variable. X_{ij} is a

[12] Part-worth utility is the contributed portion of various attribute levels to the overall preference, utility perceived (Green and Srinivasan 1978).

[13] The importance of the attributes for the overall preference can be determined by calculating the difference in part-worth utilities between the level with the highest and level with the lowest part-worth utility (Moore 1980)

control variable to flag either presence (X_{ij}) or absence (X_{ij}=0) of the j^{th}-level for the i^{th} -attribute. Interaction between a person's background variables[14] and the attribute levels is represented by γ_{jk}. Similarly, Z_k is a vector of background variables (Schrieder 1994).

The choice of conjoint methodologies revolves around the basic characteristics of the proposed research: number of attributes handled, level of analysis, choice task. and the permitted model form. Table 4.3 compares the three methodologies on these considerations.

Table 4.3 Comparison of Alternative Conjoint Methodologies by Tradition Conjoint, Additive/Hybrid Conjoint and Choice-Base Conjoint in Different Characteristics

Characteristics	Conjoint Methodologies		
	Tradition Conjoint	**Additive/ Hybrid Conjoint**	**Choice-Base Conjoint**
Upper Limit on Number of Attributes	9	30	6
Level of Analysis	Individual	Individual	Aggregate or Individual
Model Form	Additive	Additive	Additive and Interaction
Choice Task	Evaluating Full -Profile Stimuli One at a Time	Rating Stimuli Containing Subsets of Attributes	Choice Between Set of Stimuli
Data Collection Format	Any Format	General Computer-Based	Any Format

Source: Hair, J.F. et al (2006).

Traditional conjoint analysis, portrayed in the earlier example, is characterized by a simple additive model generally containing up to nine factors estimated for each individual. A respondent evaluates stimuli constructed with selected levels from each attribute (known as full profiles). Although this format has been the mainstay of conjoint studies for many years, two additional methodologies have been developed in an attempt to deal with certain design issues.

The adaptive conjoint method was developed to accommodate a large number of factors (marry times up to 30) that would not be feasible in traditional conjoint analysis. It employs a computerized process that adapts the stimuli

[14] Socio-economic and demographic background variables are for instance gender, income group, and place of residence.

shown to a respondent as the choice task proceeds. Moreover, the stimuli can he composed of subsets of attributes, thus allowing for many more attributes.

The choice-based approach employs a unique form of presenting stimuli in sets (choose one from a set of stimuli) rather than one by one. Due to the more complicated task, the number of factors included is more limited, but the approach does allow for inclusion of interactions and can be estimated at the aggregate or individual level (Hair, J.F. et al 2006).

Many times the research objectives create situations not handled well by traditional conjoint analysis, thus the use of these alternative methodologies. In this study will apply choice-based approach.

CBC is used for discrete choice modeling, a research technique that is now the most often used conjoint-related method in the world. The main characteristic distinguishing choice-based from other types of conjoint analysis is that the respondent expresses preferences by choosing from sets of concepts, rather than by rating or ranking them. The choice-based task is similar to what buyers actually do in the marketplace. Choosing a preferred product from a group of products is a simple and natural task that everyone can understand.

CBC is often used to study the relationship between price and demand, and is especially useful when the price-demand relationship differs from brand to brand, and when only a few features need to be considered. One of the strengths of CBC is its ability to deal with interactions, such as when different brands have different sensitivities to price changes. Most conjoint methods are based on "main effects only" models that ignore the existence of such interactions. In contrast, CBC may be used to evaluate all two-way interactions.

CBC data can be analyzed in a number of ways. First, the relative impact of each attribute level can be assessed just by counting "wins." In randomized CBC designs, each attribute level is equally likely to occur with each level of every other attribute. Therefore, the impact of each level can be assessed by counting the proportion of times concepts including that level are chosen. This "counting" method can be used for main effects as well as for two- or three-way interactions.

For a second type of analysis, CBC contains an easy-to-use module to perform multinomial logit estimation. This analysis results in a set of numbers comparable to respondent-level conjoint "utilities," but which differ in that they describe preferences of a group rather than for an individual. CBC's Logit module can estimate main-effects and two-way interactions. The output is used by the market simulation module, which estimates the share of choice for products that are made up of combinations of the study's attributes (Sawtooth 2006).

4.2.5 Econometric Model for Analyzing Vulnerability to Poverty: Feasible Generalized Least Square Estimation

In this section, the feasible generalized least square applies to analyze the vulnerability to poverty of household. The result will appear in chapter 10.

The key to estimating a household's vulnerability to poverty is to obtain an estimate of the household's variance of consumption expenditure. A reliable estimate of consumption expenditure variance can be obtained from panel data collected over a sufficiently long period. However, as noted by Jalan and Ravallion (2000), most of the available standard data sources are based on a 'single visit' (cross-sectional) household survey and cannot be used for this purpose. Hence, there is a need to develop a method for estimation household consumption expenditure variance from cross-section data. This, however, obviously requires relatively strong assumptions about the stochastic process generation consumption (Suryahadi and Sumarto 2001).

Chaudhuri (2002) has developed a methodology to estimate vulnerability of a household to poverty using cross sectional data by using Philippines data for 1997. Chaudhuri and Datt (2001) find that they are able to predict which households will be poor in 1998. Suryahadi and Sumarto (2001) have adopted this methodology to identify households that are vulnerable to poverty and to identify the chronic poor in Indonesia. They do this by making use of information on vulnerability to poverty based on current consumption, the estimated degree of vulnerability and the estimated expected consumption. Five categories of households are developed. These are poor, non-poor, high vulnerability to poverty, low vulnerability to poverty and the total vulnerable group. The total vulnerable group includes non-poor households. These are households that are currently non-poor but are expected to become poor in the future. The critical vulnerability level that is adopted in their study is 0.5. A household is described as being highly vulnerable to poverty if the probability that it will be poor is equal to or greater than 0.5 (Kojo, Abena, and Senadza, 2005).

The vulnerability level of a household at time t is the probability that it will be consumption poor at time t+1 thus:

$$V_{ht} = \Pr(C_{ht+1} \leq z) \tag{4.9}$$

Where C_{ht+1} is the household's consumption expenditure at time t+1 and z is the poverty line.

Consumption expenditure is determined by observable household characteristics X_h, the state of the economy at time t S_t, unobserved time

invariant household level effects α_h , and any idiosyncratic factors that contribute to differential welfare outcomes for households that are otherwise observationally equivalent, ε_{ht} . Thus

$$C_{ht} = c(X_h, \beta_t, \alpha_h, \varepsilon_{ht}) \tag{4.10}$$

With cross-sectional data there is not enough information to include changes in the structure of the economy and idiosyncratic shocks to household. Thus, we begin by assuming that the stochastic process generation the consumption of a household *h* is given by:

$$Lnc_h = X_h\beta + \varepsilon_h \tag{4.11}$$

Where c_h is per capita consumption expenditure, X_h represents a bundle of observable household characteristics such as household size, education of household head, etc., β is a vector of parameters, and ε_h is a mean-zero disturbance term that captures idiosyncratic factors (shocks) that contribute to different per capita consumption levels for households that are otherwise observationally equivalent.

In addition the variance of ε_{ht} is allowed to depend on observable household characteristics. We assume that the variance of ε_h is given by:

$$\sigma^2_{\varepsilon,h} = X_h\theta \tag{4.12}$$

Estimates of β and θ are obtained using a three step feasible generalized least squares procedure. We estimate equation (4.12) using an ordinary least squares (OLS) procedure. We use the estimated residuals from equation (4.12) to estimate:

$$\hat{\varepsilon}^2_{OLS,h} = X_h\theta + \eta_h \tag{4.13}$$

The OLS estimate, $\hat{\theta}_{OLS}$ is then used to transform as:

$$\frac{\hat{\varepsilon}2_{OLS,h}}{X_h\hat{\theta}OLS} = \left(\frac{Xh}{X_h\hat{\theta}OLS}\right)\theta + \frac{\eta_h}{X_h\hat{\theta}OLS} \tag{4.14}$$

This transformed equation is estimated using OLS to obtain an asymptotically efficient FGLS estimate, $\hat{\theta}FGLS$. Note that $X_h\hat{\theta}FGLS$ is a consistent estimate of $\sigma^2_{e,h}$, the variance of the idiosyncratic component of household consumption. Then, we transform equation (4.12) as below:

$$\frac{\ln c_h}{\sqrt{X_h\hat{\theta}FGLS}} = \left(\frac{X_h}{\sqrt{X_h\hat{\theta}FGLS}}\right)\beta + \frac{\varepsilon_h}{\sqrt{X_h\hat{\theta}FGLS}} \tag{4.15}$$

OLS estimation of equation (3.15) yields a consistent and asymptotically efficient estimate of β. The standard error of the estimated coefficient, $\hat{\beta}FGLS$, can be obtained by dividing the reported standard error by the standard error of the regression.

Using the estimates and that we obtain we are able to directly estimate expected log consumption:

$$\hat{E}\left[\ln c_h \middle| X_h\right] = x_h\hat{\beta} \tag{4.16}$$

And the variance of log consumption for each household *h*:

$$\hat{V}\left[\ln c_h \middle| X_h\right] = \hat{\sigma}^2\varepsilon,h = X_h\hat{\theta} \tag{4.17}$$

By assuming that consumption is log-normally distributed, we are then able to use these estimates to form an estimate of the probability that household with the characteristics, X_h, will be poor, i.e, to estimate the household's vulnerability level. Letting $\phi(.)$ denote the cumulative density of the standard normal.

The estimates of β and θ are used to obtain estimates of expected log consumption and the variance of log consumption for each household. The estimates of log consumption and the variance of log consumption are used to form an estimate of the probability that a household with characteristics X_h will be poor, i.e. the household's vulnerability level.

$$\hat{V}h = \hat{\Pr}(\ln c_h < \ln c | X_h) = \phi\left[\frac{\ln c - X_h \hat{\beta}}{\sqrt{X_h \hat{\theta}}}\right] \qquad (4.18)$$

To deal with measurement error it is recommended that the estimates are applied at a disaggregated level (Chaudhuri, 2000).

As the available data for the estimation of vulnerability consist of a single cross-section, identifying the household characteristics that are associated with vulnerability necessitates making strong assumptions about the stochastic process that generates consumption (Chaudhuri, 2000). Probably the most important and strongest identifying assumption is that cross-sectional variance can be used to estimate intertemporal variance. Most likely cross-sectional variance can explain a part of inter-temporal variance, mostly due to idiosyncratic components or cluster-specific shocks. However, the model will miss the impact of inter-temporal or aggregate (household-invariant but time-variant) shocks. In other words, the model will probably produce good estimates of vulnerability for the situations where the distribution of risks and the risk-management instruments are similar in all periods of time. As there is probably some error in the measurement of consumption, this may have resulted in significant overestimation of the variance of consumption, and thus of vulnerability. An advantage of the estimation strategy used in this paper – using a FGLS approach to estimate the variance of the idiosyncratic component of household consumption – is that it yields a consistent estimate of the true variance of consumption even when consumption is measured with error unless the measurement error varies systematically with some household characteristics (Tesliuc, and Lindert, 2002).

4.3 Research Area

The research is implemented within a Ph.D. work at the University of Hohenheim, Department of Agricultural Development Theory and Policy in the Tropics and Subtropics. It is closely linked to the Special Research Program (SFB 564) "Sustainable Land Use and Rural Development in Mountainous Regions of Southeast Asia", also known as the Uplands Program at the University of Hohenheim. The Uplands Program aims at a better understanding of the constraints to the sustainable management of the natural resources and to poverty alleviation in the Mountainous Regions of Southeast Asia. The field research of the sociological and economic sub-projects centre around the farm household and community levels and are closely intertwined to yield synergetic results.

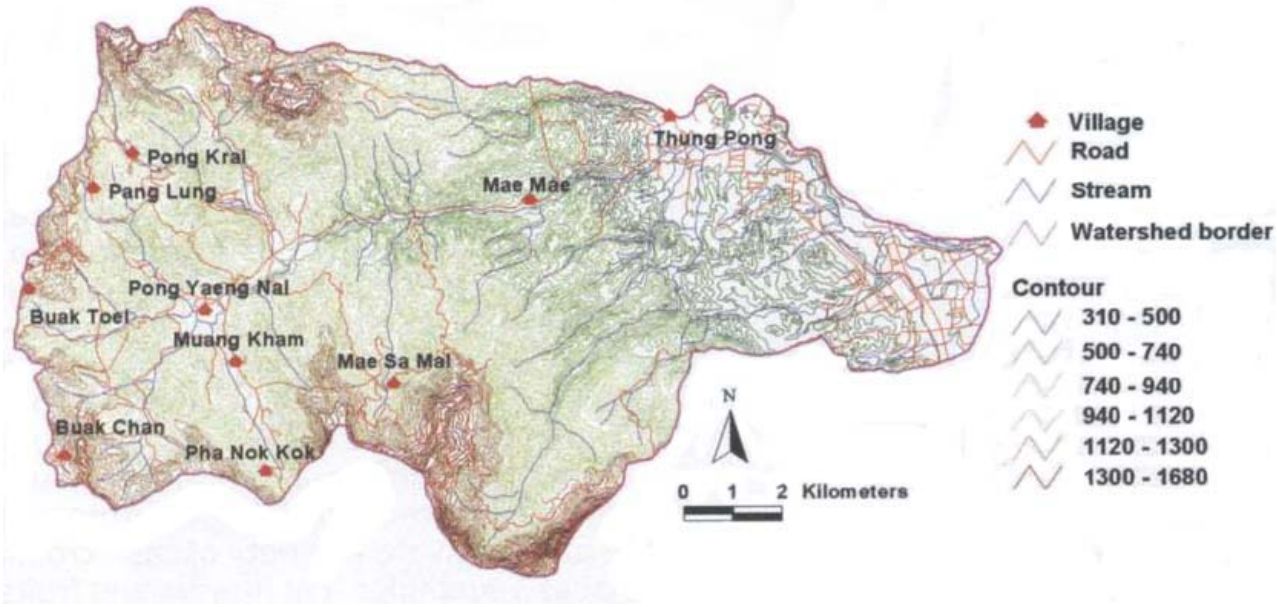
This research on "Risk Management for Sustainable Livelihoods of Farm Households in Northern Thailand" closely co-operated with the sociological sub-project F3.2 "Development Intervention, State Administration and local Society: Conditions for Political Participation in the Highlands of Northern Thailand and Northern Vietnam" (led by Prof. Dr. Rüdiger Korff) and the economic sub-project F2.2 "Risk Management of Farm Households in Northern Vietnam" (led by Prof. Dr. Gertrud Buchenrieder). It evaluates the risk management strategies (ex-post coping and ex-ante adaptive strategies) of the farm households which were adapted as a consequence to the manifold individual and mass risks (e.g. illness, livestock theft and harvest failures) encountered in the research area of the Uplands Program in Northern Thailand. The lack of adequate risk management strategies and thus lack of social protection within a livelihood framework that is characterised by population pressure and diminishing natural resources can result in the over-exploitation of natural resources and human capital resulting in increasingly vulnerable farm households. Vulnerability is characterised by the relationship of poverty, risk and the efforts to manage risks (Bucherieder, 2003).

The selection of the study area is based on the problem defined for analyses and objectives of the study by considering the poverty situation and problems exist in Northern Thailand. This study was conducted in Mae Rim district. This is a mountainous district of Chiangmai province which is representative of the northern mountainous region of Thailand (Figure 4.3 and 4.4).

Figure 4.3 Location of the Study Area in Mae Rim District, Chiangmai Province, Northern Thailand

Source: SFB (2006).

Figure 4.4 Location of Survey Region and Villages Name in Mae Sa Watershed, Mae Rim District, Chiangmai Province, Northern Thailand



Source: SFB (2006).

4.4 Population and Data Sampling

Research on risk management for sustainable livelihoods of farm households in northern Thailand divided into two types of questionnaires. In the first one is about risk management for sustainable livelihoods of farm households in northern Thailand to analyze about the difficulties which rural farm household encounter and the strategies which have been selected by individual farm household to solve their difficulties. Risk management has been simulated from the structured questionnaire. Secondly, demand for micro insurance has to propose to solve household risks, especially health insurance. Beyond these, PRA activities have to be arranging in objective to overview whole household risks, sources of risk, risk management strategies, village resources and social group to encourage farm household to manage risks.

Table 4.4 illustrates the number of farm household, area of study and data sampling procedure of farm household in Tambol Pong Yang, Mae Rim District, Chiang Mai Province. There are nine villages in the study area, that are, Ban Pong Yang Nai, Ban Pong Yang Nok, Ban Muang Kam, Ban Kong Hae, Ban

Pong Krai, Ban Mae Sa Mai, Ban Buak Jan, Ban Pang Lung and Ban Pha Nok Kok. The villages, where the Hmong hill tribes live, are Ban Mae Sa Mai, Ban Buak Jan and Ban Pha Nok Kok. There are 987 farm household in the study area. The random sampling of data is at 20% of number of farm household. The number of data collections in each village is demonstrated in table below.

Table 4.4 Village Name, Number of Farm Household and Data Sampling in Tambol Pong Yang, Mae Rim District, Chiang Mai Province in 2004

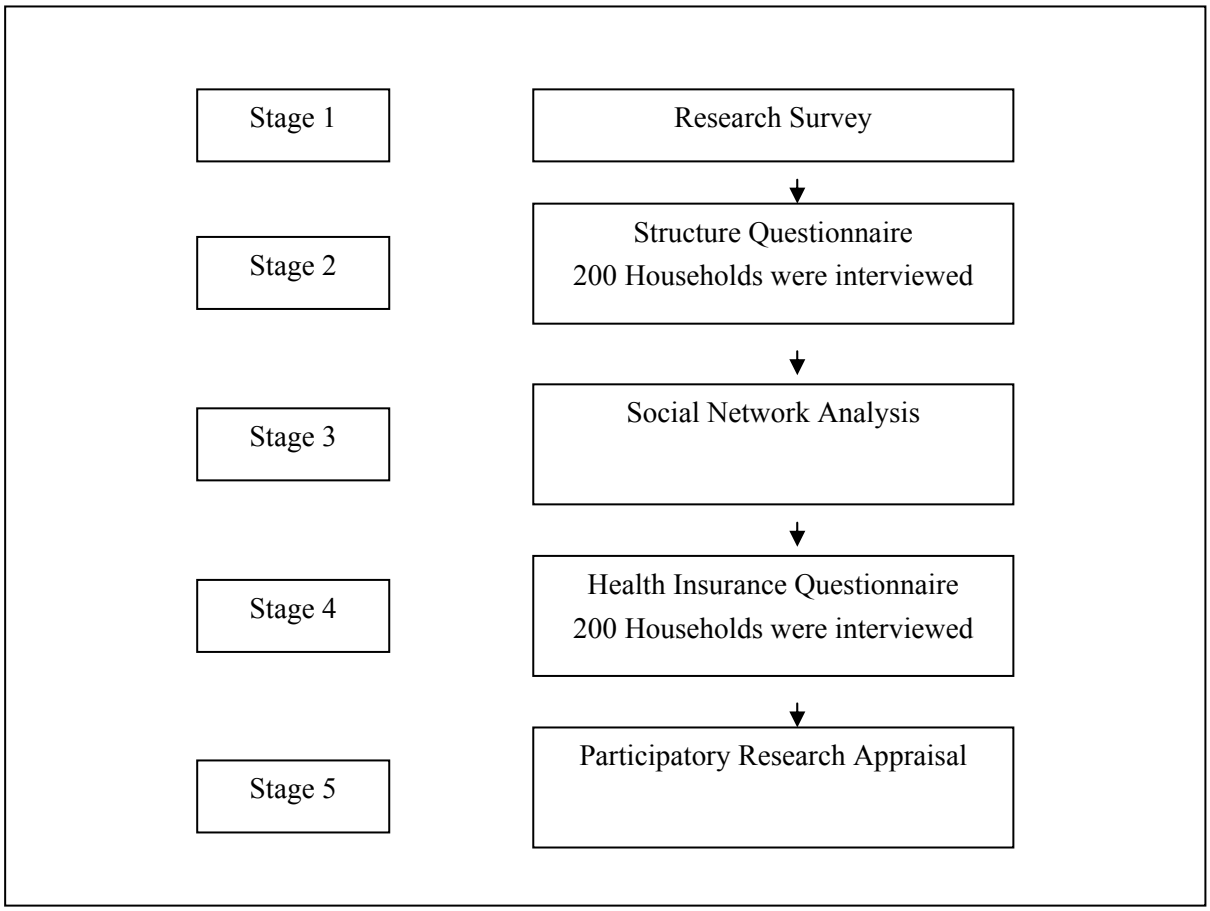
Moo (Village Number)	Village Name	Number of Farm Household	Number of Data Sampling	% of Random	Number of Respondents	Number of Completed Questionnaire
1	Pong Yang Nai	128	26	20.31	30	26
2	Pong Yang Nok	170	34	20.00	35	34
3	Muang Kam	173	35	20.23	38	35
4	Kong Hae	123	25	20.33	28	25
5	Pong Krai	61	12	19.67	13	12
6	Mae Sa Mai	141	29	20.57	29	29
7	Buak Jan	62	13	20.97	16	13
8	Pang Lung	68	14	20.59	13	14
9	Pha Nok Kok	61	12	19.67	13	12
	Total	987	200	20.26	215	200

Source: Own survey.

Figure 4.5 gives the information about the method of field research, which starts with research survey and the improvement of questionnaire. After that, data collection and other research activities were held parallel in the study area.

During the field research phase, rural households in Chiang Mai Province, Pong Yang Area were interviewed using a structured questionnaire. Data were collected in nine villages. Two groups of farm households were interviewed: a so called hill-tribe known as Hmong and a local people known as Khon Muang. The random sample consists of 200 households; 142 local northern and 58 Hmong households. This study employs a cross sectional dataset complied from sample household surveys implemented in 2004.

Figure 4.5 Methods in Data Collection



These activities (structured interviewing) were complemented with participatory rural appraisal tools. These included brainstorming and group discussions at the village level, drawing of agricultural production calendars, reporting of most pressing difficulties at present, five and ten years ago, illustration of risk causes and effects using fish-bone-diagrams and risk ranking.

Furthermore, the potential demand for health insurance was estimated on the basis of the 200 household interviews using the so-called CBC analysis. Data were collected in nine villages, which were the same area as the structured questionnaire. The random sample consists of 200 households; 146 local northern and 54 Hmong households. The analysis will be particularly useful as it compares to the governmental health policy that already provides health insurance cards for 30 Baht/time visit doctor.

5 PRINCIPAL COMPONENT ANALYSIS OF POVERTY IN NORTHERN THAILAND

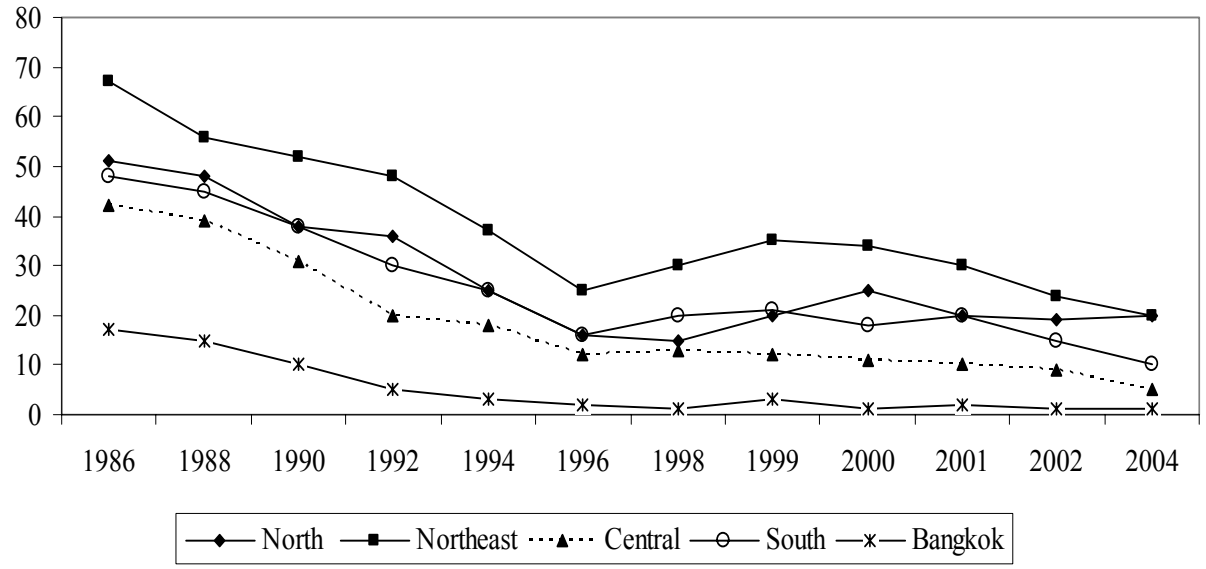
This chapter presents the analytical results concerning poverty in Northern Thailand. This chapter divides into 6 main topics. First, introduction on the national poverty status of Thailand is presented in section 5.1. Second, the selection of indicator in national context is discussed in section 5.2. Third, study area, database and methodology is summarised in section 5.3. Afterwards, empirical results from multivariate statistical analysis are further analyzes in section 5.4. It presents the poverty status, poverty classifications, poverty measurement, and the determinant of poverty and the comparison of poverty with socio-economics indicators. Additionally, in section 5.5 examines the assessment of the empirical poverty index in relation to socio-economic and demographic household characteristics. In the last section in 5.6 shows the conclusion in principal component analysis of poverty.

5.1 Introduction on the National Poverty Status of Thailand

Since the last century, poverty and inequality of income distribution among developing country have been the most important global issues. The lesson of economics crisis in Thailand proved that high economic growth rate was not guarantee the sustainability and efficiency of economic development. High growth rate result in the declining in the absolute poverty or poverty incidence, but relative poverty was worse off. If this worsening poverty is not reversed, the problem of Thai economy will become very serious.

Poverty is emerging as one of the most serious problem of Thailand. The incidence of poverty is most severe in the rural areas. The incidence of poverty in the region has been declining very rapidly until 1996. The crisis has contributed to an increase in the incidence by 29.9%. In 1998, higher percentage of population in rural area has income below the official poverty line. The incidence of poverty varies considerably by region. The North-eastern region has the highest incidence of poverty and then the northern region (Figure 5.1). In 2002, the percentage of the poor in the north is 18.7% compared to 15.5% for the Whole Kingdom (Table 5.1). In the mid of 2004, the percentage of the poor in the north-eastern region has a dramatic declined, while in northern region remained stable.

Figure 5.1 Poverty Incidence by Region (Income) Between 1986 and 2004



Source: NESDB (2005)

Table 5.1 Percentage of the Poor Classified by Region in Urban and Rural Area Between 1988 and Mid Year 2004, Thailand

		1988	1990	1992	1994	1996	1998	2000	2002	Mid year 2004
Bangkok*	Bangkok	15.1	10.9	6.0	2.9	1.6	1.7	1.6	2.2	1.2
	Total	15.1	10.9	6.0	2.9	1.6	1.7	1.6	2.2	1.2
Central	Urban	28.0	22.9	12.0	11.8	7.0	6.9	6.4	5.1	3.2
	Rural	44.0	36.4	25.5	18.7	13.3	14.4	12.6	9.5	6.4
	Total	39.2	32.1	21.2	16.4	11.2	11.9	10.5	8.0	5.3
North	Urban	39.3	27.7	19.2	20.1	11.9	10.9	14.8	11.0	8.1
	Rural	50.2	39.1	39.8	26.8	18.1	18.6	25.6	20.7	21.2
	Total	**48.0**	**36.8**	**35.6**	**25.4**	**16.8**	**17.0**	**23.5**	**18.7**	**18.5**
Northeast	Urban	34.5	35.7	29.8	22.9	14.8	15.9	21.4	13.0	10.4
	Rural	59.4	53.8	50.4	39.6	27.7	31.5	37.7	26.2	19.6
	Total	**55.9**	**51.1**	**47.4**	**37.0**	**25.7**	**29.0**	**35.0**	**23.7**	**17.9**
South	Urban	21.4	22.6	14.0	12.1	8.7	9.5	7.6	7.3	5.5
	Rural	50.8	42.5	33.4	29.2	19.6	23.2	19.8	16.0	9.2
	Total	44.9	38.4	29.4	25.6	17.2	20.1	17.1	13.8	8.3
Total	Urban	25.2	21.4	14.1	11.7	7.3	7.5	8.7	6.7	4.8
	Rural	52.9	45.2	40.3	30.7	21.3	23.7	27.0	19.7	15.4
	Total	44.9	38.2	32.5	25.0	17.0	18.8	21.3	15.5	12.0

Source: NESDB (2005)

Note: *Bangkok, Nonthaburi, Pathum Thani and Samut Prakarn

Poverty reduction is the main goals under Thailand's Poverty Reduction Strategy and the Ninth Plan (B.E. 2002 – 2006). Government continues to decrease poverty by adopting sectoral policies. The policies and interventions most relevant to poverty alleviation include: (1) Agricultural Development Policy; (2) Rural Development Policy; (3) Rural Industry Policy; and (4) Rural Economic and Social Rehabilitation Plan. However, the policies and interventions will be effective if distributing to the real poverty group.

Hence, the identification of poverty group is significant. The poor is the one who live under the unacceptable deprivation of human both in physiological and social deprivation. In general, the indicator to defined the poor are related to nutrient, health system, education and dwelling. Poor people is the one who has these physiological deprivation-income, expenses, housing, education, health, less than basic needed. However, this deprivation should not only consider in economics sides, but social deprivation including risk, vulnerability, lack of autonomy, powerless and lack of self-respect should also be considered.

Poverty group can be divided into 3 groups. Firstly, chronic poverty group are the poor who had very much less than the basic needed. Government should concentrated more on this group. Secondly, middle poor are the poor who has less opportunity to seek income due to lack of destitution and opportunity to reach the factor of production such as land, capital assets. This group is not very poor as the first group, but can not far away from the poor level. Thirdly, the conjectural poverty group is the poor who is not lack of basic needed but this group has the vulnerability and has opportunity to become the poor easily because of external factors such as weather, earthquake, flood, death of household head (Jitsuchon, S. 2001).

Reducing poverty and inequality of income distribution (sectoral and regional) are among the most important development policy issues. Economic growth is generally associated with poverty reduction. Nevertheless, one of the lessons of the economic crisis in Thailand in 1997 was that high economic growth rates do not guarantee the sustainability and efficiency of economic development. High growth rates result in the declining of the absolute poverty or poverty incidence, but relative poverty may even worsen. Poverty is thus reemerging as one of the most serious problems of Thailand. The incidence of poverty is most severe in the rural areas. Poverty reduction is one of the main goals under Thailand's Poverty Reduction Strategy and the Ninth Plan (B.E. 2002 – 2006) (NESDB, NSO, and World Bank, 2003).

However, the policies and interventions will be effective only if the correct poverty group is targeted. Hence, the identification of poverty groups is significant. This study, therefore, has the purpose to examine the status of rural household poverty in northern Thailand and identifies the relevant determinants.

5.2 Selection of Poverty Indicators

Measuring poverty in Thailand by National Economic and Social Development Board divided into 2 levels. The first one measuring poverty at household level and the next one measuring poverty at village level. The first method applied poverty line for absolute poverty measurement which classified the poor are whose income below poverty line. Besides, relative poverty was measure by determining level of living standard. The next method at village level applied basic minimum needs indicator and rural development indicators. This study is adapting the research of National Economic and Social Development Board on factor analysis of rural poverty and development problems which analyze by the same principal component approach, but different factors.

One of the main arguments in favor of poverty measurement is that how to evaluate poverty which reflect to the real appearance and the context of that country. Poverty is not reliance on any one dimension. There are 4 group of factors are applied in this study, that are, human resource (education, family size, occupation), food security (the sufficient of food), dwelling (structural of house, quality of dwelling), and assets (productive assets or agricultural assets, land own).

Principle component analysis method led to the selection of 16 indicators out of 65 variables. The indicators reflect on different dimensions of poverty concerning human resources, food security, dwelling and assets (Table 5.2).

Human Resources

Human resources indicators discriminated the ability to acquire income. These indicators are the most uses in explaining poverty of Thailand. Education beyond the primary level is the surest pathway out of poverty and education also seems to make people less vulnerability. A total 6 out of 28 indicators related to human resource are included in study. Number of family member, the level of education in the household and occupation are particularly important.

Food Security

Thailand is the agricultural productive country. Most of farm household grow a variety of crop around the house for sustain living and food security. The patronizing society is found in rural area. Family self reliance and community-based support is the key to guarantee food sustainability. Two indicators are explained for food security of household. Crop yield are most important for self-sufficiency. In addition, value of main crop or cash-crops are significance for generating cash for buying important consumption goods.

Dwelling

These indicators are very important in explaining the differences between the poor in remote highland and lowland. There are 4 of 21 indicators were related to housing quality. In the research area, housing is different between villages, status, occupation of family member and development expansion.

Assets

Four indicators related to assets are used. These indicators reflect the wealth of household. Productive assets and quantity land own are the mean to create household income.

Table 5.2 Selection A Group of Indicators For the Analysis of Principal Component

	Human resources:	**6**
1	Average age of household adults (age above 16 year)	
2	**Percentage of adult who can write**	/
3	Percentage of household member who can write	
4	Percentage of illiterate adult	
5	Percentage of household member who completed education	
6	Percentage of adult who has no education	
7	Percentage of adult who completed primary school	
8	Percentage of adult who completed secondary school	
9	Percentage of adult who completed vocational school	
10	Percentage of adult who completed bachelor and above	
11	**Percentage of adult who completed primary school**	/
12	Percentage of adult who completed secondary school	
13	**Percentage of adults with non farm occupation**	/
14	Percentage of adults with farm occupation	
15	**Number of children (age 16 and below)**	/
16	Number of old age people (age 60 and above)	
17	Dependency ratio of children to adults	
18	Dependency ratio of old age to adults	
19	Dependency ratio (National statistics of Thailand formula)	
20	Dependency ratio UNDP formula	
21	**Percentage of unemployed to employed**	/
22	**Family size**	/
23	Percentage of male adult to total adult	
24	Percentage of female adult to total adult	
25	Age of household head	
26	Gender of household head	
27	Education of household head	
28	Occupation of household head	

Source: Own modification (2004)

Table 5.2 Selection A Group of Indicators For the Analysis of Principal Component (Continue)

	Food security:	**2**
1	Number of household give crop production to relatives or friend	
2	Value of crop give	
3	Quantity of rice consumption in kg per adult equivalence per year	
4	Rice surplus from consumption (Rice stock)	
5	Crop yield (Top ten crop)	/
6	Value of main crop yield (Top ten crop)	/
	Dwelling:	**4**
1	Resident area owned per person	
2	Total area owned per person	
3	Resident area owned per adult equivalent[15]	
4	Total area owned per adult equivalent	
5	**Structural condition of house**	/
6	**Quality of latrine**	/
7	**Quality of water system**	/
8	Quality of dwelling walls	
9	Quality of roofing	
10	Quality of floors	
11	**Quality of furniture**	/
12	Quality of kitchen	
13	Quality of sleeping room	
14	Quality of latrine (material uses)	
15	Quality of water system (material uses)	
16	Quality of dwelling walls (material uses)	
17	Quality of roofing (material uses)	
18	Quality of floors (material uses)	
19	Quality of furniture (material uses)	
20	Quality of kitchen (material uses)	
21	Quality of sleeping room (material uses)	

Source: Own modification (2004)

[15] Per adult equivalent expenditure is the weight of household members by age of adult and children in household.

Table 5.2 Selection A Group of Indicators For the Analysis of Principal Component (Continue)

	Assets:	**4**
1	Value of appliances and electronics	
2	**Value of transportation assets**	/
3	**Quantity of land owned**	/
4	Quantity of land rent	
5	Quantity of land lease	
6	Value of livestock	
7	**Assets value per adult equivalent**	/
8	Assets value per adult	
9	Value of crop	
10	**Value of productive/agricultural assets**	/
11	Number of TVs	
12	Number of car	
13	Number of motorcycle	

Source: Own modification (2004)

5.3 Study Area, Data Base and Methodology

Primary data were collected in nine villages in Mae Rim district, Chiang Mai province. Two groups of farm households were interviewed: a so-called hill-tribe known as Hmong and a local people, known as Khon Muang. The random sample consists of 200 households; 142 local northern and 58 Hmong households.

For the data analysis, principal component analysis (PCA) is utilized to determine the important factors explaining household poverty. PCA is an indicator reduction procedure to analyze observed variables that would result in a relatively small number of interpretable components (group of variables), which account for most of the variance in a set of observed variables. Furthermore, a poverty index is developed. The components reflect on different dimensions of poverty concerning human resources, food security, dwelling and physical assets. (1) *Human resources* indicators discriminated the ability to acquire income. These indicators are among those most used in explaining poverty in Thailand. Education beyond the primary level is a promising pathway out of poverty. A total of six out of 28 indicators related to human resources are included in study. The number of family members, the level of education in the household and occupation are particularly important. (2) *Food security***:** Two indicators appear to explain household food security, namely crop yield and value of the main crop yield. (3) *Dwelling:* There are four out of 21 indicators, which were related to housing quality. In the research area, housing is different

between villages, household wealth, household head occupation, and land development expansion. 4) *Assets:* Four indicators related to physical assets are used. These indicators reflect the wealth of household. Productive assets and the size of owned land are important means to create household income.

5.4 Empirical Results of Multivariate Statistical Analysis

This section presents the results of the quantitative data analysis. It firstly refers to the PCA and secondly the comparison of the poverty index and demographic indicators affecting household poverty.

With the large number of observed indicators related to poverty, a principal component analysis (PCA)[16] retained 16 out of 65 possible poverty determining variables. Six of the 16 variables relate to the human resource factor: (1) percentage of adults who can write, (2) percentage of adult completed primary school, (3) percentage of adults with non-farm occupation, (4) number of children, (5) percentage of unemployed to employed, and (6) family size. There are two variables relating to food security that were significant: (7) crop yield and (8) value of main crop yield. Four variables relating to the dwelling show a high correlation to poverty. These are the (9) housing condition, (10) quality of latrine, (11) water system, and (12) furniture. Four variables related to assets: (13) value of transportation assets, (14) farm land owned, (15) value of assets per adult equivalent, and (16) value of agricultural assets.

The Kaiser-Meyer-Olkin Measure (KMO) of sampling adequacy is a measure for comparing the magnitudes of observed correlation coefficients with the magnitudes of partial correlation coefficients. The value of the KMO is 0.744 and shows the appropriateness of the model which is within an acceptable range for a well-specified model and which good to warrant interpretation of results. (Table 5.3)

The Eigen values are calculated for each component. The Eigen values and Scree test were used to determine the number of extracted components from the observed data. The size of an Eigen value indicates the amount of variance in the principal component explained by each component.

[16] PCA is an indicator reduction procedure to analyze observed variables that would result in a relatively small number of interpretable components which account for most of the variance in a set of observed variables.

Table 5.3 KMO and Bartlett's Test

Test		Value
Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.744
Bartlett's Test of Sphericity	Approximate Chi-Square	2686.961
	df	120
	Significance of Bartlett	.000

Source: Own survey (2004)

The Communalities in Table 5.4 represent how well the indicators combine to identify different components. Most indicators have highly explanatory of the poverty component. Farm land own has least explanation, but the communality coefficients are above 0.5.

Table 5.4 Communalities

	Initial	Extraction
Percentage of adult who can write	1.000	.935
Percentage adult completed primary school	1.000	.938
Percentage of adults with non-farm occupation	1.000	.615
Number of children age 16 and below	1.000	.802
Percentage of unemployed to employed	1.000	.731
Family size	1.000	.863
Main crop yield (Top ten cash crop)	1.000	.769
Value of main crop	1.000	.758
Housing condition	1.000	.980
Quality of latrine	1.000	.911
Quality of water system	1.000	.943
Quality of furniture	1.000	.861
Value of transportation assets	1.000	.901
Farm land owned	1.000	.558
Value of assets per adult equivalent	1.000	.894
Value of agricultural assets	1.000	.887

Source: Own survey (2004)

Note: Extraction Method: Principal Component Analysis.

The outcome of analyzing indicators from Table 5.5 indicates the Eigen values calculated for each component. The Eigen value and scree test were used to determine the number of extracted components from the observed data. The size of an Eigen value indicates the amount of variance in the principal component explained by each component. Six components are to be considered as a common variance is being measured.

Table 5.5 Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.969	31.058	31.058	4.969	31.058	31.058	3.727	23.297	23.297
2	2.858	17.859	48.917	2.858	17.859	48.917	2.725	17.032	40.329
3	1.856	11.598	60.515	1.856	11.598	60.515	2.346	14.663	54.992
4	1.451	9.069	69.585	1.451	9.069	69.585	1.875	11.721	66.713
5	1.179	7.368	76.953	1.179	7.368	76.953	1.590	9.940	76.653
6	1.032	6.453	83.406	1.032	6.453	83.406	1.081	6.753	83.406
7	.880	5.500	88.906						
8	.615	3.846	92.752						
9	.294	1.837	94.589						
10	.226	1.414	96.003						
11	.171	1.067	97.070						
12	.155	.969	98.039						
13	.113	.707	98.746						
14	.104	.649	99.395						
15	.074	.460	99.855						
16	.023	.145	100.000						

Source: Own survey (2004)

Note: Extraction Method: Principal Component Analysis.

The orthogonal rotated solution was chosen to obtain uncorrelated components using varimax rotation method. The rotated component matrix of PCA led to the selection of six components explaining poverty. These components reflect poverty thorough different indicators, especially housing conditions, assets and human resources.

The components are extracted from a set of indicators by the application of the PCA. The first principal component makes up the largest proportion of the total variability in the set of indicators used. The second component accounts for the next largest amount of variability not accounted by the first component, and so on for the higher order components. The poverty components can be easily interpreted by analyzing the signs and size of the indicators in relation to the new component variable (Table 5.6).

Table 5.6 Rotated Component Matrix(a)

	Component					
	1	2	3	4	5	6
Housing condition	.965					
Quality of water system	.951					
Quality of latrine	.932					
Quality of furniture	.901					
Value of transportation assets		.925				
Value of agricultural assets		.907				
Value of assets per adult equivalent	.253	.864			.211	
Family size			.921			
Number of children age 16 and below			.875			
Farm land owned			.678			.231
Percentage of adult who can write				.943		
Percentage adult completed primary school				.929		
Value of main crop		.357			.748	-.238
Main crop yield			.408		.738	
Percentage of adults with non-farm occupation					-.611	-.464
Percentage of unemployed to employed						.835

Source: Own survey (2004)

Notes: Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.

5.5 Assessment of the Empirical Poverty Index in Relation to Socio-economic and Demographic Household Characteristics

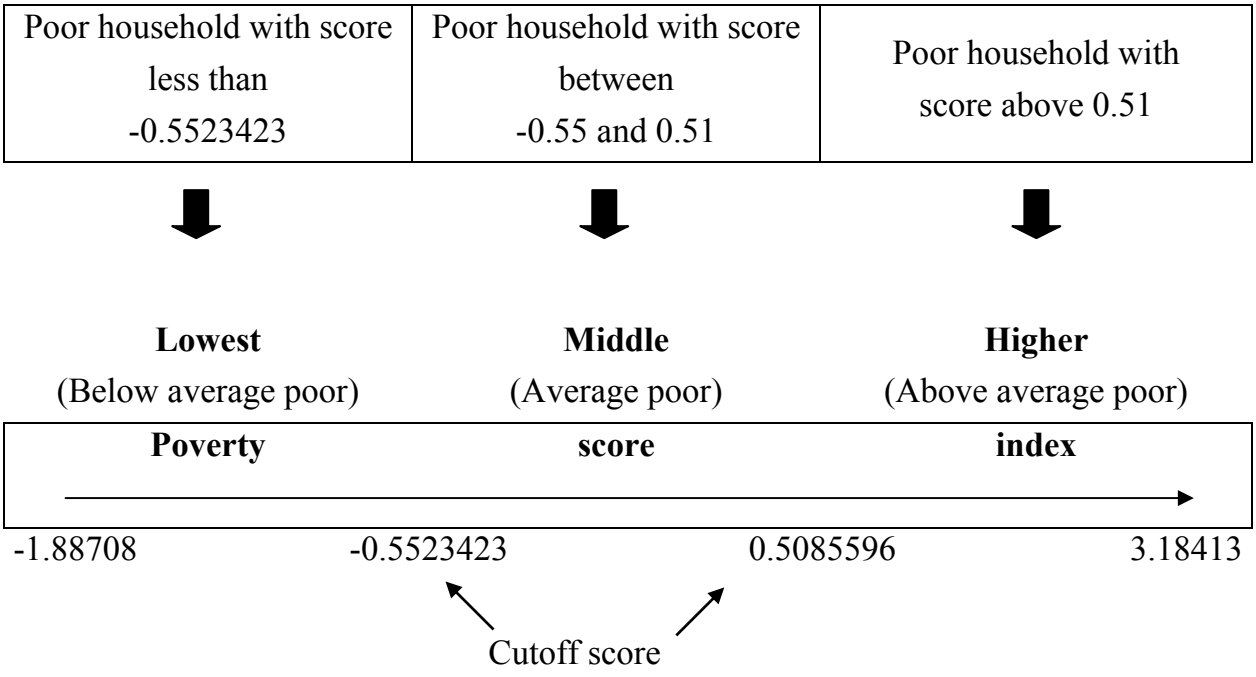
A poverty index is most useful to identify poverty groups. The construction of the poverty index assigns a poverty-ranking score to each household. The lower the score, the poorer the household relative to all others with higher scores. Using the poverty as a comparison, the sample of 200 households is sorted in ascending according to poverty index score. The top third of households are grouped in the higher-rank and the bottom third in the lowest-rank group. In the first place, the poverty comparison within the area of study found that most of the poor are living in rural highland areas. Then, the comparison between poverty and demographic indicators has been applied. According to family size, the findings reveal that on average, the poor have a large family size with five to six persons. A larger family size increases the vulnerability of households to changes in economic conditions. A smaller family size has high opportunity to outreach the poverty. Educational attainment is the next attribute that differed significantly between the poor and nearly poor. Households headed by an illiterate person are most likely to be poor. Another factor affecting poverty of

households is age of the household head. People living in households headed by elderly suffer from a greater degree of poverty.

In Thailand, as elsewhere, the measurement of poverty and the analysis of its causes are controversial. Nevertheless, all major studies of poverty incidence in Thailand agree on some basic points: 1) Absolute poverty has declined dramatically in recent decades, with the exception of a recession in the early 1980s and the period following the crisis of 1997. 2) Poverty is concentrated in rural areas, especially in the Northeastern and Northern regions of the country. 3) Large families are more likely to be poor than smaller families. 4) Farming families operating small areas of land are more likely to be poor than those operating larger areas. 5) Households headed by persons with low levels of education are more likely to be poor than others (Warr and Sarntisart 2004). Therefore, the study of poverty in this part has adjusted the poverty index to identify the poverty group, and then demographic indicators have been applied as a comparison to poverty index.

The construction of the poverty index assigns a poverty-ranking score to each household. The lower the score, the poorer the household relative to all others with higher scores (Figure 5.2).

Figure 5.2 Creating Poverty Group By Poverty Standardized Score



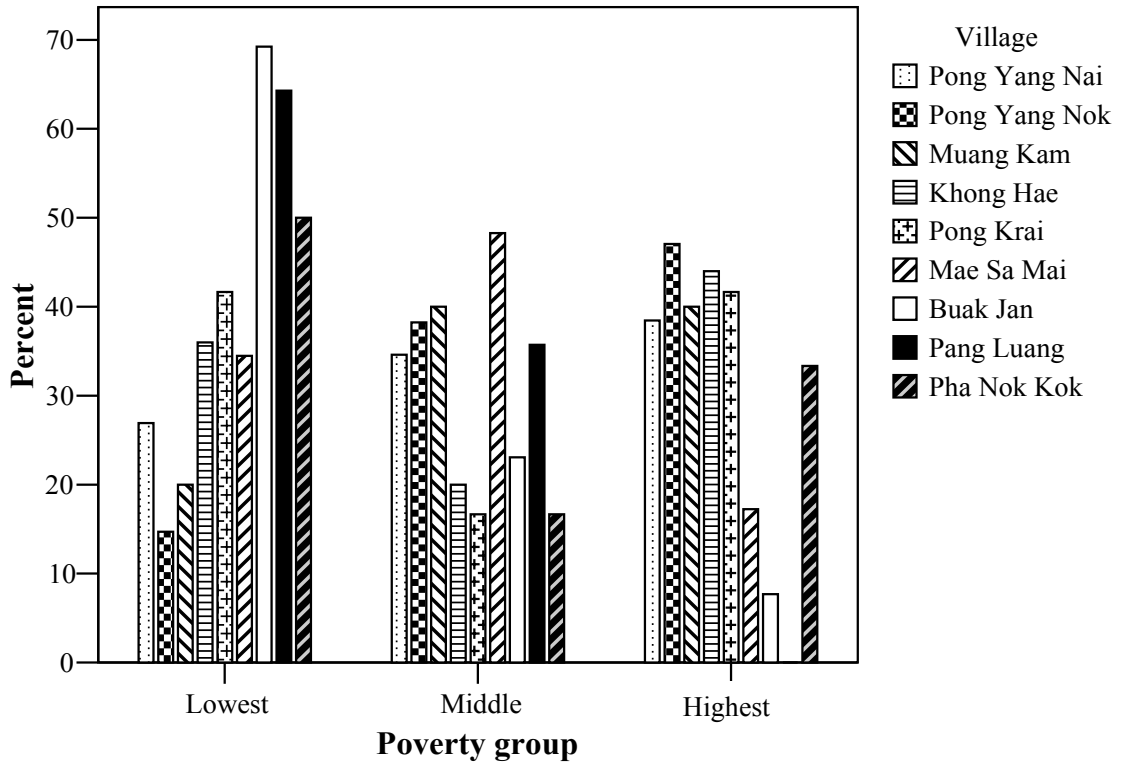
Source: Henry, et al. (2003) and own calculation (2004)

Using the poverty as a comparison, the 200 household samples are sorted in ascending according to poverty index score. The top third of households are grouped in the higher-rank, middle-rank and lowest-rank group.

In the first place, the poverty comparison within the area of study found that poverty group below average poor are mostly found among the highland village of Ban Buak Jan, Pang Luang, Pha Nok Kok and Mae Sa Mai. Poverty is significant in these villages and in a few in Pong Yang Nai, Pong Yang Nok and Muang Kam which located in low land. Whereas Khong Hae is settled in high land, but appear relative less poor. The poverty in Buak Jan accounts for nearly most of all villages' poor households. At the village level, most of the poor are living in rural and highland area.

In the above average poor group, Ban Pang Luang, Ban Buak Jan and Ban Mae Sa Mai farm household have a small percentage in this group. Another village, Ban Pha Nok Kok, had a high differentiate between the poverty groups, the lowest rank and the highest rank group. (Figure 5.3)

Figure 5.3 Comparison of Poverty Groups Classified by Villages in Percent



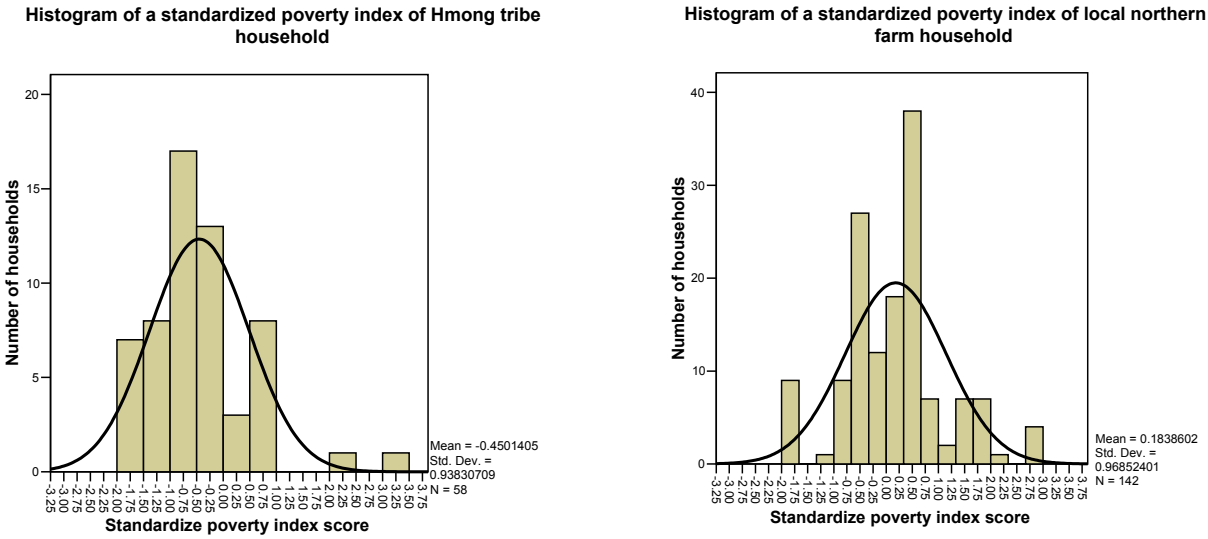
Source: Own survey (2004)

Highland settled households are lowest rank group. Most of the hill tribes living in these areas practice subsistence farming. They were pretty much left alone until the 1950s, when the increase in their numbers, extreme poverty, statelessness and threat of insurgency forced the Thai government to establish the National Committee for the Hill Tribes. Hill tribe village in the study area are Mae Sa Mai, Buak Jan and Pha Nok Kok. The comparison between household groups found that poverty among hill tribe group remains high with the lowest rank group. On the other hand, local northern households are ranked in the middle poor to above.

Figure 5.4 and 5.5 gives an example of the distribution of a poverty index across households. The greater the values of the score, the relatively wealthier the household.Interesting, normal curve of standardized poverty index of hill tribe farm household reflect their statuses are in middle to lowest rank group.

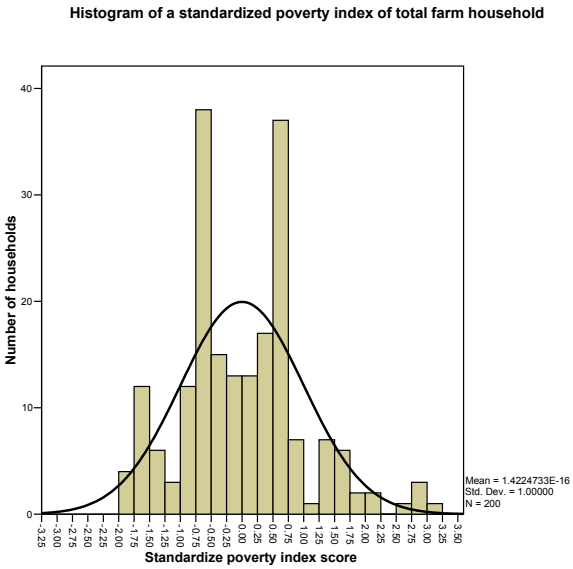
In comparison, the poverty index of hill tribe and local northern household is on the inverse direction. Hill tribe household has the high tendency to be in the lowest rank group, while local northern household has high percentage in all groups but higher percentage in higher rank group (Figure 5.6).

Figure 5.4 Comparison Histogram of A Standardized Poverty Index Among Hmong and Non-Hmong Hill Tribe Household



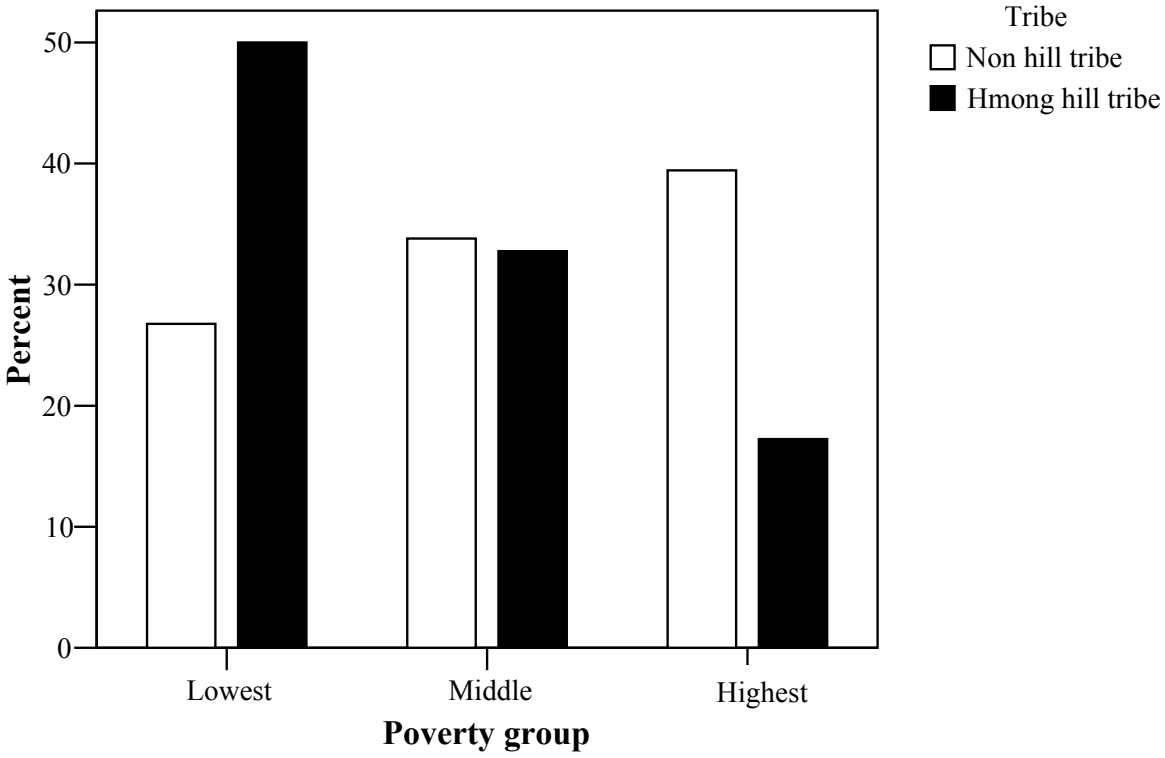
Source: Own calculation (2004)

Figure 5.5 Histogram of a Standardized Poverty Index of Total Farm Household



Source: Own calculation (2004)

Figure 5.6 Comparison of Poverty Group and Tribe in Percent



Source: Own survey (2004)

Table 5.7 show that the percentage of households with a range of poverty group. Percentage of non hill tribe household is higher from 56.72% in lowest rank group to 84.85% in highest rank group, whilst percentage of hill tribe household is reducing in higher rank group. Next come percentage poverty within tribe, half of hill tribe group is in lowest rank group, whereas, the percentage of poverty within non hill tribe group are similar in each rank group.

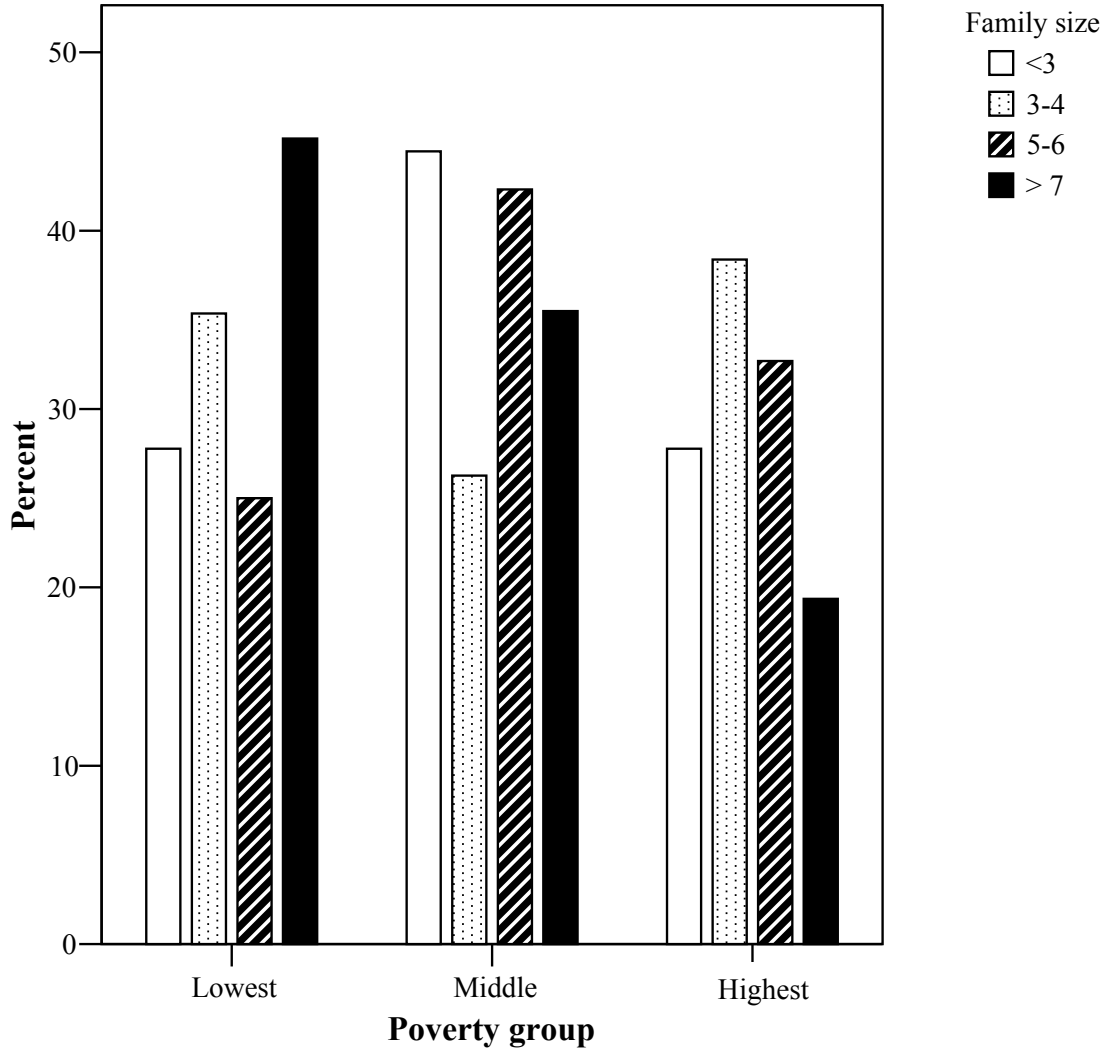
Table 5.7 Comparison of Poverty Group and Tribe

Tribe		Poverty group			Total
		Lowest	Middle	Highest	
Non hill tribe	Count	38.00	48.00	56.00	142
	% within tribe	26.76	33.80	39.44	100
	% within Poverty group	**56.72**	**71.64**	**84.85**	71
Hmong hill tribe	Count	29.00	19.00	10.00	58
	% within tribe	**50.00**	32.76	17.24	100
	% within Poverty group	43.28	28.36	15.15	29
Total	% within Poverty group	100.00	100.00	100.00	

Source: Own survey (2004)

Then, the comparison between poverty and demographic indicators has been applied. According to family size, the findings reveal that on average, the poor have a large family size with 5 to 6 persons. This is true in all villages. The largest family size is 20 persons, appearing in Hmong family. In reality, some Hmong families have extended family up to 30 persons who live together in the same house. Their average family sizes are expected to be higher than the other. Therefore, the incidence of poverty is also high. Increase in family size increase the vulnerability of households to changes in economic conditions. Single family with less than four has high opportunity to outreach the poverty (Figure 5.7).

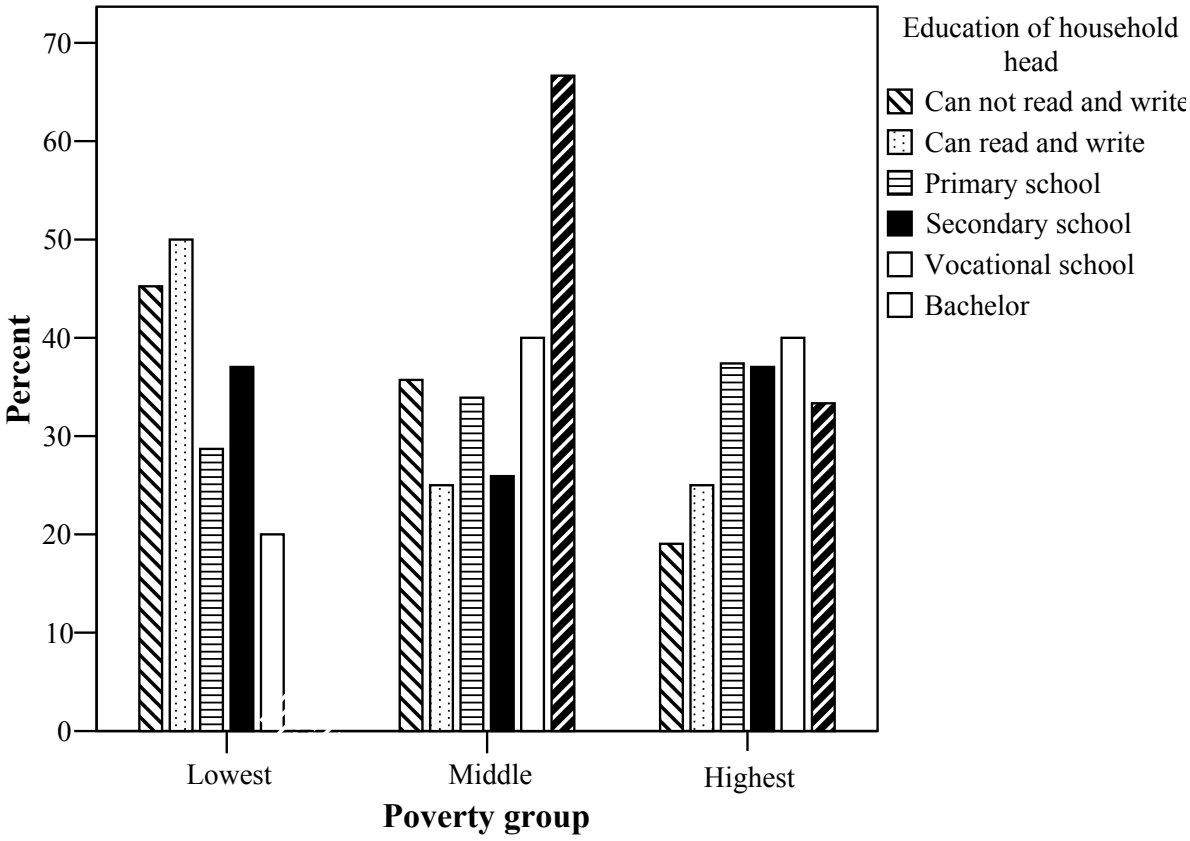
Figure 5.7 Comparison of Poverty Group and Family Size in Percent



Source: Own survey (2004)

Educational attainment is the next attribute that differed significantly between the poor and nearly poor. Around half of northern household head completed primary school. Households headed by an illiterate person are most likely to be poor. From figure 5.8, a quarter of household head has no education. Most of them are in the lowest rank group. While about 4 % of household heads had above secondary education are much less poor. Thus, higher education of household head contains less risk to be ranking in the poorest group.

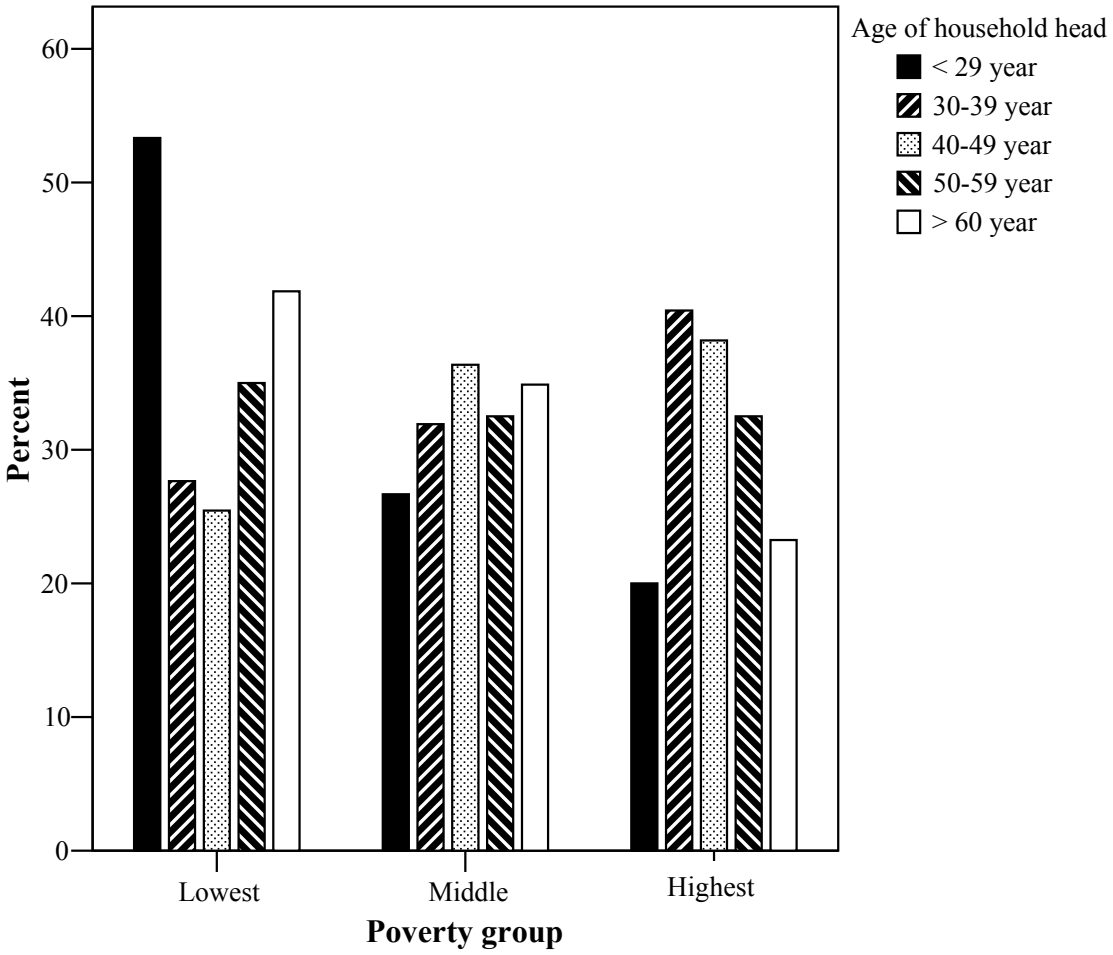
Figure 5.8 Comparison of Poverty Group and Education of Household Head in Percent



Source: Own survey (2004)

Another factor effect poverty of household is age of household head. The less poor is emerging within middle age group. In contrast to this, the larger proportion of poor households is headed by old age and young age. In Figure 5.9 it can be seen that the poverty is related to household head age below 29 years and above 60 years. Therefore, people living in households headed by elderly and youth suffer from the greater degree of poverty.

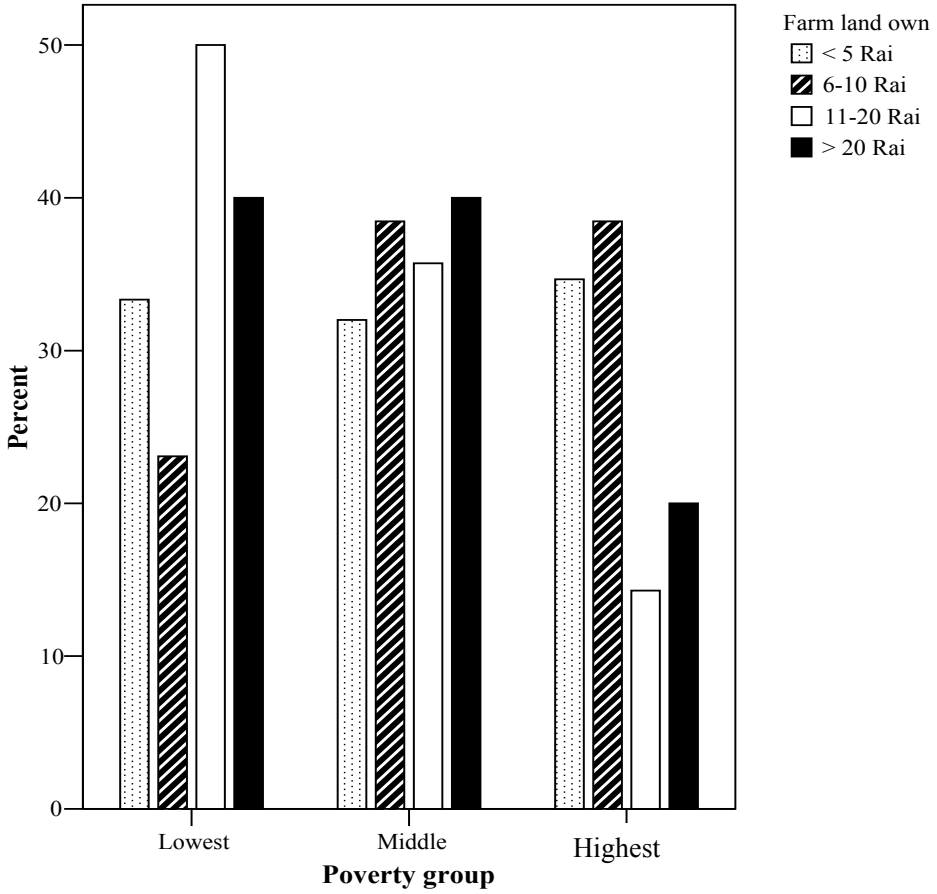
Figure 5.9 Comparison of Poverty Group and Age of Household Head in Percent



Source: Own survey (2004)

An assets feature, farm land own, that do not appear to distinguish the poverty of household. With regard to farm land own, 75 % of household has very small land accounting for less than 5 rai. However, about 12 % of household that has large farm size still be below average poor. This finding contrasts with that in many other Thai research results where quantity farm land own of household is high-represented among the poor. The reason support this finding is that quantity of land own is one of many factors representing the wealth of household. Landholdings of household in research area are small because some farmer lost the land during the economic crisis in late 1990s. Besides, it depends on the productive of land, crop plant and particularly the type of land certificate. (Figure 5.10)

Figure 5.10 Comparison of Poverty and Quantity of Farm Land Own in Percent



Source: Own survey (2004)

Note: 1 Rai = 1,600 m^2

5.6 Summary of Important Findings

In conclusion, measuring poverty is manifested not just by one dimension. Selecting appropriate poverty indicators is most important, particularly as they must reflect the country's local conditions. As for Thailand's rural north, poverty is not only determined by inadequate food security, but also by a lack of opportunities for higher education, lack of productive assets to create income, poor dwelling conditions and degraded environment.

Almost all of the poor households in the nine sample villages are involved in agriculture. The link between poverty and agriculture is further illustrated by the relationship between the household's socioeconomic status and ability to gain income. The below average poor group differ from the others in terms of human resources, food security, dwelling and assets. Poor households have

larger families, lower education, higher dependency ratios, poorer settlement conditions, fewer assets and lower self-reliance. The poorest group, which is far below the standardize poverty score should be the first priority group to be included in development planning.

The north of Thailand is among the poorest regions of the country. To a large extent the population belongs to ethnic minorities with few income sources. For this reason, this paper examines the status of rural household poverty in northern Thailand and identifies the relevant determinants. Data were collected in nine villages in Mae Rim district, Chiang Mai province. Principal component analysis (PCA) is utilized to determine the important factors explaining household poverty. Furthermore, a poverty index is developed. The explicit factors, relevant to assess poverty are the dwelling conditions, physical assets, human resources, and food security issues respectively. The factor, which can turn the poor become even poorer, is the human resource factor, where e.g. the number of dependents is comprised. The poverty comparison between farm households living in the highlands and lowlands found that Hmong households, which normally live in more mountainous regions, are relatively poorer than the so-called local northern households. This finding leads to the conclusion that factor analysis is very helpful in planning well-targeted and efficient poverty alleviation policies.

6 PARTICIPATORY RURAL APPRAISAL ANALYSIS OF LIVELIHOOD DIFFICULTIES OF FARM HOUSHOLDS

This chapter explores livelihoods, risk and risk management strategies of farm households in Northern Thailand. The so-called social learning and sustainable livelihood framework are applied to guide the analysis and interpretation of the qualitative data. Participatory Rural Appraisal (PRA) tools were conducted together with the sampled rural households in Pong Yang Nok village in Mae Rim district, Chiang Mai province.

The chapter is divided into four parts; first describe background of farm household risks. Second explain methodologies. Third present the empirical result of PRA. PRA is a data collection method that enables local people to share, enhance, and analyze their knowledge of life and conditions, to plan and to act. The PRA activities in this study comprised various activities such as a village walk, a village map, seasonal calendars, seasonal analysis, a Venn diagram, brainstorm and focus group discussions, time line, trend line matrix, fish bone diagram and wealth ranking. Finally, this chapter ends with the conclusion.

6.1 Background of Farm Household Risks

Poor rural households are constantly exposed to various risks and shocks that jeopardize their livelihoods and make them extremely vulnerable. Recurring shocks are causing vulnerability and keep people close to the poverty line or push the near-poor under the poverty line. The general mass poverty in Northern Thailand is synonymous with the definition of chronic poverty. Households face many forms of risks, among them covariate risks such as drought and heavy rainfall, but also idiosyncratic risks such as illness and death. These risks occur frequently, create financial pressures and affect directly their livelihoods.

A livelihood is sustainable when a household can cope with and recover from stress and shocks and maintain or enhance its capabilities and assets and provide sustainable livelihood opportunities for the next generation (Chambers and Conway, 1992). Obviously, rural households try to use a diversity of strategies to manage shocks. These may include borrowing, saving, selling productive and non-productive assets, and other forms of ‘self-insurance’, informal group-based risk sharing systems, and, occasionally, formal insurance. The literature on vulnerability and risk management differentiates in this context between adaptive risk strategies and risk coping strategies. While the former are quite effective, they are hardly available in rural areas. The latter are more frequently available; the effectiveness of these strategies is limited. This paper,

therefore, has the purpose to examine livelihood, risk and risk management strategies of farm household in northern Thailand and to understand the limitation of households in managing risks.

6.2 Methodologies

The research design is based on a multi-stage sampling procedure. Primary data were collected in nine villages in Mae Rim district, Chiang Mai province. Risk management strategies were approached form two directions: first from a participatory, qualitative angle and second from a quantitative direction.

The risk management analysis in first section is based on the methodology of participatory rural appraisal (PRA), which analyzes the livelihood, vulnerability and risks of Pong Yang Nok village. PRA is a data collection method that enables local people to share, enhance, and analyze their knowledge of life and conditions, to plan and to act. PRA can be an empowering device as local people are given a central role in the knowledge creation process. The information shared by rural people through PRA tends to be both valid and reliable (Chambers, 1992).

However, more recently critique is voiced about possible distortions and uncertainty of the PRA results. To avoid these pitfalls, the PRA tools should be done in combination with quantitative methods because the quantitative results can be supported the PRA results and the researcher can cross check the validity of the results of PRA. Furthermore, in order to achieve reliable results within PRA activities, the participating groups should vary in gender, age, status, occupation and so on. Moreover, the voiced opinions should not be dominated by only some people in the group. Finally, everyone in the activities group should have equal rights to express the opinion or participate.

The PRA activities comprised various activities such as a village walk, a village map, seasonal calendars, seasonal analysis, a Venn diagram, brainstorm and focus group discussions, time line, trend line matrix, fish bone diagram and wealth ranking.

The quantitative analysis of risk management is based on 200 structured questionnaires that were collected in nine villages: 1) Pong Yang Nai, 2) Pong Yang Nok, 3) Muang Kam, 4) Kong Hae, 5) Pong Krai, 6) Mae Sa Mai, 7) Buak Chan, 8) Pang Lung-Buak Toey and 9) Pha Nok Kok. Descriptive statistics were used to identify risks and risk strategies of individual household.

6.3 Empirical Results of Participatory Rural Appraisal of Farm Households' Livelihood in Northern Thailand

This section presents the results of the qualitative data analysis. The result of PRA presents the case study of Ban Pong Yang Nok village, which is one of nine villages in the research area. The activities were held during the field research from March to October 2004.

6.3.1 Village Walk: General Information Gathering

The first collective and participatory activity conducted in the village was the village walk. By walking through the village, important resources and meeting places available to the village could be pointed out. Some structures of importance mentioned by the villagers were the temple, school, hill tribe foundation, post office, local market stalls, health centre, shops and so forth. The religion of most villagers is Buddhism. The village walks as an activity that also served as introduction to the villagers, thus building up some mutual trust.

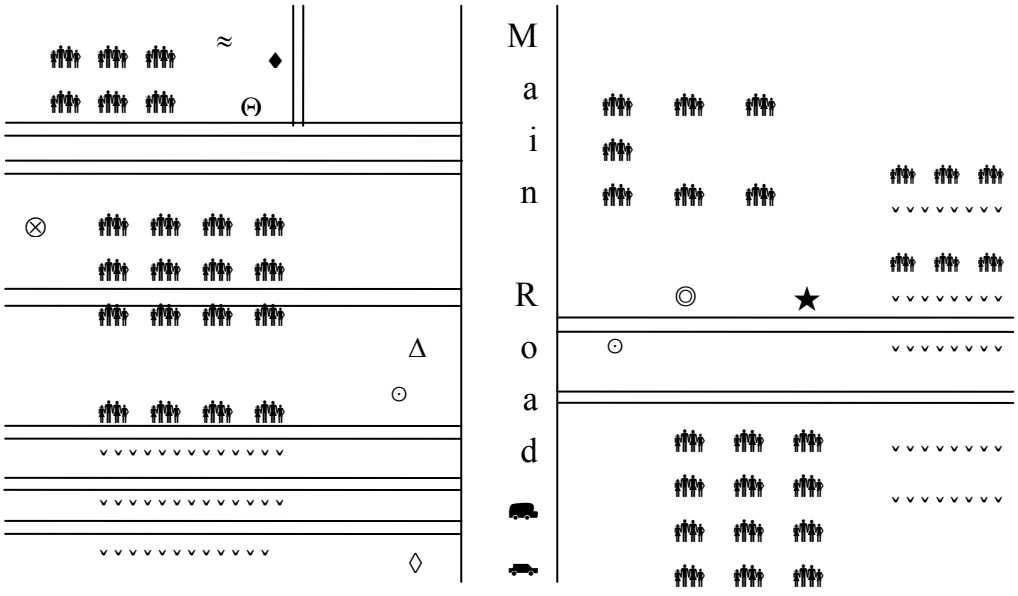
Economic activities practiced in the area are mainly farm-related, producing mainly sweet pepper, chrysanthemum, chayote, egg plant, litchi, peanut, sweet potato and so on. Non-farm activities include motorcycle repairing, cloth sewing, small-scale pond fishing, and small-scale trading in food and households goods. There were resorts in the area that could provide regular non-farm wage employment and contributed to the development of the area. The market was held close to the villagers, which was the center of trading farm household product and livestock.

6.3.2 Village Map: Village Resources and Agriculture Area

Figure 3.1 depicts the map of the most important Pong Yang Nok village structures that had been pointed out during the village walk. Most of the villagers were involved in growing sweet pepper and chrysanthemum flower and therefore, plastic nursery stations were predominant. Both crops create substantial income to villagers. The village headman's house was a regular meeting place where villagers could come together on a daily basis.

There were several small roads passing through the village. Public transport vehicles pass through the village's main road. Most of the roads in this region are either dirt roads or paved roads (Figure 6.1).

Figure 6.1 Ban Pong Yang Nok's Village Map Derived From PRA Activities



Source: Own survey (2004)

Note: House, ⊙ School, Δ Temple, ◎Post office, ★Village headman house, ◊ Tambon administration , ˇ Crop field, ⊗ Resort, Θ Hill tribe foundation, ♦ Nong Hoi royal project, ≈ Watershed management unit

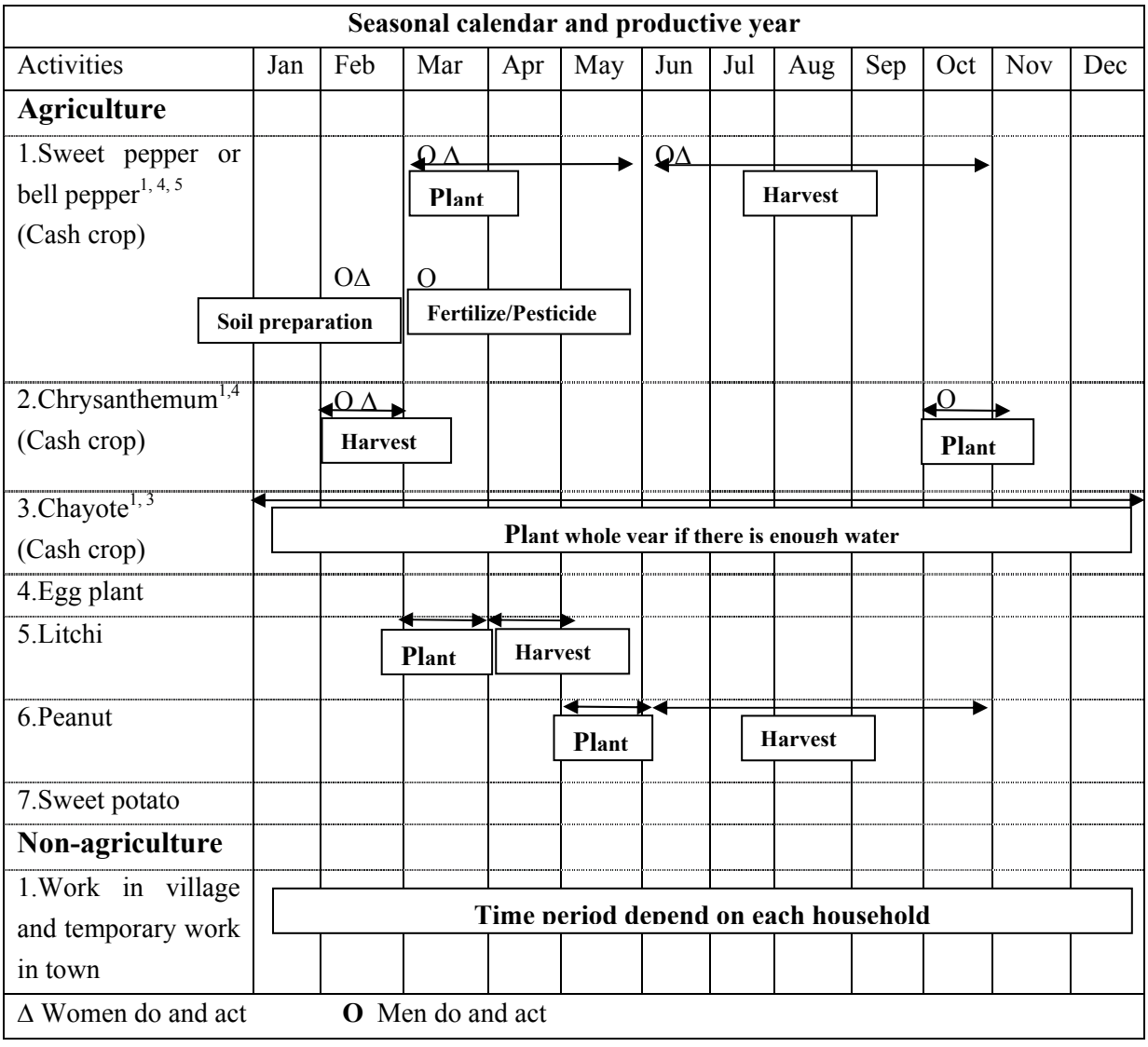
6.3.3 Seasonal Calendars: Agricultural Season

Seasonal calendars (Table 6.1) were prepared together with representatives of the village to show what kind of farm and non-farm economic activities were carried out. The villagers listed crops that they grew and in which season these were planted and indicated when they were harvested. The raining season runs from May to October. The planting cycle depends on the crop, for example, sweet pepper is planted from March till May, and Chrysanthemum flower in October. Generally, farmers work all year around as they are in debt. There is no explicit gender differentiation for farm and non-farm activities. They do the same activities such as planting, weeding, fertilizing and harvesting. Non-farm economic activities can run throughout the year.

Sweet pepper is the most important crop because it is a cash crop and its price is high. Planting period is between March and May and harvesting from June to October. Chrysanthemum flower is the next popular crop for this village. Farmer will circulate to cut it every four months. It is high income creating crop but it can not be sold in full because of market seeking. Another high income creating crop is Chayote. It is planted widely and is a low investment crop.

Elderly and child labors are most employed in this crop. It can be planted all year around but it must have enough water. After one month, households can harvest its leave to sell. After four months, its fruit can be sold. There are alternative crops such as Litchi, peanut, egg plant and sweet potato. Litchi are planted in March and harvested in April 2004. Peanut can plant on May and after 45 days can be harvested.

Table 6.1 Seasonal Calendar and Productive Year Classified by Activities of Pong Yang Nok Village



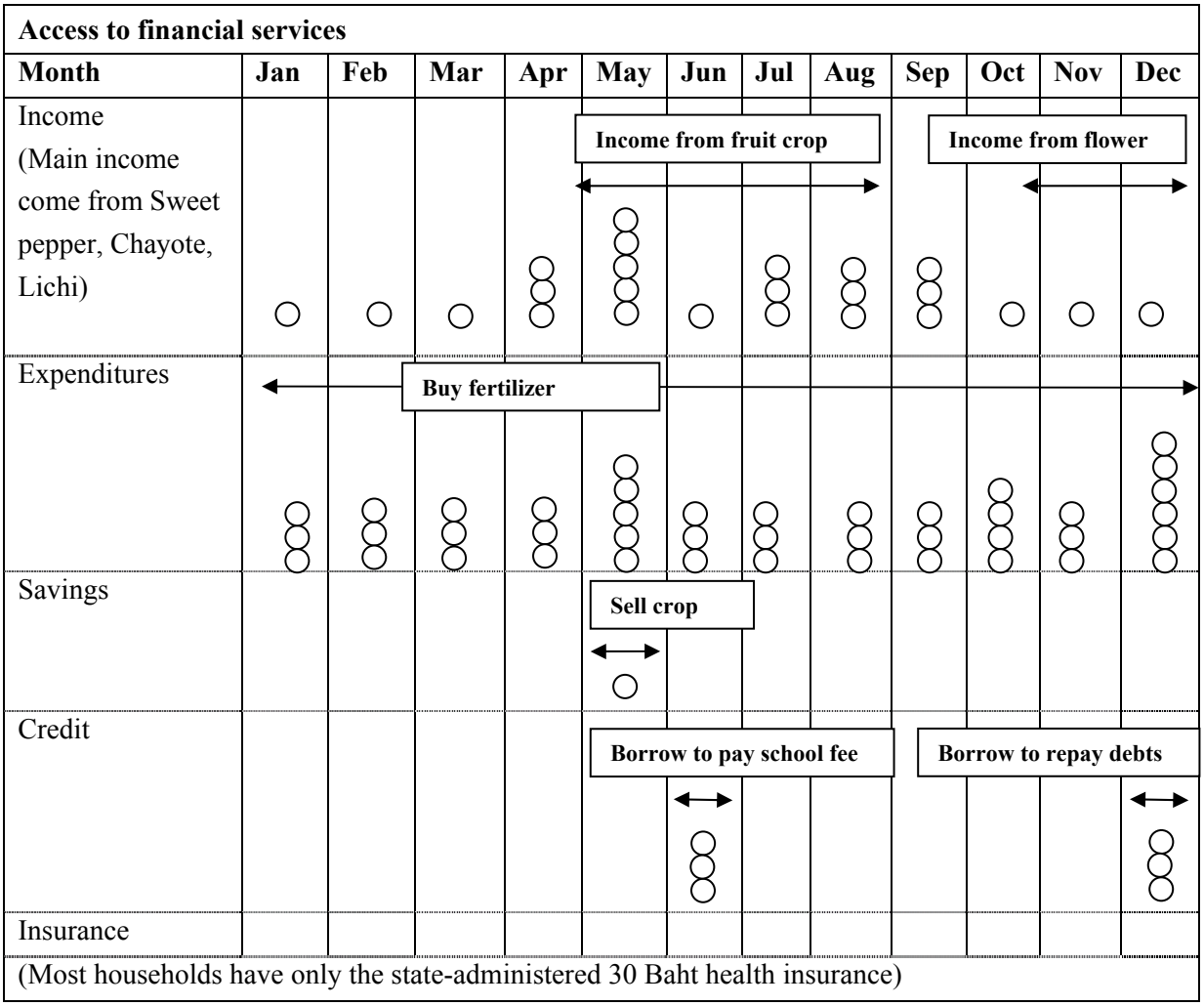
Source: Own survey (2004)

Note: 1. High income creating crop
2. High investment crop
3. Widely planted and low investment crop. Elderly and child labors are most employed in this crop.
4. Production loss when it can not all sold.
5. High price crop

6.3.4 Seasonal Analysis: Agricultural Activities

The seasonal analysis tries to describe certain activity variations according to the different seasons. These situations include, labor demand, income, expenditure, credit demand and saving. The seasonal analysis, also referred to as seasonal calendar, is a PRA tool used to explore changes that occur throughout the year. The result of a seasonal analysis is given in Table 6.2. This calendar shows the different livelihood activities that are undertaken at various times of the year. Main household income is from Chayote, sweet pepper and litchi. The income flow reaches a peak in May. Households have to manage difficulties due to small income for eight months in a year. Households have the highest expenditure phases in December and May respectively. This is the result of high demand for credit in June and December and no cash-saving among household.

Table 6.2 Seasonal Analysis of Household Income, Expenditure, Borrowing and Saving in Pong Yang Nok Village



Source: Own survey (2004)

Note: Scores ranked from 5 (high) to 1 (low).

Many households encounter difficulties when seasonal income is below their expenditures. Some villagers solve these difficulties by asking for credit from informal and formal sources. It is effective for temporary problem solving. When the difficulties occur again, they have to ask for more credit and the debt accumulates.

Another seasonal analysis is on festivals or rural activities. Participating in festivals is important to households. It shows the level of contribution between households, social networks and the income creating period. The festival which has the most numerous participants in each year is Song kran and Yi Peng festival. The most important festival to community is Song kran festival or Thai New Year in April, which is the time when family members who are employed outside the village will come back home to join together. It stimulates both inflow and outflow of money. Next is the Yi Peng festival which motivates high inflow of money to villagers in November (Table 6.3).

Table 6.3 Seasonal Analysis of Circular Flow of Money in Relation to Important Cultural Festivals in Pong Yang Nok Village

Festival	Note	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Flower festival	2		/										
Songkran	1,2,3,4				/								
Khao Phansa								/					
Ok Phansa											/		
Yi Peng	1, 2											/	

Source: Own survey (2004)

Note: 1 is there are many villagers participate in this festival.

2 is the festival which make inflow money to villagers.

3 is the festival which make outflow money of villagers.

4 is the important festival which have meaning to villagers.

- Flower festival is the annual festival which shows plenty type of flower.

- Songkran festival is the ancient New Year's Day. Now the official New Year's Day is on the 1st January. But the most popular festival is still Songkran.

- Khao Phansa festival is the beginning of Buddhist Lent. This day is a Buddhist public holiday. It is the beginning of the Buddhist rain retreat which last three months. During this period monks are not allowed to sleep outside their temple. Thai people buy big candles and offer them to temples.

- Ok Phansa festival is the end of Buddhist lent. Monks are allowed to go out of temples. Thai people choose temples everywhere in Thailand and bring there clothes, food for the monks.

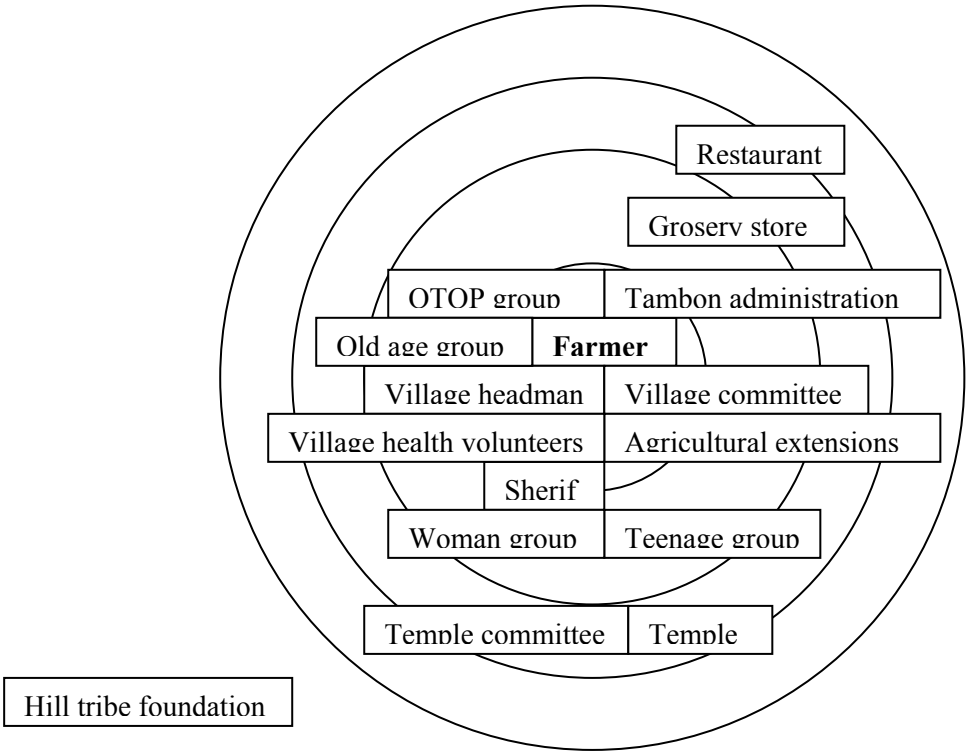
- Yi Peng Loi Khom festival is the traditional practice of Chiang Mai. Traditional belief has it that when these huge hot air balloons are set adrift and float away, so do the troubles of the persons who launched the balloon.

6.3.5 Venn Diagram: Institutions and Organizations

As expressed, the Venn diagram was applied to find out what internal activities were carried out in the village and whether they were involved with outside institutions. There are several groups in which households interacted. The closer the circle the more important it is. The wider the circle represented the smaller diminishing importance. The centre sphere represented the villager of Pok Yang Nok. Circles placed closer to the sphere represented more interaction with the villager than those placed further from the centre (Figure 6.2).

The village headmen (named 'Kamnan' in Thai), the village committee and government officers such as subdistrict or Tambon administration, sheriff, agricultural extension worker, and village health volunteers are important to villagers to help them when they face problems. There exist many groups in the village, for instance, the One Tambon One Product (OTOP) group, old age group, woman group, and teenage group. Most people in the village attend these groups for recreation, socialization and income creating. OTOP group started off successfully but became disabled when members business loss. However, villagers still continue their group. Women group was active because women involved in organizing activities and preparing food for village activities. Non-governmental organizations (NGOs) were not present in the village and did not play any role in the lives of the villagers at that time.

Figure 6.2 Venn Diagram of Institutions and Organizations in Pong Yang Nok Village



Source: Own survey from group discussion with villager (2004)

6.3.6 Focus Group Discussion: Local Perspectives of Vulnerability

Focus group discussions were organized about the history of important events related to vulnerability of livelihood. Many shocks were mentioned by the villagers that affected their livelihood vulnerability and the employed livelihood strategies in the study area. These include:

Drought: A natural disaster such as a drought (normally a covariate risk) is always a serious problem. A short drought period was experienced in 2003.

Flood: In 2001, the Pong Yang Nok villagers have suffered from a flood. Almost all crops were damaged. Only little of the harvest could be brought home. The villagers thought that the problem was caused by forest clearing for agricultural activities. This also might increase insects that damaged the agricultural products and then caused farmer to use more insecticides leading to higher production expenditures.

Hail: In 1999 villagers were exposed to hail that had caused damage to flower and sweet pepper's nursery buildings.

Low (high variability of) producer prices: In 2001, the litchi price was high (up to 50 Baht/kg or 1.3 US$/kg), however now the price is only 10 Baht/kg (0.3 US$/kg). This has affected the household income who planted litchi.

Drug problem: During 1997-2001, the opium problem increased and spread in the village. This was reflected by households and the community. However, this problem had been solved by government through many approaches such as the elimination of the opium planting area, the provision of Royal project, etc.

In order to solve the drug problem, a balanced approach to reduce demand and supply has been launched as the main guideline for implementation. To reduce supply, two measures, one on law enforcement and another on crop control, were laid down to stop the availability of drugs. The most significant work on supply reduction is the reduction of land used for opium poppy cultivation. It has been carried out by following the Royal Initiative of His Majesty the King to improve the living conditions of hill tribes, so that they stop growing opium poppy and have better lives. Thailand was able to reduce the opium poppy cultivation area from 8,776.64 hectares in 1984-1985 to 1,257.14 hectares in 2000-2002. As for demand reduction, two important measures on drug prevention and drug treatment and rehabilitation were created to prevent people from using drugs and to help cure drug addicts. Other supportive measures have also been set up, such as legal measures, international cooperation, asset forfeiture investigation, and human resource development.

Other problems: The villagers of Pong Yank Nok have encountered other problems such as exploitative trading with middleman, conflicts between villagers and forest officers, etc. All of these problems have affected the livelihoods of villagers.

To sum up, villagers have experienced several serious problems in the past that also worsened the conditions of their livelihoods.

6.3.7 Time Line: Event Affects Livelihoods of Farm Household

The time line analysis aims at documenting the important events that occurred in the village. Time lines try to include the local perspective vis-à-vis difficulties. Difficulties were listed as debts, no land rights, water shortage, expensive fertilizer, middleman problems and bad health (Table 6.4). The results are consistent with those reported in the section above.

Table 6.4 Historic Time Line in Pong Yang Nok Village

Year	Situation
2004	**Debt severity**
2003	**Drought and water shortage**
	Low crop production
	High fertilizer price
	Debt problem
2001	**Heavy rainfall and flood**
	Crop loss
1997-2001	**Mad drug problem and health problem**
1997	**Economics crisis**

Source: Own survey (2004)

6.3.8 Trend Line Matrix: Problem Existed in Village

The villagers completed a trend line matrix to discuss the way in which problems had changed since the village's beginnings in the area. They first listed all the problems that they faced in the past. They also indicated the severity of those problems in each period. The score five represents a severe problem and zero means no problem. The villagers ranked the value of various problems by placing stones on the respective squares. This method was particularly helpful in getting achieving the participation of the entire group. The more stones placed on the squares, the more important the problem.

As can be seen from Table 6.5, the study group felt that land rights and middleman problems have been consistent over the past 10 years. These problems were not as severe in the past as they have become in the present. Interestingly, it was reported that ten year ago, the debt problem was not severe in village. However, it has become difficult to handle since 2004 and has been given a score of five by the villagers. The increasing fertilizer price is also seen as a high priority problem as it directly causes income degeneration. The next problem that exists is related to the use of forest land for agriculture. The Forest Department officer protects the area by not allowing villagers to do agricultural activities in this area, which causes conflicts between them. Drought issue becomes significant for agriculture because of irregular rainfall.

Table 6.5 Trend Line Matrix on Recursive Stress in Pong Yang Nok Village

Year	This year	Last year	Last 5 year	Last 10 year
Problem	**2004**	**2003**	**1998-2002**	**1988-98**
Debt	**5**	**4**	**2**	**0**
Land rights	**4**	**4**	**2**	**1**
Lack of water (Drought)	**4**	**4**	**1**	**0**
Expensive fertilizer	**5**	**3**	**2**	**0**
Middleman	**3**	**3**	**2**	**1**

Source: Own survey (2004)

Note: Scores ranked from 5 (high) to 1 (low)

After the above exercise was completed, villagers had become more aware of their main problems. Then, the same problems were ranked using a ranking matrix to determine the order of problems. The problems are ranked according to different categories: number of people who were affected, the urgency of the problem to be solved, their effect on future development of village, the importance of it when compared to other problems (Table 6.6). The villagers have to give a score from 0 (no severe problem) to 5 (severe problem). Then, the number of entries for each row is counted. The problems mentioned the most on the chart is ranked first and so on.

Table 6.6 Ranking and Matrix of Pong Yang Nok Village Problem

Problem/The solving priority	Number of people were effected (5)	Severity/urgent problem to be solved (5)	Effect on future development (5)	The importance when compare to other risk (5)	Total score (20)
1.Debt	OOOOO 5	OOOOO 5	OOOOO 5	OOOOO 5	20
2.Land rights	OOOOO 5	OOOOO 5	OOOOO 5	OOOO 4	19
3.Drought and no water for farm	OOOO 4	OOOOO 5	OOOOO 5	OOO 3	17
4.Higer fertilizer price	OOOOO 5	OOOOO 5	OOOOO 5	OO 2	17
5.Middleman problem	OOOO 4	OOOOO 5	OOOOO 5	O 1	15

Source: Own survey (2004)

Note: Scores ranked from 5 (high) to 1 (low)

Table 6.6 illustrates that debt and land right problems have a high total score of 20 and 19 respectively. The issues of water shortage and fertilization price have the same score at 17.

After that, ranking of village problem has been done in order to rank the importance of problems and cross check that villagers face these problems. It found that villagers also face health problem (Table 6.7).

Table 6.7 Ranking Key Difficulties of Villagers in Pong Yang Nok Village

Difficulties or risk	Risk	Ranking
Middleman offer low production price to farmers		5
Fertilizer price increase sharply (500 Baht to 630 Baht)	/	4
Drought and scarcity of water for agriculture	/	3
Land problem, no land rights		2
Debt (the consequence of risk)		1
Sickness of family members	/	6

Source: Own survey (2004)

Note : Scores ranked from 5 (high) to 1 (low)

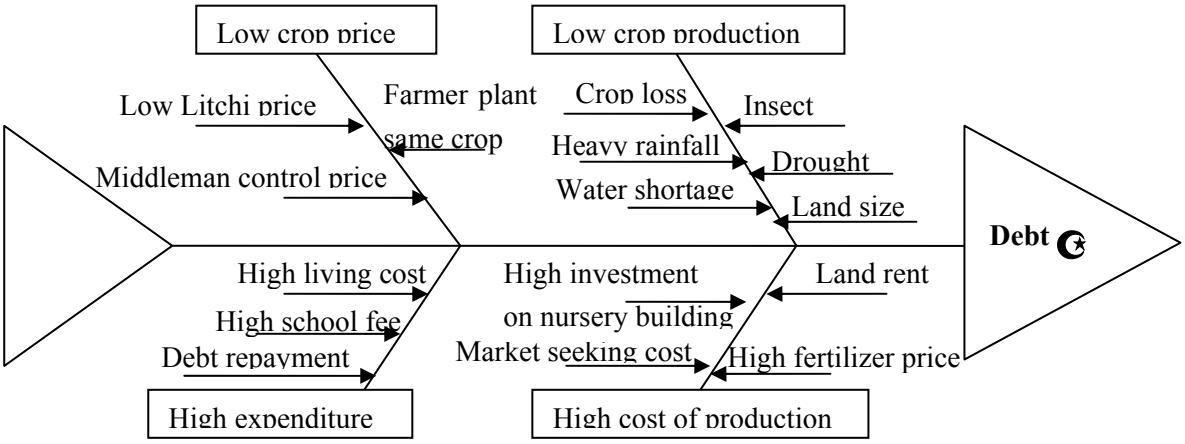
6.3.9 Fish Bone Diagram: Cause and Effect of Difficulties

The Fishbone Diagram can be very helpful in examining risks or difficulties, their causes and effects, barriers to recovery and strategies of farm households (Figure 6.3). There were 20 participants in this participatory tool. Many livelihood difficulties were mentioned, such as droughts, high factor prices, low productivity, debt, and the burden of school fees.

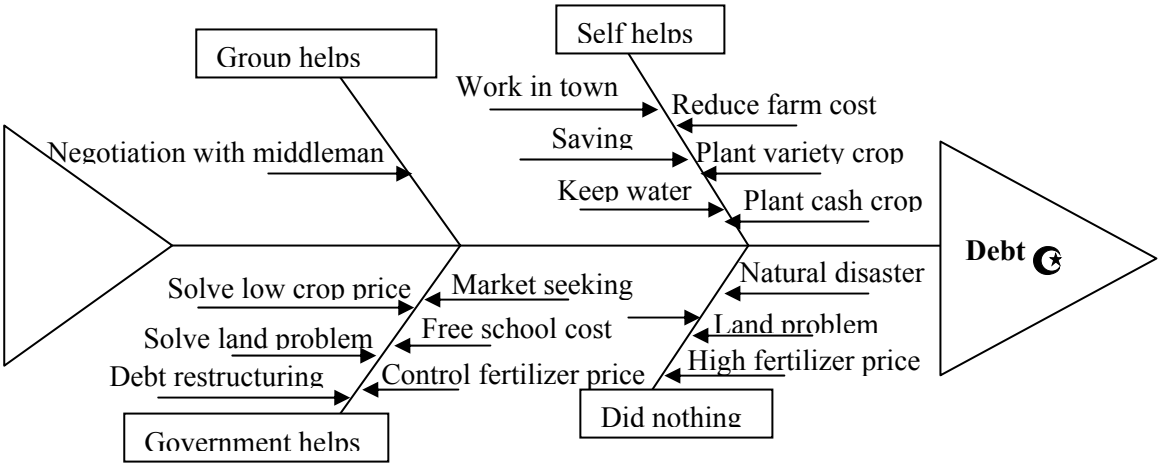
The villagers were asked to identify and present the most important livelihood difficulties and their causes. In order to solve the problem, all of the causes need to be identified. The causes of debts come from small harvests, combined with high production costs and declining product prices. In response to government's encouragement to grow cash crops, farmers switched from sustainable farming to mass production, which failed miserably a couple of years later. The resulting mounting debts have crippled the farmers. Moreover, households have to borrow for expenditures such as school fees and agricultural investments. The main sources of loan are the Village Fund, the Urban Communities Program, agricultural cooperatives and the Bank of Agriculture and Cooperatives (BAAC). Almost all of villagers borrow from the Village Fund and Urban Communities Program.

Figure 6.3 Fish Bone Diagram For Analysis of Cause and Solution of Difficulties of Villagers in Pong Yang Nok Village

Cause



Solution



Source: Own survey (2004)

The role of the community in solving problems is low. Villagers expect little from group-negotiation with middlemen because most of farmers rely on middleman and they plant the same crops. So, negotiation power is very low. Villagers expect very much from the government in solving many problems such as crop price, input price control, school fee, and so on. Problems which they think can not be solved are crop loss from natural disaster. Most of villagers try to help themselves by saving, reducing farm expenses, diversifying employment, farm restructuring through varying crop planting, and solving the water shortage problem.

6.3.10 Wealth Ranking: Current Status of Household

Within is participatory activity, the households' ranked other households in terms of who is better-off and they explained the characteristics of the rich and the poor. Households thought that the poor has no land, no house or live in the very small house with small number of furniture. Some poor sleep on the ground without bed in their house. The poor has low consumption but they have high debt and some can not access to health insurance (Table 6.8).

Table 6.8 Wealth Ranking: Current Status of Household in Pong Yang Nok Village

Wealth Levels	Characteristics			
	Housing	Consumption	Physical Assets	Health
High	Beautiful and large house.	Have cash to purchase food everyday.	Have high saving and assets.	Have many cards and have alternative choice to private hospital.
Medium	Smaller house	Have cash to purchase food.	Have some saving and assets	Use 30 Baht health insurance card. Some use social security card.
Low	Landless, no house, live with relatives or small house.	Find vegetable from the villager's fence, have basic consumption.	Debt severity, no assets	No access to health card or some use 30 Baht health insurance card.

Source: Own survey (2004)

6.4 Summary of Important Findings

Results of the PRA showed that the most pressing problem plaguing households is their debt. Households try to honor their debt repayment obligations, but it appears that the frequent occurrence of income shocks and their low risk management capacities obstruct them. Land issues relate to the second most important problem area. Often, farm households lack sufficient land and have land certificate problems. Another pressing problem influencing households' livelihoods negatively are droughts, which lead to water shortage, higher fertilizer price and middleman problems. The result gave an overview of all livelihood problems; it concentrated on livelihood shocks related to idiosyncratic and covariate risks. One idiosyncratic risk of main importance to this result is bad health.

The difference between the Hmong hill tribe and the local northern tribe is that Hmong are poor not only in physical assets, but also lack other issues such as human resources and have a high health risk incidence.

On the one hand, some local northern households are not being identified to be poor in the dimension of dwelling and physical assets but they fall into the vulnerable group. These households are disguised poor. Although they have a house and transportation assets, they have to borrow money to buy these assets and spend money to cope with their agricultural production loss. The PRA result shows that some of them have no land. They are indebted towards relatives, middlemen and formal financial institutions. Therefore, they have high debt severity.

All in all, both Hmong and local northern households can not escape from the vicious cycle because they have a very low capacity to cope with risks and manage their livelihood system. Therefore, these rural households should not be neglected in rural development policies. The policy should be drafted to serve in the macro level to cover all of these ethnic groups.

7 ANALYTICAL AND EMPIRICAL RESULTS ON RISK AND RISK MANAGEMENT OF FARM HOUSHOLDS

The existence of risk significantly affects people's life. Risk creates uncertainty, which in turn influences people in making their decision. Risk also makes individuals face some probability to experience income shocks. An income shock could make some people's income fall below the poverty line. In other words, risk makes some individuals vulnerable to poverty.

This section presents the significance of risk to the low income individuals, and the mechanisms available to manage it. The discussion is outlined as follows. Section 7.1 presents the exposure of risk. Section 7.2 discusses risk cost. Section 7.3 compares the incidence of risk by poverty status. Section 7.4 discusses the strategies the poor apply to manage risk. Finally, section 7.5 concludes the discussion. This section is based on the interview of 200 structured questionnaires. According to the questionnaire, households were asked about the exposure to risks in different time period: during last five year, during the previous 12 months and risks, which household expect to encounter in the future. To have a better risk management, it is important to analysis risk and understands risk management of household.

7.1 Seasonal Risk Analysis of Farm Household

Most households experienced multiple shocks. More than a quarter of them reported experiencing two shocks during that time, and less than a tenth of them reported experiencing three or more shocks (Table 7.1).

The results of risk analysis, presented in Table 7.2, revealed the following five major types of bunched shocks:

(1) Natural risks, that is fire, local heavy rainfall, local heavy wind, damage of house and drought;
(2) Theft risks, that is theft of livestock, crop and consumer goods
(3) Economic risks or production risks, that is crop loss from weather, crop loss from insect, storage loss, low production price, low production, higher input factor price, death of chicken;
(4) Life-cycle risks or human risks, that is birth of son, birth of daughter, funeral costs, unemployment, sudden moving away of working family member and breaking ties, old age, death of other working family member, son is arrested in jail, risks of be cheated;
(5) Health risks such as prolonged sickness of household head, prolonged sickness of other working family member, chronic disease of household head, chronic disease of other family member, working

disability of household head, working disability of other family member, alcohol problems of household head, alcohol problems of other family member.

Table 7.1 Number of Household Encounter Different Risks in Different Time Period

Risk		Number of household facing risk
Last 5 years	1.First risk	200
	2.Second risk	68
	3.Third risk	9
Last year	1.First risk	200
	2.Second risk	61
	3.Third risk	7
Future	1.First risk	200
	2.Second risk	60
	3.Third risk	14

Source: Own survey (2004)

Shocks tend to hit in bunches. From the information shown, we can see that exactly half of bunch shocks are production risks, while health risks account for slightly more than a fifth. Human risks are the next biggest bunch, accounting for a fifth. Natural risks makes up a tenth of the overall shocks, and theft risks make up the remaining percentage. Given this, it can be deduced that natural, physical and financial risks account for more than half, which is a larger percentage than human and social risks.

Table 7.2 Frequency and Percentage of Risks Hit Household at Different Time Period

Year	1999-2002		2003-2004		Since 2005-	
Risks	Risks during last 5 year		Last year risks		Risks will occur in future	
	Number	Percent	Number	Percent	Number	Percent
1. Natural, physical and financial risks	152	*63.33*	142	*56.58*	137	*59.06*
1.1 Natural risks	27	**11.25**	26	**10.36**	34	**14.66**
Fire	1	0.42	1	0.40	0	0.00
Local heavy rainfall	10	4.17	11	4.38	19	8.19
Local heavy wind	3	1.25	3	1.20	2	0.86
Damage of house	1	0.42	1	0.40	0	0.00
Drought	12	5.00	10	3.98	13	5.60
1.2 Theft risks	2	**0.83**	1	**0.40**	0	**0.00**
Theft of livestock	1	0.42	0	0.00	0	0.00
Theft of crops	1	0.42	0	0.00	0	0.00
Theft of consumer goods	0	0.00	1	0.40	0	0.00
1.3 Production risks	123	**51.25**	115	**45.82**	103	**44.40**
Crop loss (weather)	20	8.33	14	5.58	13	5.60
Crop loss (insect, plant disease)	51	21.25	43	17.13	34	14.66
Storage loss (pests)	0	0.00	1	0.40	1	0.43
Low production price	33	13.75	35	13.94	37	15.95
Low production	15	6.25	15	5.98	11	4.74
Higher input price	4	1.67	5	1.99	6	2.59
Death of chicken (bird flu)	0	0.00	2	0.80	1	0.43
2. Human and social risks	88	*36.66*	109	*43.43*	95	*40.95*
2.1 Human risks	38	**15.83**	52	**20.72**	49	**21.12**
Birth of son	2	0.83	6	2.39	6	2.59
Birth of daughter	23	9.58	34	13.55	35	15.09
Funeral costs	1	0.42	1	0.40	0	0.00
Unemployment	1	0.42	2	0.80	2	0.86
Sudden moving away of working family member &breaking ties(no money flow)	3	1.25	3	1.20	2	0.86
Old age	2	0.83	3	1.20	2	0.86
Death of other working family member	4	1.67	1	0.40	0	0.00
Other: Son is be arrested in jail	1	0.42	1	0.40	1	0.43
Other: To be cheated	1	0.42	1	0.40	1	0.43
2.2 Health risks	50	**20.83**	57	**22.71**	46	**19.83**
Prolonged sickness of household head	3	1.25	5	1.99	4	1.72
Prolonged sickness of other working family member	11	4.58	17	6.77	10	4.31
Chronic disease of household head	9	3.75	9	3.59	7	3.02
Chronic disease of other family member	17	7.08	16	6.37	17	7.33
Working disability (disease: malaria, flu)of household head	1	0.42	0	0.00	0	0.00
Working disability (accident)of other family member	1	0.42	1	0.40	0	0.00
Alcohol problems of household head	2	0.83	2	0.80	2	0.86
Alcohol problems of other family member	6	2.50	7	2.79	6	2.59
Total number of risks	**240**	100	**251**	100	**232**	100

Source: Own survey (2004)

Households reported experiencing 32 risks. The first top ten risks make up around 80%. The vast majority of risks are production risks, health risks and natural risks as shown in Table 7.3.

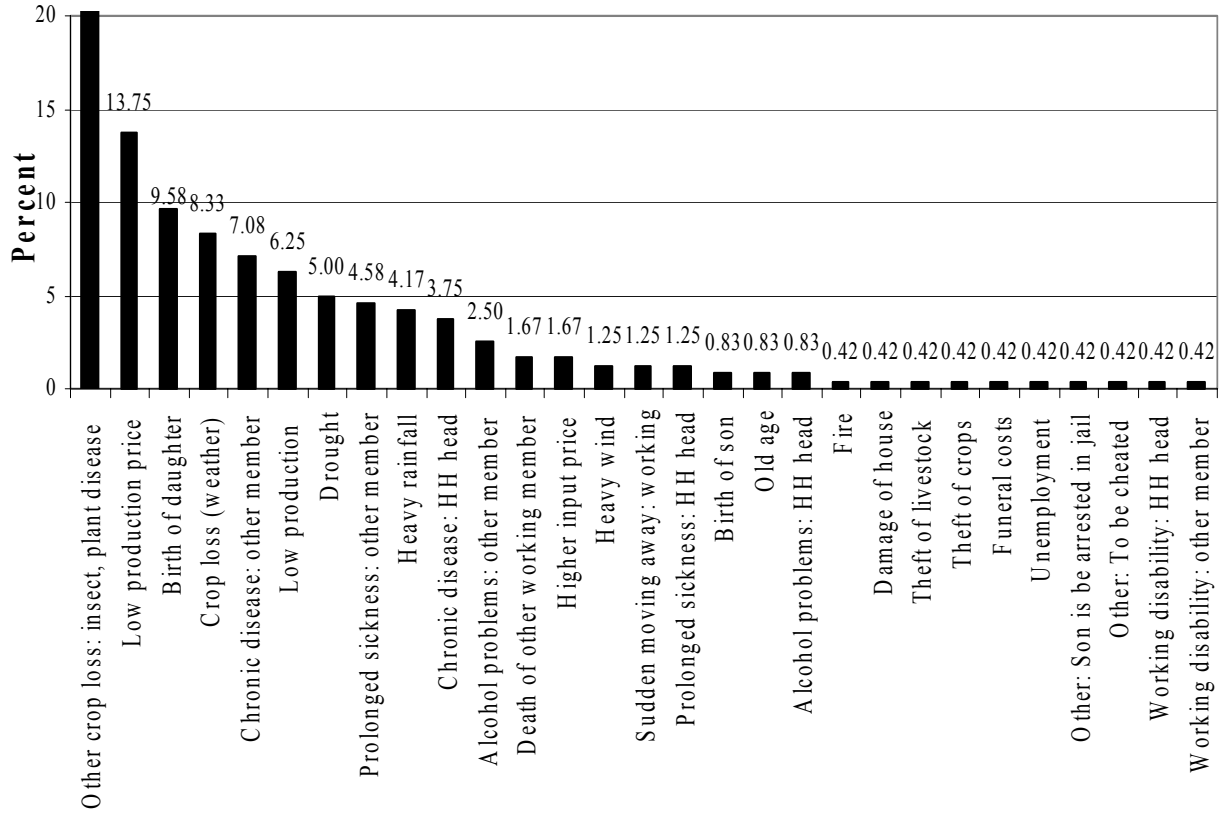
Table 7.3 Ranking Percentage of Most Occurred Risks

Risks	1999-2002	2003-2004	2005-
Crop loss: insect, plant disease	21.25	17.13	14.66
Low production price	13.75	13.94	15.95
Birth of daughter	9.58	13.55	15.09
Chronic disease of other family member	7.08	6.37	7.33
Crop loss: weather	8.33	5.58	5.60
Low production	6.25	5.98	4.74
Local heavy rainfall	4.17	4.38	8.19
Drought	5.00	3.98	5.60
Prolonged sickness of other working member	4.58	6.77	4.31
Chronic disease of household head	3.75	3.59	3.02
Total percentage of top ten risks	**83.74**	**81.27**	**84.49**
Alcohol problems of other family member	2.50	2.79	2.59
Higher input price	1.67	1.99	2.59
Birth of son	0.83	2.39	2.59
Prolonged sickness of household head	1.25	1.99	1.72
Local heavy wind	1.25	1.20	0.86
Sudden moving away of working family member	1.25	1.20	0.86
Old age	0.83	1.20	0.86
Alcohol problems of household head	0.83	0.80	0.86
Unemployment	0.42	0.80	0.86
Death of other working family member	1.67	0.40	0.00
Other: Son is arrested in jail	0.42	0.40	0.43
Other: To be cheated	0.42	0.40	0.43
Death of chicken (bird flu)	0.00	0.80	0.43
Storage loss (pests)	0.00	0.40	0.43
Fire	0.42	0.40	0.00
Damage of house	0.42	0.40	0.00
Funeral costs	0.42	0.40	0.00
Working disability (accident)of other family member	0.42	0.40	0.00
Working disability (disease: malaria, flu)of household head	0.42	0.00	0.00
Theft of livestock	0.42	0.00	0.00
Theft of crops	0.42	0.00	0.00
Theft of consumer goods	0.00	0.40	0.00
	100.00	100.00	100.00

Source: Own survey (2004)

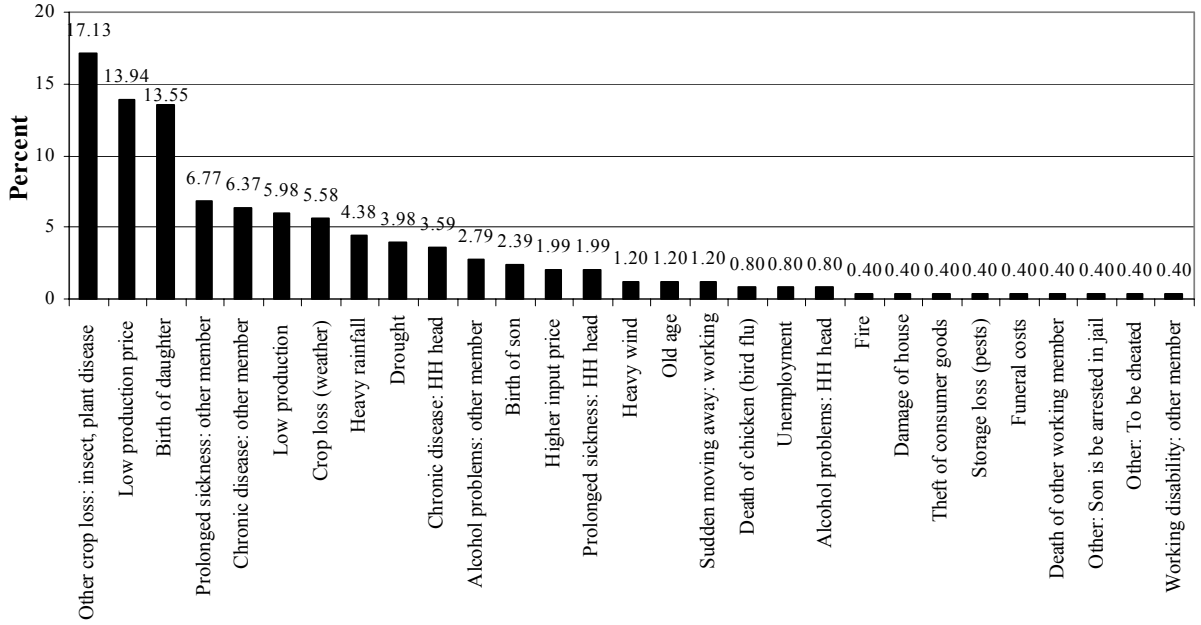
After analyzing what risks hit households, the risks are ranked in order. Figure 7.1 to 7.3 illustrate the percentage of risks that occurred to farm households. Crop loss from insects, low production price and birth of daughter are the most risks hit household in each period. The risks hit households are completely different in each period, for example, the fourth risks occurred to households during last 5 year and last year were crop loss from weather and prolonged sickness of other member respectively.

Figure 7.1 Percentage of Risk Hitting Households During Last Five Years (1999-2002)



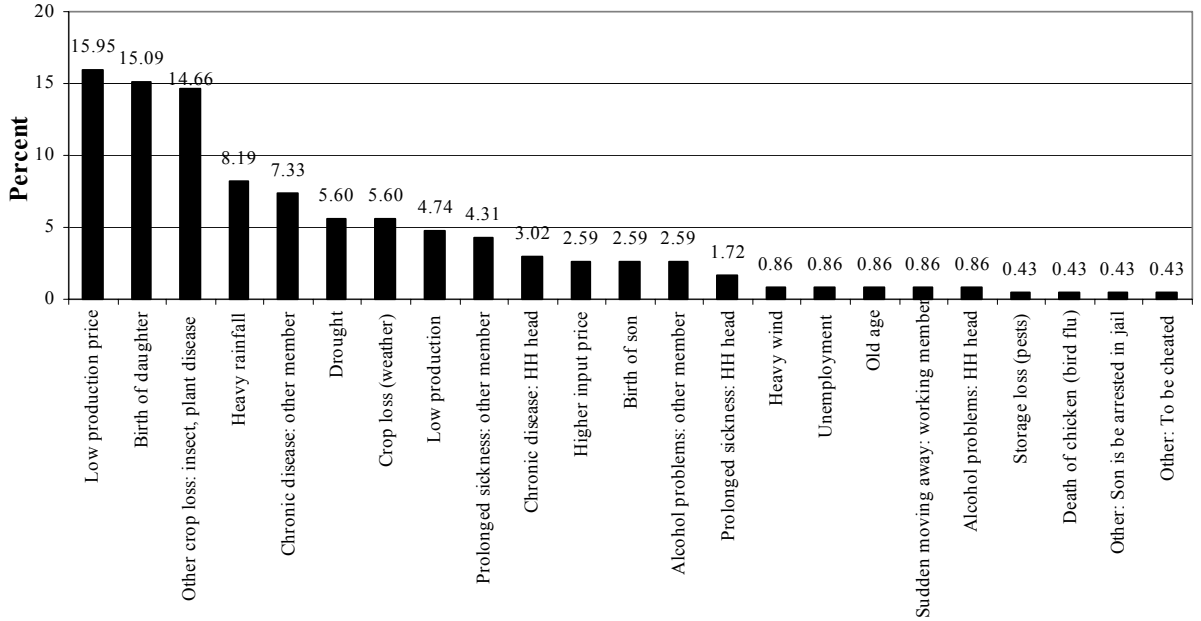
Source: Own survey (2004)

Figure 7.2 Percentage of Risks Hitting Households During Previous 12 Months (2003-2004)



Source: Own survey (2004)

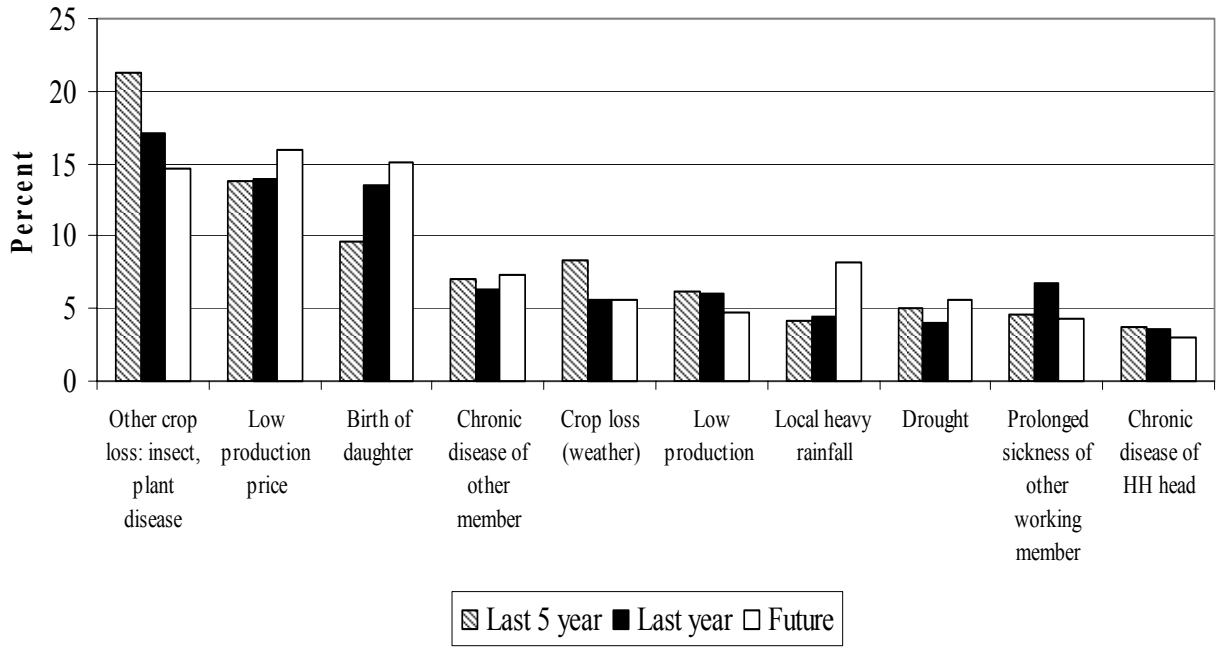
Figure 7.3 Percentage of Risk which Household Expected to Encounter in Future (Since 2005)



Source: Own survey (2004)

Continuing from the previous analysis, the top ten risks are selected to analysis. The bar chart compares the percentage of main risks at different time. Main risks are crop loss from insects and plant decease, low production prices and the birth of a daughter. Other risks such as chronic disease of other member, crop loss from weather, low production, and local heavy rainfall are also important, however with a low percentage when compared to the first three risks. The corresponding decline in crop loss from insect and plant decease from being the most important risk in last five year to less important risk in the future, and the growing the difficulties in manage the birth of daughter become more important between past and future (Figure 7.4).

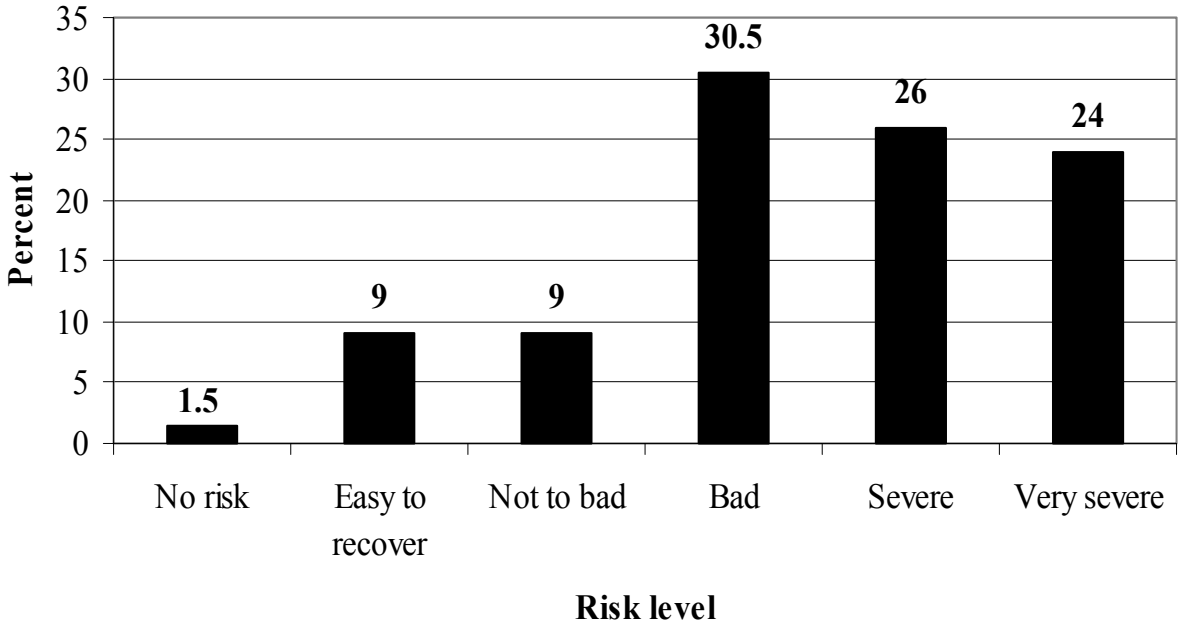
Figure 7.4 Comparison of the Percentage of Main Risks at Different Time Period



Source: Own survey (2004)

In the analysis of risk levels, shocks are classified by the severity of them on household. The results in Figure 7.5 have shown that slightly more than 80% of households experienced badly to very severe risks. Over 30.5% of the risks that hit households fell into the category bad. Risks ranking level, which are not too bad and easy to recover, have the same percentage at 9% and 1.5% reported no risk.

Figure 7.5 Ranking the Percentage of Risk Level



Source: own calculation.

7.2 Analysis of Costs of Risk Management Which Affect Farm Households in Different Time Periods

The analytical cost of risk management gives the details of what risks most affect on household. If households spent a lot of money to manage risks, their income and wealth will probably go down. The effect of a decrease in wealth is to raise their unsustainable livelihood. Therefore, risks management cost analysis helps household to have a better understanding on how to manage them. In last five years, 46 risks were managed under the cost between 10,000-19,999 Baht (US$ 263-526). Next, 44 risks could be managed with an average cost of less than 5,000 Baht. Some household managed risks such as crop loss from insects and plant disease, crop loss from weather, local heavy rainfall with the highest cost of more than 100,000 Baht (US$ 2632) (Table 7.4).

Table 7.4 Risk Cost of Household in Last 5 Year (1999-2002)

Last 5 year risk cost (1999-2003)	Risk cost (Baht)													Total
	0	<5000	5000-9999	10000-19999	20000-29999	30000-39999	40000-49999	50000-59999	60000-69999	70000-79999	80000-89999	90000-99999	> 100000	
Fire	0	0	0	0	0	0	0	0	0	0	0	0	1	**1**
Local heavy rainfall	0	0	0	2	0	3	0	1	0	0	0	0	4	**10**
Local heavy wind	0	1	0	0	0	2	0	0	0	0	0	0	0	**3**
Damage of house	0	1	0	0	0	0	0	0	0	0	0	0	0	**1**
Theft of livestock	0	0	0	1	0	0	0	0	0	0	0	0	0	**1**
Theft of crops	0	1	0	0	0	0	0	0	0	0	0	0	0	**1**
Crop loss (weather)	0	1	4	4	4	1	1	1	0	0	0	0	4	**20**
Crop loss: insect, plant disease	4	9	7	9	8	5	2	1	0	0	1	0	5	**51**
Drought	3	4	0	1	1	1	0	0	1	0	0	0	1	**12**
Low production price	5	2	3	10	4	2	0	4	0	0	0	0	3	**33**
Low production	0	2	0	1	4	2	0	4	0	0	0	0	2	**15**
Higher input price	1	0	0	0	0	1	0	0	0	1	0	0	1	**4**
Birth of son	0	1	0	0	0	1	0	0	0	0	0	0	0	**2**
Birth of daughter	2	2	0	7	5	0	1	3	0	0	1	0	2	**23**
Funeral costs	0	0	0	0	0	0	0	1	0	0	0	0	0	**1**
Unemployment	0	0	1	0	0	0	0	0	0	0	0	0	0	**1**
Old age	0	2	0	0	0	0	0	0	0	0	0	0	0	**2**
Death of other working member	0	0	0	0	0	1	0	0	0	0	0	0	3	**4**
Prolonged sickness of household head	0	3	0	0	0	0	0	0	0	0	0	0	0	**3**
Prolonged sickness of other working member	1	3	2	3	0	1	0	0	1	0	0	0	0	**11**
Chronic disease of household head	1	5	1	2	0	0	0	0	0	0	0	0	0	**9**
Chronic disease of other family member	0	4	4	2	2	1	0	0	2	0	0	0	2	**17**
Working disability (disease: malaria, flu)of household head	0	1	0	0	0	0	0	0	0	0	0	0	0	**1**
Working disability (accident)of other family member	1	0	0	0	0	0	0	0	0	0	0	0	0	**1**
Alcohol problems of household head	0	0	0	2	0	0	0	0	0	0	0	0	0	**2**
Sudden moving away of working member	0	1	0	1	0	0	0	0	1	0	0	0	0	**3**
Other: Son in jail	0	0	0	0	0	1	0	0	0	0	0	0	0	**1**
Alcohol problems of other family member	2	1	0	1	0	0	0	1	0	0	0	0	1	**6**
Other: Be cheated	0	0	0	0	0	1	0	0	0	0	0	0	0	**1**
Total	**20**	**44**	**22**	**46**	**28**	**23**	**4**	**16**	**5**	**1**	**2**	**0**	**29**	**240**

Source: Own survey (2004)

According to Table 7.5, most of risks could be managed under low cost with less than 5,000 Baht (US$ 132) in the last year. Forty-seven risks, which affected households, could be managed with 20,000-29,999 Baht (US$ 526-789). Some households managed some risks with very high cost during the last five years.

Table 7.5 Risk Cost of Household in the Previous 12 Months (2003-2004)

Last year risk (2003-2004)	Risk cost (Baht)													
	0	< 5000	5000-9999	10000-19999	20000-29999	30000-39999	40000-49999	50000-59999	60000-69999	70000-79999	80000-89999	90000-99999	> 100000	Total
Fire	0	0	0	0	0	0	0	0	0	0	0	0	1	**1**
Local heavy rainfall	0	2	0	2	2	1	0	1	0	0	0	0	3	**11**
Local heavy wind	0	1	1	0	1	0	0	0	0	0	0	0	0	**3**
Damage of house	0	1	0	0	0	0	0	0	0	0	0	0	0	**1**
Theft of consumer goods	0	1	0	0	0	0	0	0	0	0	0	0	0	**1**
Crop loss (weather)	0	2	3	1	6	0	1	1	0	0	0	0	0	**14**
Crop loss(insect)	1	10	4	11	4	3	3	1	1	0	2	0	3	**43**
Storage loss (pests)	0	0	0	0	0	0	0	0	0	1	0	0	0	**1**
Drought	1	3	2	0	2	0	1	0	0	0	0	0	1	**10**
Low production price	9	1	4	9	5	0	1	3	0	1	1	0	1	**35**
Low production	0	1	0	0	6	0	0	4	0	0	1	0	3	**15**
Higher input price	0	1	0	0	2	1	0	0	0	1	0	0	0	**5**
Death of chicken	0	0	0	1	0	0	0	0	0	0	0	0	1	**2**
Birth of son	0	1	0	0	4	1	0	0	0	0	0	0	0	**6**
Birth of daughter	0	2	3	11	5	1	1	5	0	1	1	0	4	**34**
Funeral costs	0	1	0	0	0	0	0	0	0	0	0	0	0	**1**
Unemployment	0	0	2	0	0	0	0	0	0	0	0	0	0	**2**
Old age	0	3	0	0	0	0	0	0	0	0	0	0	0	**3**
Death of other working member	0	0	0	0	1	0	0	0	0	0	0	0	0	**1**
Prolonged sickness of household head	0	3	0	0	1	0	0	0	0	0	0	0	1	**5**
Prolonged sickness of other working member	2	8	2	2	2	0	0	0	1	0	0	0	0	**17**
Chronic disease of household head	1	7	1	0	0	0	0	0	0	0	0	0	0	**9**
Chronic disease of other family member	0	5	0	4	5	0	0	0	1	0	0	0	1	**16**
Working disability of other family member	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Alcohol problems of household head	0	0	1	0	0	0	0	0	0	0	0	0	0	**1**
Sudden moving away of working member	0	0	1	1	0	0	0	0	1	0	0	0	0	**3**
Other: Son in jail	0	0	0	0	1	0	0	0	0	0	0	0	0	**1**
Alcohol problems of household head	2	0	0	0	0	0	0	0	0	0	0	0	0	**2**
Alcohol problems of other family member	4	1	1	0	0	0	0	1	0	0	0	0	0	**7**
Other: Be cheated	0	0	1	0	0	0	0	0	0	0	0	0	0	**1**
Total	**20**	**54**	**26**	**42**	**47**	**7**	**7**	**16**	**4**	**4**	**5**	**0**	**19**	**251**

In Table 7.6 households depict their expectation on risks which they will face in the future and the cost of it. Households reported that they expect that they can handle most of risks under the budget around 10,000-19,999 Baht (US$ 263-526).

Table 7.6 Risk Cost Household Expect to Encounter in the Future (Since 2005)

Future risk cost	Risk cost (Baht)													Total
	0	<5000	5000-9999	10000-19999	20000-29999	30000-39999	40000-49999	50000-59999	60000-69999	70000-79999	80000-89999	90000-99999	> 100000	
Local heavy rainfall	1	0	0	1	3	1	0	4	1	0	0	0	8	**19**
Local heavy wind	0	0	1	0	0	1	0	0	0	0	0	0	0	**2**
Crop loss (weather)	2	2	0	3	3	0	1	0	0	0	0	0	2	**13**
Crop loss: insect, plant disease	1	6	3	12	2	4	3	0	0	0	1	0	2	**34**
Storage loss (pests)	0	0	0	0	0	0	0	1	0	0	0	0	0	**1**
Drought	3	4	1	0	1	1	1	0	0	0	0	0	2	**13**
Low production price	6	1	3	12	7	2	1	4	0	1	0	0	0	**37**
Low production	0	1	0	1	3	2	0	2	0	0	0	0	2	**11**
Higher input price	0	2	0	0	1	2	0	0	0	1	0	0	0	**6**
Death of chicken	0	0	0	0	0	0	0	0	0	0	0	0	1	**1**
Birth of son	0	0	1	0	3	2	0	0	0	0	0	0	0	**6**
Birth of daughter	2	4	2	11	5	3	0	2	0	1	0	0	5	**35**
Unemployment	0	0	1	1	0	0	0	0	0	0	0	0	0	**2**
Old age	0	2	0	0	0	0	0	0	0	0	0	0	0	**2**
Prolonged sickness of household head	0	3	0	0	0	0	0	0	0	0	0	0	1	**4**
Prolonged sickness of other member	2	4	1	2	0	1	0	0	0	0	0	0	0	**10**
Chronic disease of household head	1	5	1	0	0	0	0	0	0	0	0	0	0	**7**
Chronic disease of other member	1	3	1	7	3	1	0	0	1	0	0	0	0	**17**
Alcohol problems of household head	0	0	1	0	1	0	0	0	0	0	0	0	0	**2**
Alcohol problems of other member	2	1	1	0	0	0	0	1	0	0	0	0	1	**6**
Sudden moving away of working family member	0	1	0	1	0	0	0	0	0	0	0	0	0	**2**
Other: Son in jail	0	0	0	0	0	0	0	1	0	0	0	0	0	**1**
Other: Be cheated	0	0	0	0	1	0	0	0	0	0	0	0	0	**1**
Total	**21**	**39**	**17**	**51**	**33**	**20**	**6**	**15**	**2**	**3**	**1**	**0**	**24**	**232**

Source: Own survey (2004)

Risk cost in Table 7.7 is classified into three groups according to the average income per household adult per year, which is 33,000 Baht (US$ 868). In this part, it is assumed that households can support low risks if the cost is not more than half of their average income because they need to spare the other half of their income for other expenditure items. If the risks cost is beyond their average income, it is assumed to be a high risk because it is over their ability to manage them. Thus, the cost less than 10,000 Baht (US$ 263) is classified into low risk cost. Medium risk cost is between 10,000 and 39,999 Baht (US$ 263-1,053). The risks which need more than 40,000 Baht (US$ 1,053) to manage are defined as high risk cost. Among the shocks cost that households reported that they had expended in the previous 12 months, 100 risks are low risks, 96 risks are medium risks and 55 risks are high risks. Medium and high risk cost contains 60%.

The risks cost level is given the score as presented in Table 7.8. A low risk cost is given the score 1. A high risks cost has score 3. Then each risks cost level is multiplied by the score. It is apparent that the most costly risks are crop loss from insect and plant disease, birth of daughter, low production price, low production, chronic disease of other family member, crop loss from weather and local heavy rainfall.

Table 7.9 show that in last five years, there were no occurrence of risks such as death of chicken from bird flu, storage loss but since last year these risks had become more important.

Table 7.7 Analysis of Last Year Risk Cost

Last year risk	Risk cost											Total
(year 2003-2004)	0	< 5000	5000-9999	**Low**	10000-19999	20000-29999	30000-39999	**Medium**	40000-49999	> 50000	**High**	**risk**
Fire	0	0	0	**0**	0	0	0	**0**	0	1	**1**	1
Local heavy rainfall	0	2	0	**2**	2	2	1	**5**	0	4	**4**	11
Local heavy wind	0	1	1	**2**	0	1	0	**1**	0	0	**0**	3
Damage of house	0	1	0	**1**	0	0	0	**0**	0	0	**0**	1
Theft of consumer goods	0	1	0	**1**	0	0	0	**0**	0	0	**0**	1
Crop loss (weather)	0	2	3	**5**	1	6	0	**7**	1	1	**2**	14
Crop loss: insect, plant disease	1	10	4	**15**	11	4	3	**18**	3	7	**10**	43
Storage loss (pests)	0	0	0	**0**	0	0	0	**0**	0	1	**1**	1
Drought	1	3	2	**6**	0	2	0	**2**	1	1	**2**	10
Low production price	9	1	4	**14**	9	5	0	**14**	1	6	**7**	35
Low production	0	1	0	**1**	0	6	0	**6**	0	8	**8**	15
Higher input price	0	1	0	**1**	0	2	1	**3**	0	1	**1**	5
Death of chicken	0	0	0	**0**	1	0	0	**1**	0	1	**1**	2
Birth of son	0	1	0	**1**	0	4	1	**5**	0	0	**0**	6
Birth of daughter	0	2	3	**5**	11	5	1	**17**	1	11	**12**	34
Funeral costs	0	1	0	**1**	0	0	0	**0**	0	0	**0**	1
Unemployment	0	0	2	**2**	0	0	0	**0**	0	0	**0**	2
Old age	0	3	0	**3**	0	0	0	**0**	0	0	**0**	3
Death of other working family member	0	0	0	**0**	0	1	0	**1**	0	0	**0**	1
Prolonged sickness of household head	0	3	0	**3**	0	1	0	**1**	0	1	**1**	5
Prolonged sickness of other working member	2	8	2	**12**	2	2	0	**4**	0	1	**1**	17
Chronic disease of household head	1	7	1	**9**	0	0	0	**0**	0	0	**0**	9
Chronic disease of other member	0	5	0	**5**	4	5	0	**9**	0	2	**2**	16
Alcohol problems of HH head	0	0	1	**1**	0	0	0	**0**	0	0	**0**	1
Sudden moving away of working member	0	0	1	**1**	1	0	0	**1**	0	1	**1**	3
Other: Son in jail	0	0	0	**0**	0	1	0	**1**	0	0	**0**	1
Alcohol problems of household head	2	0	0	**2**	0	0	0	**0**	0	0	**0**	2
Alcohol problems of other family member	4	1	1	**6**	0	0	0	**0**	0	1	**1**	7
Other: Be cheated	0	0	1	**1**	0	0	0	**0**	0	0	**0**	1
Total	20	54	26	**100**	42	47	7	**96**	7	48	**55**	251

Source: Own survey (2004)

Table 7.8 Most Costly Last Year Risk Range by Assuming Score

Last year risk	Number	Number of risk cost			Low	Medium	High	Most costly
(Year 2003-2004)	of risk	Low	Medium	High	1	2	3	risk
Fire	1	0	0	1	0	0	3	3
Local heavy rainfall	11	2	5	4	2	10	12	24
Local heavy wind	3	2	1	0	2	2	0	4
Damage of house	1	1	0	0	1	0	0	1
Theft of consumer goods	1	1	0	0	1	0	0	1
Crop loss (weather)	14	5	7	2	5	14	6	25
Crop loss: insect, plant disease	43	15	18	10	15	36	30	81
Storage loss (pests)	1	0	0	1	0	0	3	3
Drought	10	6	2	2	6	4	6	16
Low production price	35	14	14	7	14	28	21	63
Low production	15	1	6	8	1	12	24	37
Higher input price	5	1	3	1	1	6	3	10
Death of chicken (bird flu)	2	0	1	1	0	2	3	5
Birth of son	6	1	5	0	1	10	0	11
Birth of daughter	34	5	17	12	5	34	36	75
Funeral costs	1	1	0	0	1	0	0	1
Unemployment	2	2	0	0	2	0	0	2
Old age	3	3	0	0	3	0	0	3
Death of other working family member	1	0	1	0	0	2	0	2
Prolonged sickness of household head	5	3	1	1	3	2	3	8
Prolonged sickness of other working family member	17	12	4	1	12	8	3	23
Chronic disease of household head	9	9	0	0	9	0	0	9
Chronic disease of other family member	16	5	9	2	5	18	6	29
Alcohol problems of household head	1	1	0	0	1	0	0	1
Sudden moving away of working family member	3	1	1	1	1	2	3	6
Other: Son in jail	1	0	1	0	0	2	0	2
Alcohol problems of household head	2	2	0	0	2	0	0	2
Alcohol problems of other family member	7	6	0	1	6	0	3	9
Other: Be cheated	1	1	0	0	1	0	0	1
Total	251	100	96	55	100	192	165	457

Source: Own survey (2004)
Note: given low risk score = 1, medium cost score=2, high cost score=3

Table 7.9 Comparison Cost of Household in Managing Risk in Different Time Period

Risk	Last 5 year risk cost Baht	Last year risk cost Baht	Future risk cost Baht
Fire	150,000	150,000	-
Local heavy rainfall	**1,841,000**	**1,603,000**	**2,235,000**
Local heavy wind	62,000	28,000	36,000
Damage of house	4,000	4,000	-
Theft of livestock	10,000	-	-
Theft of crops	3,000	-	-
Theft of consumer goods	-	2,000	-
Crop loss (weather)	**738,500**	**258,500**	**393,500**
Crop loss: insect, plant disease	**2,419,400**	**1,480,000**	**1,089,000**
Storage loss (pests)	-	70,000	50,000
Drought	**235,000**	**209,500**	**306,000**
Low production price	**818,000**	**677,500**	**513,000**
Low production	**665,000**	**1,028,000**	**461,000**
Higher input price	208,000	154,000	169,000
Death of chicken (bird flu)	-	**510,000**	**400,000**
Birth of son	30,600	132,600	137,000
Birth of daughter	**1,251,500**	**2,247,230**	**1,633,600**
Funeral costs	50,000	3,000	-
Unemployment	6,000	11,000	15,000
Old age	4,000	5,000	3,000
Death of other working family member	**550,000**	**20,000**	-
Prolonged sickness of household head	3,030	127,530	104,030
Prolonged sickness of other working family member	132,430	160,660	64,030
Chronic disease of household head	32,560	11,160	8,560
Chronic disease of other family member	**528,560**	**389,330**	**253,530**
Working disability (disease: malaria, flu)of household head	1,000	-	-
Working disability (accident)of other family member	-	-	-
Alcohol problems of household head	20,000	5,000	33,000
Alcohol problems of other family member	**419,000**	**58,000**	**1,058,000**
Sudden moving away of working family member	73,050	75,000	13,000
Other: Son in jail	30,000	30,000	50,000
Other: Be cheated	36,000	8,000	20,000
Total	10,321,630	9,458,010	9,045,250

Source: Own survey (2004)

Note: Future risk cost is the cost forecasted by household

When the shocks hit, household's main strategy is to use their financial assets (cash or savings) to manage them. The impact of risks on household can be ranked by its cost. In the last previous twelve months, households lost a lot of money on these risks, for example, birth of daughter, local heavy rainfall, crop loss from insect or plant disease, low production, low production price, death of chicken from bird flu (Table 7.10).

Table 7.10 Range Risk Cost Affect to Household in Different Time Period

Last 5 year risk cost	Baht	Last year risk cost	Baht	Future risk cost	Baht
Crop loss: insect	2,419,400	Birth of daughter	2,247,230	Local heavy rainfall	2,235,000
Local heavy rainfall	1,841,000	Local heavy rainfall	1,603,000	Birth of daughter	1,633,600
Birth of daughter	1,251,500	Crop loss: insect	1,480,000	Crop loss: insect	1,089,000
				Alcohol problems of	
Low production price	818,000	Low production	1,028,000	other family member	1,058,000
Crop loss (weather)	738,500	Low production price	677,500	Low production price	513,000
Low production	665,000	Death of chicken	510,000	Low production	461,000
Death of other working		Chronic disease of other		Death of chicken (bird	
family member	550,000	family member	389,330	flu)	400,000
Chronic disease of other					
family member	528,560	Crop loss (weather)	258,500	Crop loss (weather)	393,500
Alcohol problems of					
other family member	419,000	Drought	209,500	Drought	306,000
		Prolonged sickness of		Chronic disease of other	
Drought	235,000	other working member	160,660	family member	253,530
Higher input price	208,000	Higher input price	154,000	Higher input price	169,000
Fire	150,000	Fire	150,000	Birth of son	137,000
Prolonged sickness of				Prolonged sickness of	
other working member	132,430	Birth of son	132,600	household head	104,030
Sudden moving away of		Prolonged sickness of		Prolonged sickness of	
working member	73,050	household head	127,530	other working	64,030
		Sudden moving away of			
Local heavy wind	62,000	working member	75,000	Storage loss (pests)	50,000
Funeral costs	50,000	Storage loss (pests)	70,000	Other: Son in jail	50,000
		Alcohol problems of			
Other: Be cheated	36,000	other member	58,000	Local heavy wind	36,000
Chronic disease of				Alcohol problems of	
household head	32,560	Other: Son in jail	30,000	household head	33,000
Birth of son	30,600	Local heavy wind	28,000	Other: Be cheated	20,000
		Death of other working			
Other: Son in jail	30,000	family member	20,000	Unemployment	15,000

Source: Own survey (2004)
Note: Exchanger rate 1 Euro= 49 Baht.

Table 7.10 Range Risk Cost Affect to Household in Different Time Period (Continue)

Last 5 year risk cost	Baht	Last year risk cost	Baht	Future risk cost	Baht
Alcohol problems of household head	20,000	Chronic disease of household head	11,160	Sudden moving away of working member	13,000
Theft of livestock	10,000	Unemployment	11,000	Old age	3,000
Unemployment	6,000	Other: Be cheated	8,000	Chronic disease of household head	8,560
Damage of house	4,000	Old age	5,000		
Old age	4,000	Alcohol problems of household head	5,000		
Prolonged sickness of household head	3,030	Damage of house	4,000		
Theft of crops	3,000	Theft of consumer goods	2,000		
Working disability of household head	1,000	Funeral costs	3,000		
Total	10,321,630	Total	9,458,010	Total	9,045,250

Source: Own survey (2004)
Note: Exchanger rate 1 Euro= 49 Baht.

7.3 Analysis of the Incidence of Risk by Poverty Status in Different Time Periods

The result from Principal Component Analysis of poverty in Northern Thailand in the previous chapter gives the outcome of poverty status. Households that are average poor are range in middle poverty group. The extreme poor households or households that have a wealth below the average or middle poverty group are classified in lower poverty group. Households that have a higher wealth status than average are ranged in higher poverty group. This analysis supposes that risks that hit the poor are different from the non-poor. It was found that risks occurred randomly to households. They do not depend on household status. Different kinds of risks hit household. For instance, there was a high percentage of some risks such as low production price, crop loss from weather, drought, that occurred to the very poor group in last year. The middle poverty group faced a high percentage of crop loss from insects and the birth of a daughter during the same period (Table 7.11).

Table 7.11 Incidence of Risk by Poverty Status in Different Time Period

Percentage of risks	Risk occurred in last 5 years			Risk occurred in last year			Expected risk will occur in future		
Poverty status	Lower poverty group (Very poor)	Middle poverty group	Higher poverty group (Less poor)	Lower poverty group (Very poor)	Middle poverty group	Higher poverty group (Less poor)	Lower poverty group (Very poor)	Middle poverty group	Higher poverty group (Less poor)
Fire	1.27	0.00	0.00	1.22	0.00	0.00	0.00	0.00	0.00
Local heavy rainfall	3.80	4.55	4.11	2.44	**6.90**	3.66	6.74	8.11	11.59
Local heavy wind	1.27	2.27	0.00	1.22	2.30	0.00	1.12	1.35	0.00
Damage of house	0.00	1.14	0.00	0.00	1.15	0.00	0.00	0.00	0.00
Drought	**8.86**	2.27	4.11	**7.32**	1.15	3.66	7.87	1.35	7.25
Theft of livestock	0.00	1.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Theft of crops	0.00	1.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Theft of consumer goods	0.00	0.00	0.00	0.00	0.00	1.22	0.00	0.00	0.00
Crop loss (weather)	**13.92**	5.68	5.48	**8.54**	5.75	2.44	8.99	5.41	1.45
Other crop loss: insect, plant disease	20.25	15.91	**28.77**	17.07	**18.39**	15.85	12.36	16.22	15.94
Storage loss (pests)	0.00	0.00	0.00	0.00	0.00	1.22	0.00	0.00	1.45
Low production price	11.39	**15.91**	13.70	**14.63**	13.79	13.41	15.73	17.57	0.00
Low production	1.27	**10.23**	6.85	1.22	8.05	8.54	1.12	6.76	14.49
Higher input price	2.53	1.14	1.37	3.66	1.15	1.22	4.49	1.35	7.25
Death of chicken (bird flu)	0.00	0.00	0.00	0.00	0.00	2.44	0.00	0.00	1.45
Birth of son	1.27	1.14	0.00	3.66	1.15	2.44	3.37	1.35	1.45
Birth of daughter	7.59	**11.36**	9.59	10.98	**14.94**	14.63	14.61	17.57	2.90
Funeral costs	0.00	0.00	1.37	0.00	1.15	0.00	0.00	0.00	13.04
Unemployment	1.27	0.00	0.00	1.22	1.15	0.00	1.12	1.35	0.00
Old age	0.00	2.27	0.00	0.00	2.30	1.22	0.00	2.70	0.00
Death of other working family member	1.27	1.14	2.74	1.22	0.00	0.00	0.00	0.00	0.00
Sudden moving away of working family member	1.27	2.27	0.00	1.22	2.30	0.00	0.00	2.70	0.00
Other: Son in jail	0.00	0.00	1.37	0.00	0.00	1.22	0.00	0.00	1.45
Other: To be cheated	1.27	0.00	0.00	1.22	0.00	0.00	0.00	0.00	0.00
Prolonged sickness of household head	1.27	0.00	2.74	**3.66**	0.00	2.44	3.37	0.00	1.45
Prolonged sickness of other working family member	5.06	4.55	4.11	6.10	4.60	**9.76**	5.62	2.70	4.35
Chronic disease of household head	2.53	4.55	4.11	2.44	3.45	4.88	1.12	4.05	4.35
Chronic disease of other family member	11.39	5.68	4.11	**8.54**	6.90	3.66	8.99	8.11	4.35

Source: Own survey (2004)

Table 7.11 Incidence of Risk by Poverty Status in Different Time Period (Continue)

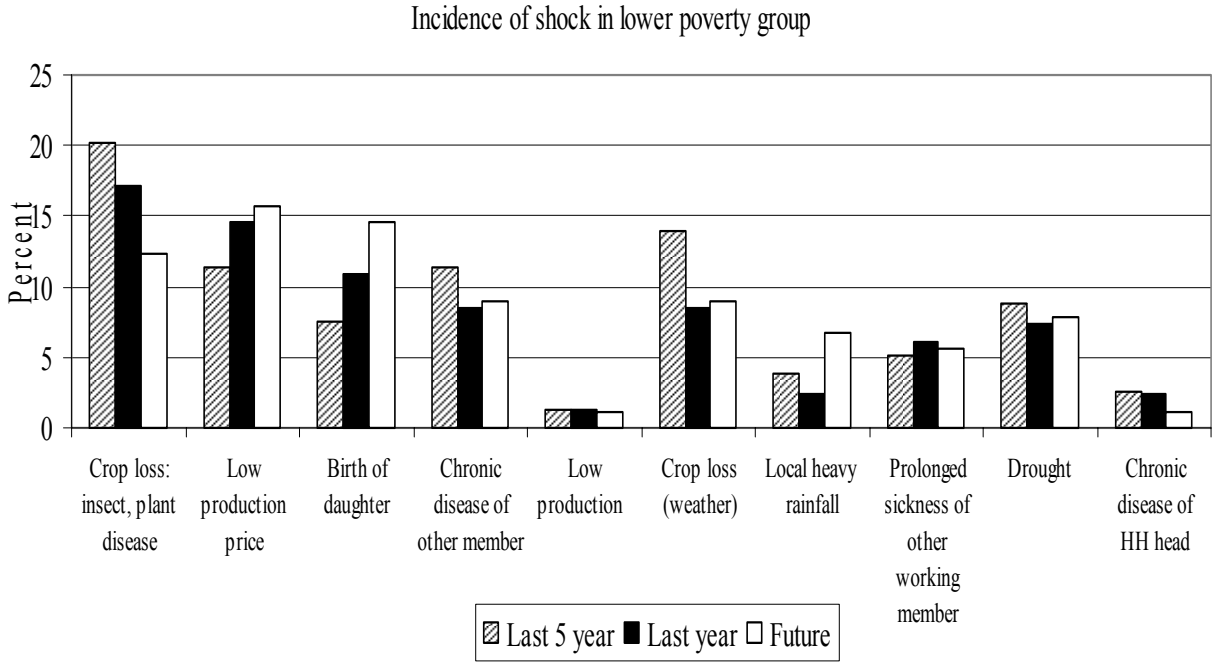
Percentage of risks	Risk occurred in last 5 years			Risk occurred in last year			Expected risk will occur in future		
Poverty status	Lower poverty group (Very poor)	Middle poverty group	Higher poverty group (Less poor)	Lower poverty group (Very poor)	Middle poverty group	Higher poverty group (Less poor)	Lower poverty group (Very poor)	Middle poverty group	Higher poverty group (Less poor)
Working disability (disease: malaria, flu)of household head	0.00	1.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Working disability (accident)of other family member	0.00	1.14	0.00	0.00	1.15	0.00	0.00	0.00	0.00
Alcohol problems of household head	0.00	1.14	1.37	1.22	0.00	1.22	1.12	0.00	1.45
Alcohol problems of other family member	1.27	2.27	4.11	1.22	2.30	4.88	2.25	1.35	4.35
	100	100	100	100	100	100	100	100	100

Source: Own survey (2004)

The difference in risks faced by different poverty groups over time is presented clearly in Figures 7.6 to 7.8. The risks which become more critical to the extreme poverty group are low production price and birth of daughter (Figure 7.6). Low production price problem increased steadily from just over 10% in last five years to nearly 15% in last year, and are expected to reach more than 15% in the future, whereas crop loss from insect problem has declined over last five year, falling from 20% to 17% and is expected to reach 13% in future.

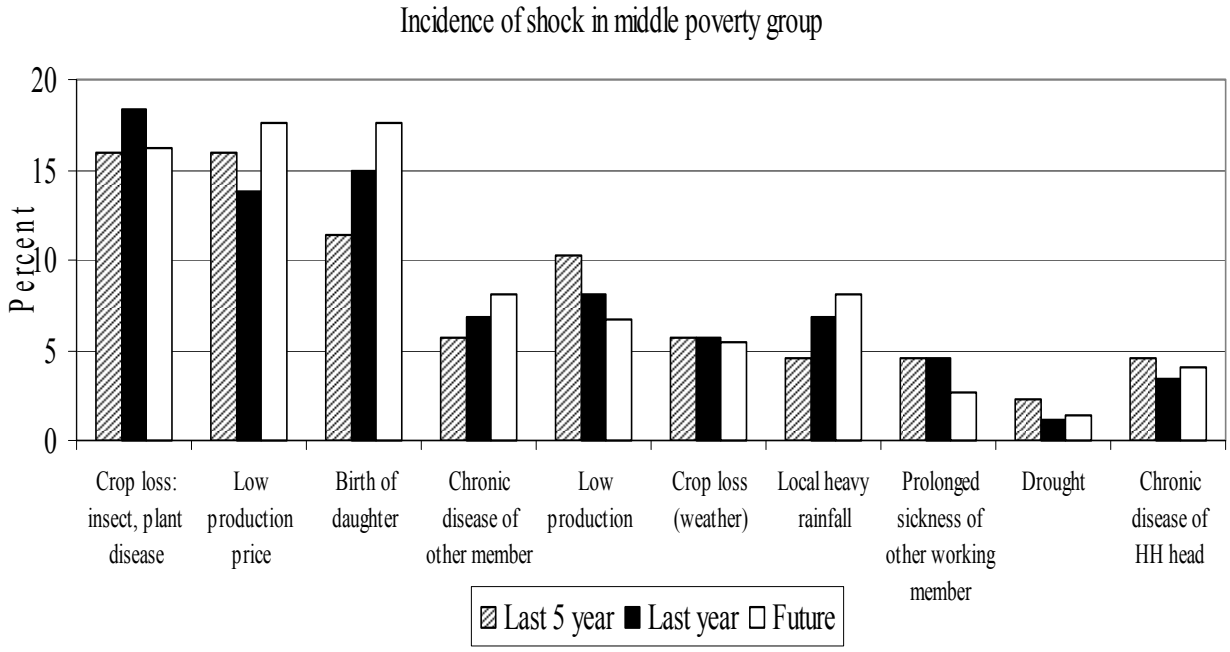
Figure 7.7 indicates the risks faced by middle poverty group. Crop loss from insects at first rose from around 15% in last five years to about 18% in last year, but then is expected to fall back to about 15% in the future. Low production price problem has been relatively stable, falling from around 15% in last five year to below 15% in last year, but expect climbing back to reach 17% in the future. Figure 7.8 shows that low production price has no affect on them in future and the birth of daughter also has small effect on them.

Figure 7.6 Top Ten Shocks Classified by Lower Poverty Status in Different Time Period



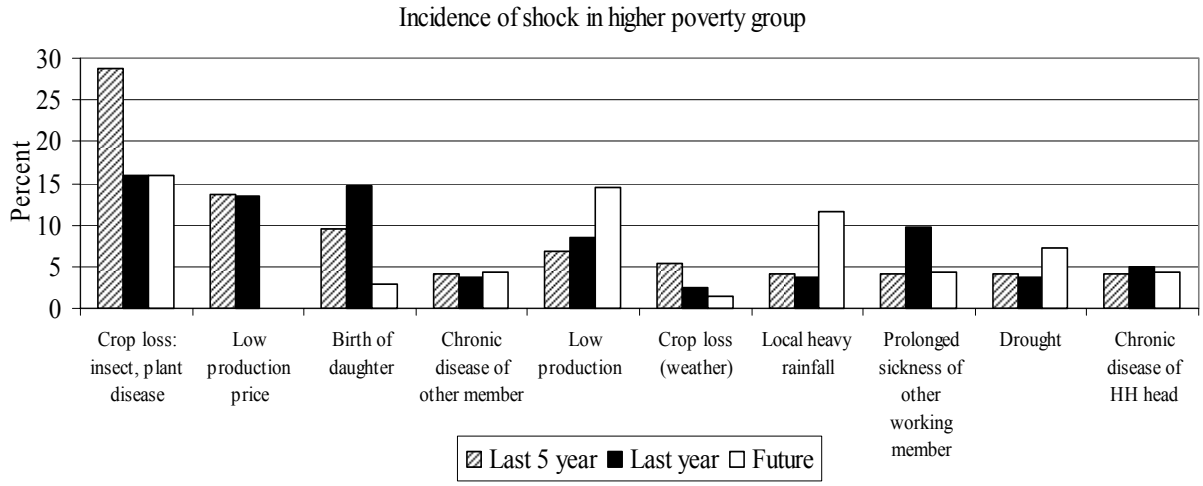
Source: Own survey (2004)

Figure 7.7 Top Ten Shocks Classified by Middle Poverty Status in Different Time Period



Source: Own survey (2004)

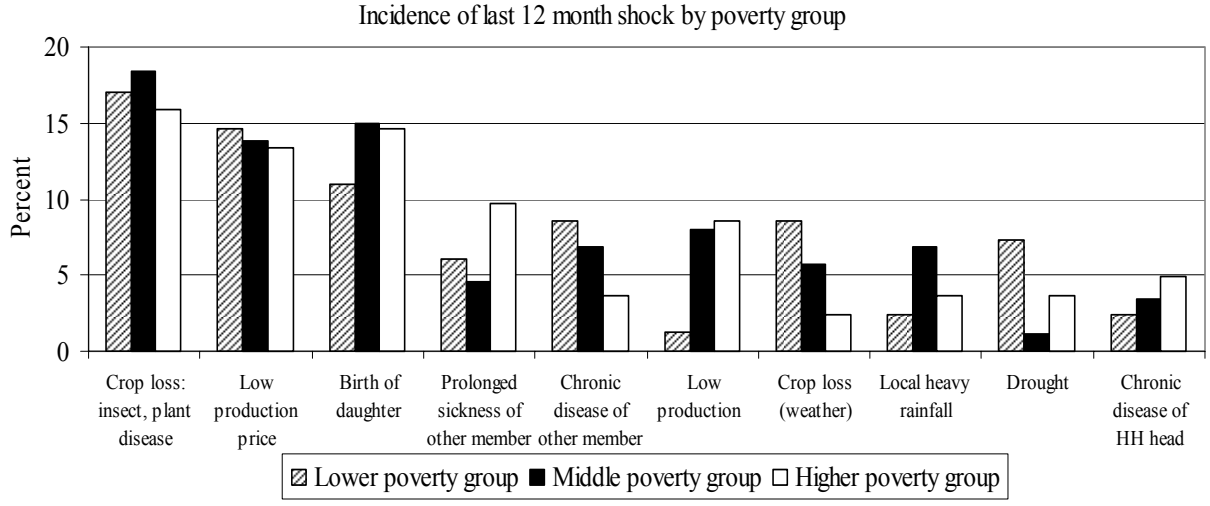
Figure 7.8 Top Ten Shocks Classified by Higher Poverty Status in Different Time Period



Source: Own survey (2004)

The poor are disproportionately exposed to agricultural-related shocks, health shocks and natural shocks than the non-poor. Crop loss from insects, low production price, crop loss from weather and drought are exposed to the extreme poor than the non-poor. On the other hand, low production is more exposed to the non-poor because they hired the extreme poor to do farm work and they take the risks when the production is very low (Figure 7.9).

Figure 7.9 Incidence of Top Ten Shocks Occurred in Last 12 Month Classified by Poverty Status



Source: Own survey (2004)
Note: Lower poverty group is the extreme poor; higher poverty group is the non-poor.

7.4 Analysis of Adaptive and Coping Risk Management Strategies which Farm Households Use

Livelihood strategies will differ with regard to whether people have to deal with gradual changes or sudden shocks. Adaptive strategies denote processes of change which are conscious and deliberate in the way people adjust livelihood strategies to long term changes. Coping strategies are short-term responses to periodic stress or sudden shocks (Korf et al, 2001).

Households have their ways to manage risks and shocks. Most commonly, they will concentrate on coping with shocks once they have occurred (e.g., borrowing money to pay for medical care, reducing food consumption to reduce expenditure, working more to acquire more income, or sending children to work to make up for lost income). They apply adaptive strategies (e.g. saving, asking help from near relatives within social networks) to long term change. The shocks that hit households can be idiosyncratic (striking an individual household), or covariant (striking the community).

Despite there were the large numbers of reported shocks, most household in the study area were able to manage them and recover from the shocks. Table 7.12 highlights the main risk management strategies. Main adaptive strategies are saving in cash, diversification of income sources, asking helping from family or relatives, health check-up, less risky production system and adoption of new production technology account for 82.5% of the total adaptive strategies, whilst 72.1% of main coping strategies are credit from bank, reduce saving, additional work of household head and other adult family member.

There is an interesting point in coping strategies that households rather ask credit from bank than relatives and friends. This may be because their relatives are also poor. When the shocks strike households, they can often be curbed by support from the local community or the extended family through some sort of a mutuality arrangement. On the other hand, when a whole community is struck (as in the case of natural disasters), local mutual support systems may become ineffective because almost everyone will need help at the same time.

Table 7.12 Frequency and Percentage of Risk Management Strategies which Farm Household Used

	Strategies used	Frequency		Percentage in total strategies
	Not at all	91		**14.13**
	Adaptive strategies	Frequency	Percent	Percentage in total strategies
Saving	**Saving in cash**	75	**21.87**	**11.65**
	Saving in kind (livestock)	1	0.29	0.16
	Saving in kind (crops)	2	0.58	0.31
Social network	**Asking help from family/relative**	29	**8.45**	**4.50**
	Asking help from neighbors	3	0.87	0.47
	Asking help from friends	2	0.58	0.31
	Use of extension service	5	1.46	0.78
	Less risky production system	22	**6.41**	**3.42**
	Adoption of new production technology	18	**5.25**	**2.80**
	Hygiene and disease prevention	6	1.75	0.93
	Proper weaning & feeding practices	1	0.29	0.16
Diversification	Crop diversification	9	2.62	1.40
	Diversification of income sources	37	**10.79**	**5.75**
	Shifting cultivation	8	2.33	1.24
	Membership in groups/networks	6	1.75	0.93
	Health check-up	27	**7.87**	**4.19**
	Others	1	0.29	0.16
	Total	343	100	**53.26**

Source: Own survey (2004)

Table 7.12 Frequency and Percentage of Risk Management Strategies which Farm Household Used (Continue)

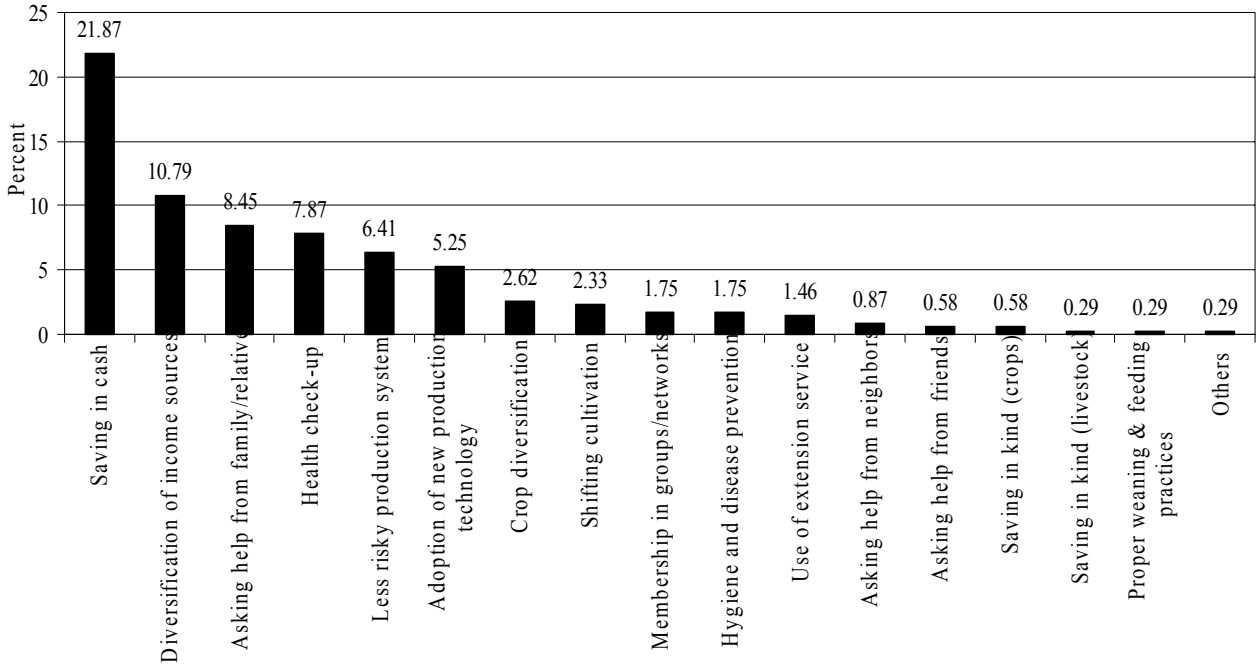
	Coping strategies	Frequency	Percent	Percentage in total strategies
	Reduce saving	79	**26.25**	**12.27**
Credit	**Credit from bank**	84	**27.91**	**13.04**
	Credit from family/relatives	15	**4.98**	**2.33**
	Credit from friends	4	1.33	0.62
	Credit from money lender	12	3.99	1.86
	Credit from other sources	10	3.32	1.55
	Take children out of school	8	2.66	1.24
	Ask for charity (from temple)	1	0.33	0.16
Work	**Additional work of household head**	26	**8.64**	**4.04**
	Additional work of other adult family members	28	**9.30**	**4.35**
	Let children work	1	0.33	0.16
Migration	Temporary migration	1	0.33	0.16
	Permanent migration	1	0.33	0.16
Sale assets	Sale livestock	2	0.66	0.31
	Sale of standing crop	1	0.33	0.16
	Sale of consumer goods	1	0.33	0.16
	Sale other	1	0.33	0.16
	Reduced food consumption	**13**	**4.32**	**2.02**
	Public assistance	4	1.33	0.62
	Others	9	2.99	1.40
	Total	301	100	**46.74**
	Total all strategies used	644		**100.00**

Source: Own survey (2004)

From Figure 7.10, most selective adaptive strategies household choose to cope with risks is saving in cash with 21.9%. The next categories are diversification of income sources, asking help from family/relatives, health check-up, less risky production, and adopt of new production (38.8% of total). The remaining strategies contain a low percentage with less than 5% such as crop diversification, shifting cultivation, etc.

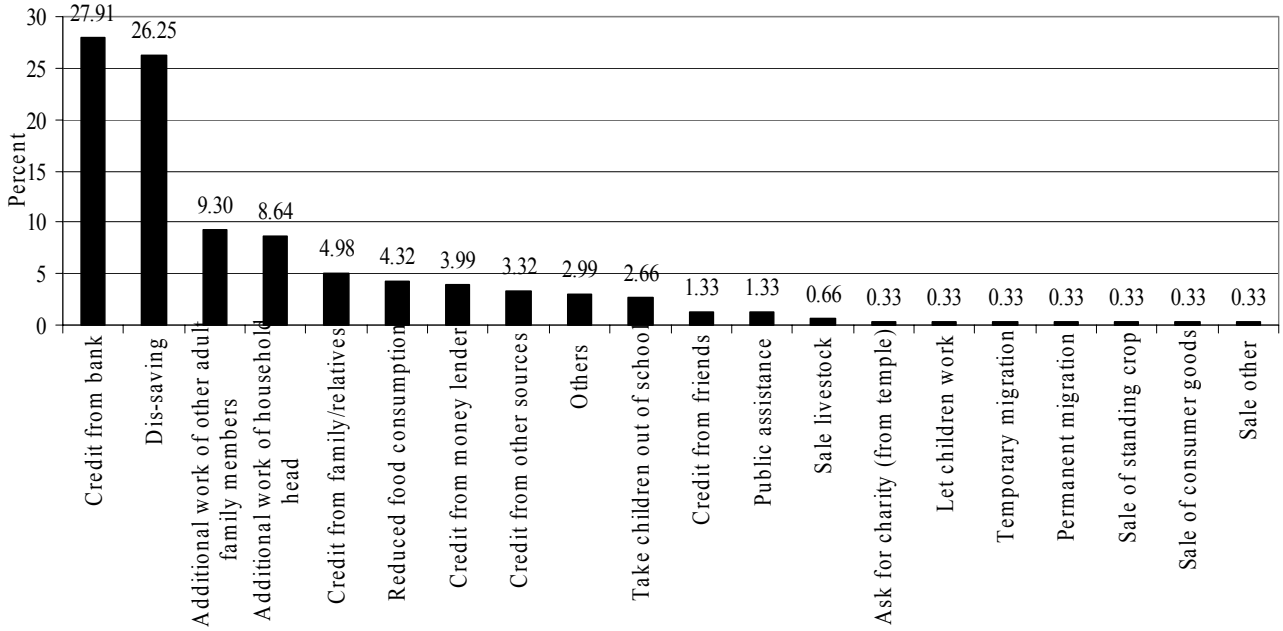
The explicit coping strategies used by households are credit from bank and reduce saving with exactly high percentage more than 25%. The rest of coping strategies are additional work of other adult family member and household head, credit from relatives, reduce food consumption, credit from money lender, credit from other sources and so on (Figure 7.11).

Figure 7.10 Percentages of Adaptive Strategies which Farm Household Used



Source: Own survey (2004)

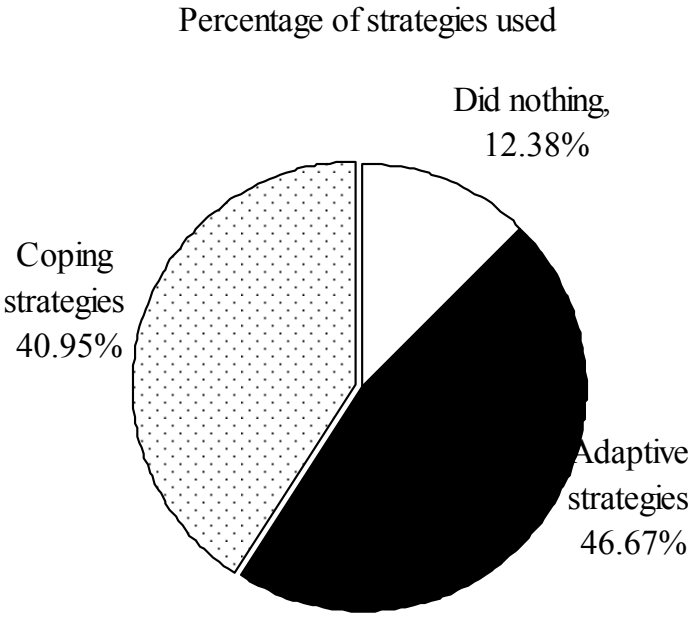
Figure 7.11 Percentages of Coping Strategies which Farm Household Used



Source: Own survey (2004)

The pie chart reveals the distribution of adaptive and coping strategies in the risk management. There are 12.4% of households that did nothing when they experienced risks. From the information shown, it is nearly half the percentage of strategies used by household is adaptive strategies, while coping strategies make up 41% (Figure 7.12).

Figure 7.12 Percentages of Strategies which Farm Household Used



Source: Own survey (2004)

Households have different strategies to recover from risks. The duration is different from household to household. Most of the risks (58.8% of total) can be managed within 12 months. However, there is 25.2% of risks are long run risks (Table 7.13).

Table 7.13 Number of Risks and Months to Recover From Difficulties

Duration to recover	Number of risks	Percent
3 month	75	21.93
6 month	64	18.71
12 month	62	18.13
18 month	14	4.09
24 month	41	11.99
> 24 month	86	25.15

Source: Own survey (2004)

To sum up, households consider strategies to deal with risks once they have occurred. The types of instruments available to households will shape the way in which they manage risks, which, in turn, will affect the vulnerability of them.

7.5 Summary of Important Findings

It is interesting to note that qualitative analysis results of PRA reflect the idea of group in risk management strategies differ from the results from individual household interview. The reason is individual household has different perception on risks and risk management. In group discussion, households have opportunity to share, discuss and decide together about most important risk threaten their livelihood.

The results from the PRA case study found that the first pressing problem plaguing household is their debts. Households try to repay it but the continuous occurring of risks and their low risk management capacities obstruct them. Land issue is the second important problem in study area. Farm household have landless and land certificate problem. The idea from group discussion show the rights of forest dwellers of farm household those who settled in the forest before the declaration of National Forests or National Parks should have the right to stay. They want the government to legalize community rights concerning natural resources development, especially by passing the Community Forestry Bill. Another pressing problem influencing household are drought which leads water shortage for agricultural farm, fertilizer price and middleman problem. The villagers strongly requested government to solve these problems, namely, reducing debt's interest rate or restructuring debt, controlling fertilizer price, finding new market to contribute crop product, creating the assistance from related institutions such as development programs. Farmers themselves will try to reduce the production cost. The suggestion from the author are that to help households meet the sustainable livelihood, government and community have to work hard together on attack the root cause of poverty which will hit on the point. Government should intervene to empower the poor by improving their opportunity to meet their basic needs, improving their capacities through expanded educational opportunities and improving their abilities to expand income and resource base.

The second section considers which kind of risk most frequently occurred to households, how much does it cost, how different of risks attack to different poverty group and how they manage them. The central part of the risk management focuses on household mechanisms for managing risk. The result from individual household interview found as following:

First of all, households reported experiencing 32 risks. Some household experienced multiple risks. Most frequently risks occurred to household are production risks, health risks and natural risks. Second part is focus on risks cost

in order to examine the ability of household to response to risks. If households can not manage or mitigate risks under their capacity or income, they may face the vulnerability to poor. High risks cost can increase household vulnerability. Most costly risks are crop loss from insect and plant disease, birth of daughter, low production price, low production, chronic disease of other family member, crop loss from weather and local heavy rainfall. Third, the analysis of risks compare to poverty group can make a conclusion that risks affect to different poverty group are not pretty much different. The poor are sensitive to natural risks, agricultural-relate risks and health risks. Finally is the study of risk management strategies of households. Household selected a little bit more adaptive strategies to handle risk than coping strategies. Most of risks (58.77 % of total) can be managed within 12 months. Most strategies uses are credit from bank, dis-saving and saving in cash.

In conclusion, these risks or shocks have brought vulnerability to household in Northern Thailand. Vulnerability to financial crisis is high since households had continuously hit by shocks and they must to provide certain amount of their income to manage them. Furthermore, household must save for precautionary if their expect shocks will happen in the future. It is not all households have a good financial management. Therefore, some may finally end up with vulnerability to poverty. Household can whether manage risks well or not depend on their experience in coping those risks, their assets, type of shocks and the length of time to manage risks. The weakness of protection and strategies will make them far from a sustainable livelihood.

Households have self help in risk management. They lack access to formal mechanisms. They rely on informal mechanisms, which are built based on the existing social networks and trust. But when the shocks are big or affecting the entire community, these informal mechanisms may not be adequate. This study has the recommendation that there should have some policy interventions to help them improving or supplementing their ability in managing risk. Policy intervention should aim to provide access for the poor on saving, credit and insurance.

8 LOGIT ANALYSIS OF HOUSEHOLD DEMAND ON HEALTH INSURANCE

This chapter is organizes as follow. Section 8.1 presents health risks, expenditure and insurance in Thailand. Section 8.2 examines general data of household health, incidence of illness, health cost effecting to household, health care seek behaviour, role of the adherence to a particular social group and health insurance, the channel of household perception in health insurance information, the price of health insurance, and the premium payment selected by the household. Section 8.3 discusses the model and estimated the demand factors for health insurance by applying binary logistic regression analysis.

8.1 Health Risks, Expenditures and Insurance in Thailand

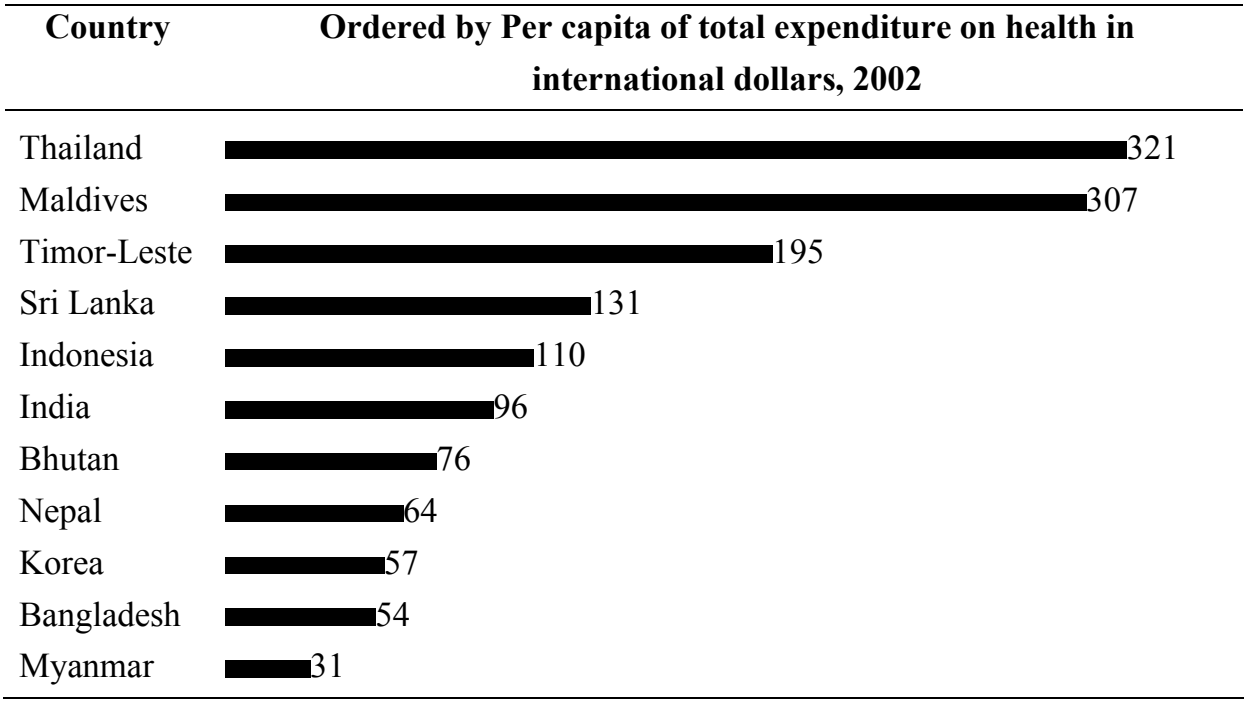
Health risk is one of the major risk stresses to a household. For this reason, households have adopted a variety of risk reduction mechanisms to mitigate the effects of risks. There exist also a variety of formal instruments dealing with individual but also idiosyncratic risks. Examples are social insurance instruments, such as health insurance, and other forms of social protection. Yet, despite this development, many people in rural areas are not being reached by social measures since they mainly cover the urban part of society, and therefore have limited coverage (Abada, 2001).

Health expenditure in Thailand has dramatically increased since 1980 from 3.8% of GDP to 6.2% in 1998. During this period the health expenditure per capita increased from 545 Baht (27 US$)[17] in 1980 to 4,663 Baht (113 US$)[18] in 1998 (Sreshthaputra and Indaratna, 2001). The per capita total health expenditures in Thailand are high when compared to other countries (see Figure 8.1). Figure 8.1 shows the health expenditures expressed in international dollars. International dollars are calculated using purchasing power parities (PPP), which are rates of currency conversion constructed to account for differences in price level between countries (WHOSIS, 2002).

[17] In 1980, the Baht was fixed to the US Dollar at an exchange rate of 1$ = 20 Baht.

[18] In 1998, the Baht was the average at an exchange rate of $1 = 41.4 Baht.

Figure 8.1 Per Capita of Total Expenditure on Health in Different Countries in International Dollars in 2002



Source: WHOSIS (2002).

Note: Total health expenditure per capita is the per capita amount of the sum of Public Health Expenditure (PHE) and Private Expenditure on Health (PvtHE). The international dollar is a common currency unit that takes into account differences in the relative purchasing power of various currencies.

Why do people buy health insurance? Conventional theory holds that people purchase insurance because they prefer the certainty of paying a small premium to the risk of getting sick and paying a large medical bill. Conventional theory also holds that any additional health care that consumers purchase because they have insurance is not worth the cost of producing it. Therefore, economists have promoted policies—co-payments and managed care—to reduce consumption of this additional, seemingly low-value care. A new theory of consumer demand for health insurance holds that people purchase insurance to obtain additional income when they become ill. In effect, insurance companies act to transfer insurance premiums from those who remain healthy to those who become ill. This additional income generates purchases of additional high-value care, often allowing sick persons to obtain life-saving care that they could not otherwise afford.

Regarding risk, the new theory shows that consumers actually prefer the risk of a large loss to incurring a smaller loss with certainty. Therefore, if consumers purchase insurance, it is not because they desire to avoid risk. Instead, the new theory suggests consumers simply pay a premium when healthy in exchange for a claim on additional income (effected when insurance pays for

the medical care) if they become ill. Health insurance is substantially more valuable to the consumer under the new theory. The new theory moreover implies that co-payments and managed care—central health policies of the last 30 years—were directed at solving problems that largely did not exist. Because these policies either reduced the amount of income transferred to ill persons or limited access to valuable health care, they may have done more harm than good. The new theory also provides a solid theoretical justification for insuring the uninsured and for implementing national health insurance (Nyman, 2003).

Health insurance in Thailand particularly, voluntary insurance, is still in an early development and has yet to seriously address the question of equity. Health care expenditure in the past has increased rapidly without clear evidence of increased quality of care. The increase in provision of private health services has raised the question of the high cost of care and the efficient allocation of resources. Only high income groups can afford and access a better quality of care. This widens the gap of inequality. Health systems are complicated and thus need the state to play an appropriate role in the health sector (Supakankunti, 1997).

Over the past decade, the Thai government has been advancing a series of health reforms that include securing revenue for healthcare and establishing a universal health security system. In 2002, a health security system called the "30 Baht System" was established covering about two-thirds of the total population (or approximately 40 million people). Under the system, those who did not have healthcare coverage before can now enjoy access to basic medical services. The system has become the first step towards a universal healthcare coverage. Social security systems are extremely important to vulnerable members of society and those whose rights tend to be ignored, including blue-collar workers, minority groups, the aged, mothers and children, and orphans (JICA, 2003).

A healthy life is an asset for poor households, it is important to minimize the risk of falling ill and to promote health in order to increase their productivity and earning capacity. The Millennium Development Goals of Thailand (1990-2015) set targets for improvements in health, primarily reducing child mortality, improving maternal health and controlling HIV/AIDS and other diseases, coupled with other important goals such as the reduction of poverty, improving the provision of education, promoting gender equality and protecting the environment (Sinnathambu, 2004).

Therefore, this study has the purpose to examine health insurance for the poor in order to give recommendations as to options for reducing health expenditures at the household level and also to advice the Government to provide alternative health insurance products which will be present in the next chapter.

8.2 Characteristics of Household Health

The incidence of illness shows how important health insurance is. This section examines the health incidence within households, the health care seek behavior, the role of village group on health insurance, the source of health insurance information, which a household can access, and the price of health insurance.

8.2.1 General Data of the Households

Primary data on health insurance was collected in Mae Rim district, Chiangmai province. The survey covered 200 households, 146 households are Thai and 54 households are Hmong. About 46% of the respondents were between 30 to 44 years old. The average number of family members is four to six people (Table 8.1).

Table 8.1 Frequency and Percentage of General Household Information

		Frequency	Percent
Gender	Men	105	52.5
	Women	95	47.5
Tribe	Non-hill tribe or local northern Thai	146	73.0
	Hmong hill tribe	54	27.0
Age	15-29 years	41	20.5
	30-44 years	92	46.0
	45-59 years	49	24.5
	> 60 years	18	9.0
Number of family member	1-3 persons	71	35.5
	4-6 persons	99	49.5
	7-9 persons	22	11.0
	> 10 persons	8	4.0

Source: Own survey (2004)

A relatively stable household income flux seems to be important because if households have not enough circulating income, they may not intend to do any kinds of health insurance. Table 8.2 illustrates the percentage of households with an income shortage in last 12 month (year 2003). It found that 55.5% of the sample had no income shortage.

Table 8.2 Percentage of Households Faced Income Shortages During A Year

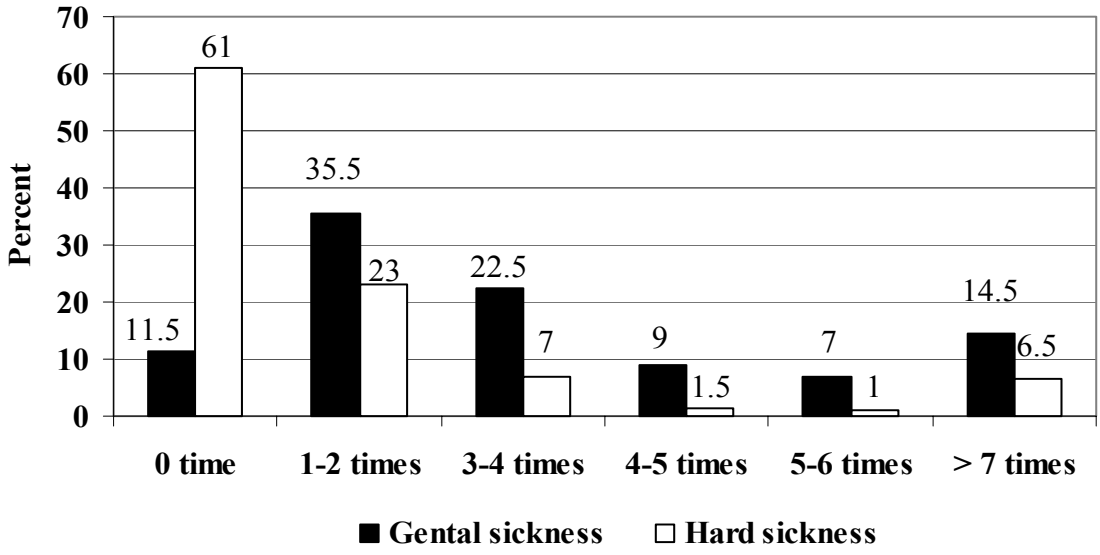
Month	Percent
Enough income and no shortage	55.5
Face income shortage for 1 month	7.5
Face income shortage for 2 month	12.0
Face income shortage 3 month	7.0
Face income shortage 4 month	3.5
Face income shortage 5 month	2.0
Face income shortage 6 month	3.5
Face income shortage 12 month	9.0
Total	100.0

Source: Own survey (2004)

8.2.2 Illness Incidence of Households

The frequency of household illness within a year relates to the health expenses household have to response. Health cost is the burden to household and may cause household income shortage. Figure 8.2 demonstrates the number of time respondent got sick. The illness can divide into gentle or normal illness and hard or serious illness. The average time respondent get gentle sick is 1 to 2 times last 12 month. Sixty one percent of total has no serious illness. It is 6.5 % of total get severity illness.

Figure 8.2 Illness Incidence of Household Classified by Gentle and Hard Illness in Percent

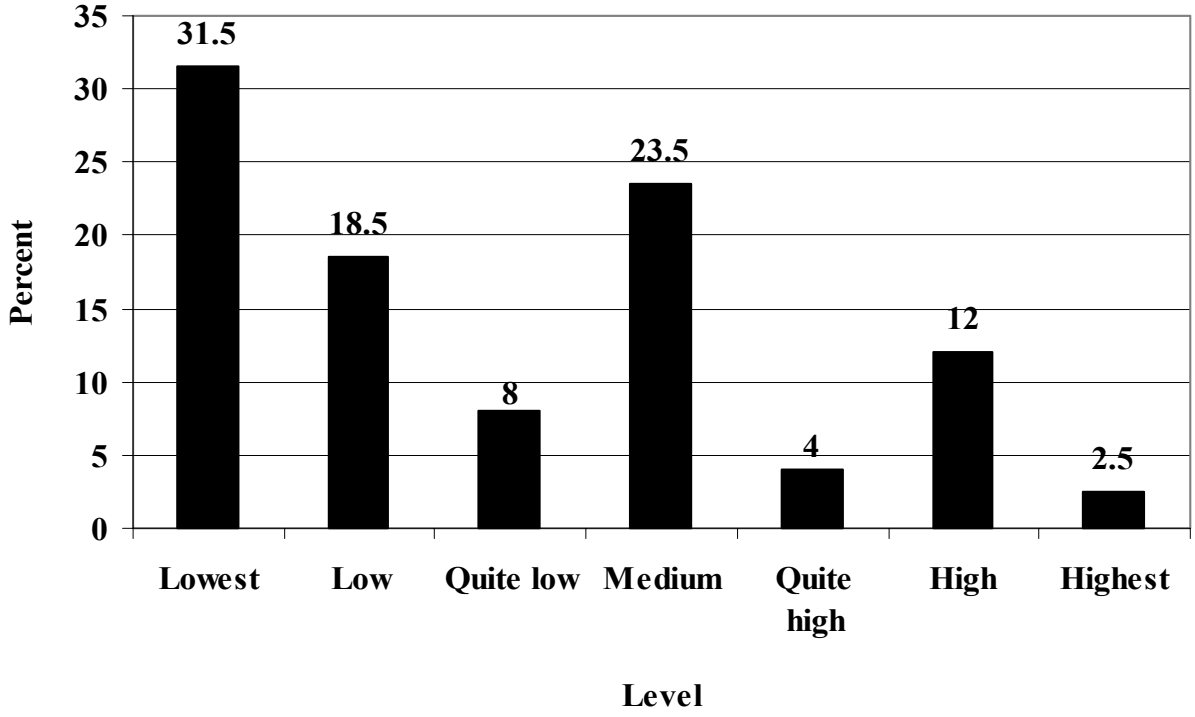


Source: Own survey (2004)

8.2.3 Health Cost Affecting the Households

The respondents reported that about the burden of health expenses became lower after they had signed up for health insurance. However, 42% of the respondents stated that the health expenses still represented a relatively high burden to their household budget (Figure 8.3).

Figure 8.3 Burden of Health Expenses to Family From Lowest to Highest Level in Percent

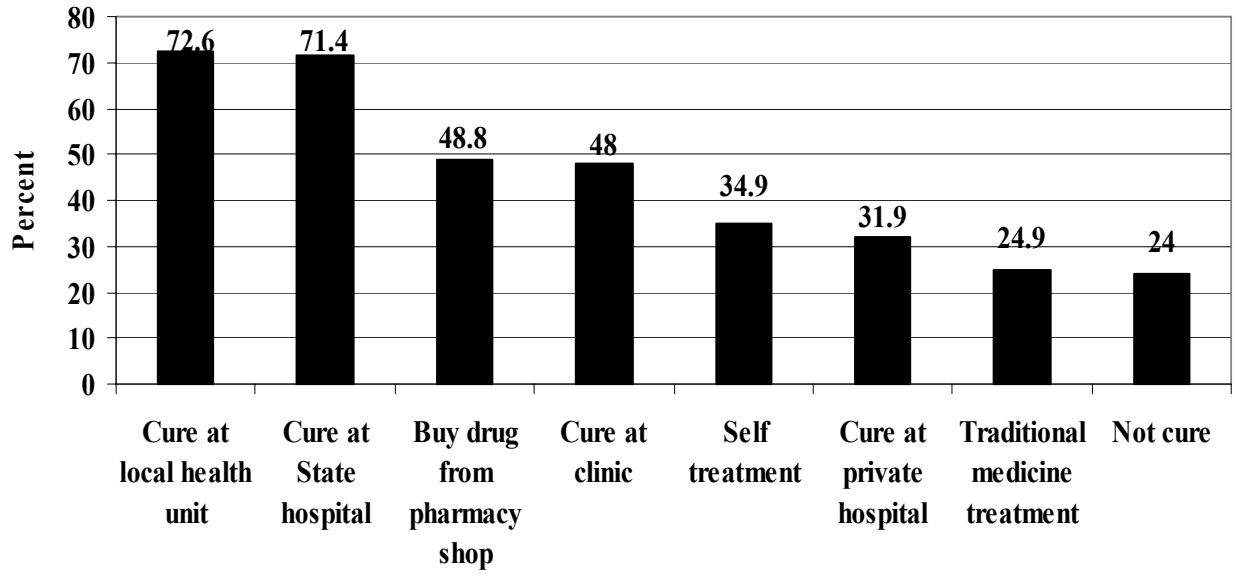


Source: Own survey (2004)

8.2.4 Health Care Seek Behaviors

The respondents were asked about their first choice of treatment when falling ill. The first choice for medical treatment service, which most of households were select was local health unit because it is located close to villagers. The next choice was state hospital because there were more completely medical instruments than local health unit. Households went there when the got severe illness. The third choice was purchasing medicine from the pharmacy shop because the medicine price was cheaper in comparison to travel to consult doctor at state hospital (Figure 8.4).

Figure 8.4 Percentage of Satisfaction of Household in Selecting Health Care Services

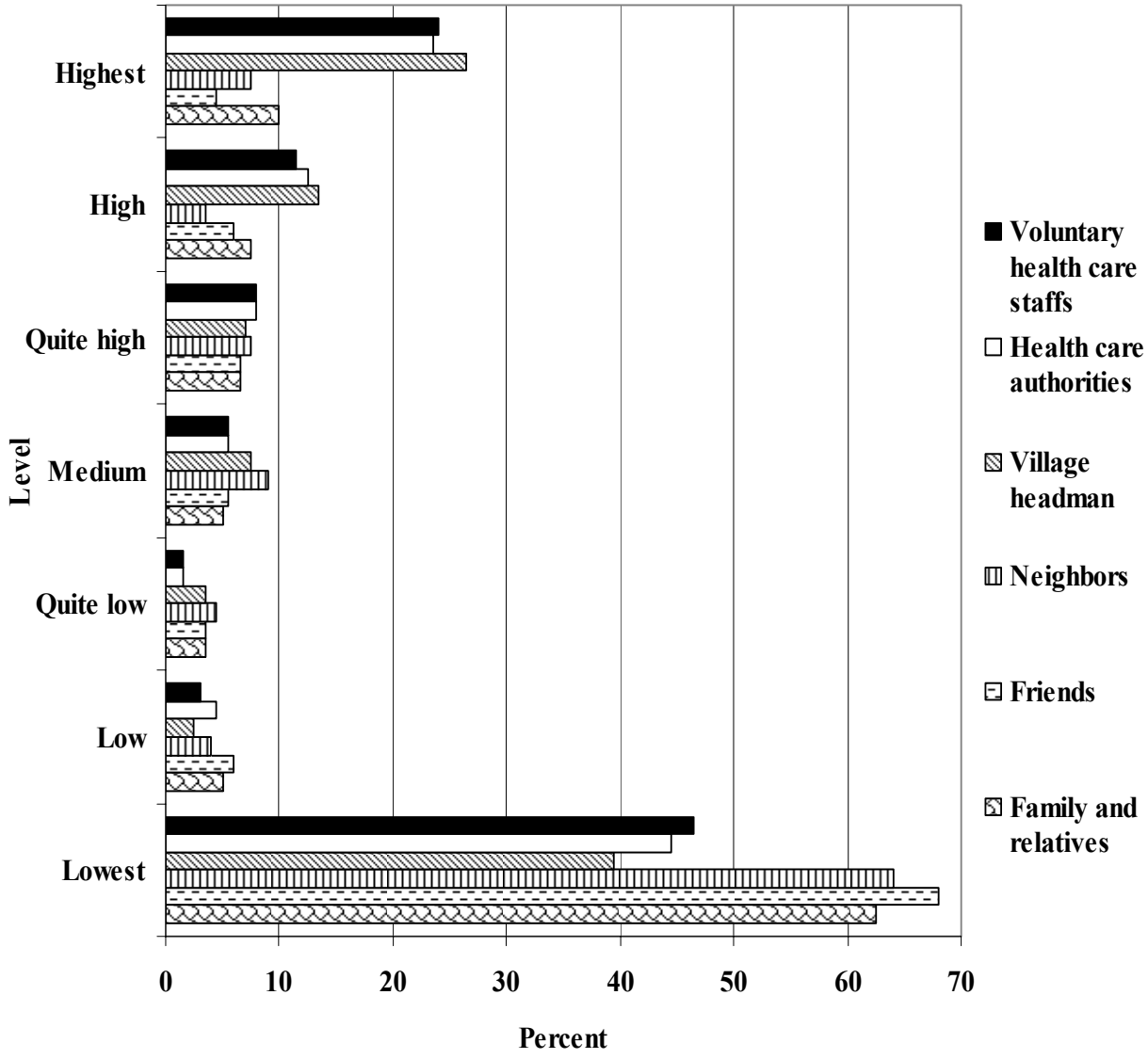


Source: Own survey (2004)

8.2.5 Role of the Adherence to a Particular Social Group and Health Insurance

The relationship of the adherence to a particular social group and the practice of engaging in health insurance is very weak. However, it is interesting that the village head man, the voluntary health care staff, and health care authorities play an important role in the decision making process of households to engage in health insurance (Figure 8.5). Therefore, knowing the role of the social group is important for the Government or any insurance company intending to offer health insurance. To increase the probability of succeeding, it is important to know which social groups are most relevant for the target group of the insurance product.

Figure 8.5 Role of Social Group in Inviting Household to Do Health Insurance

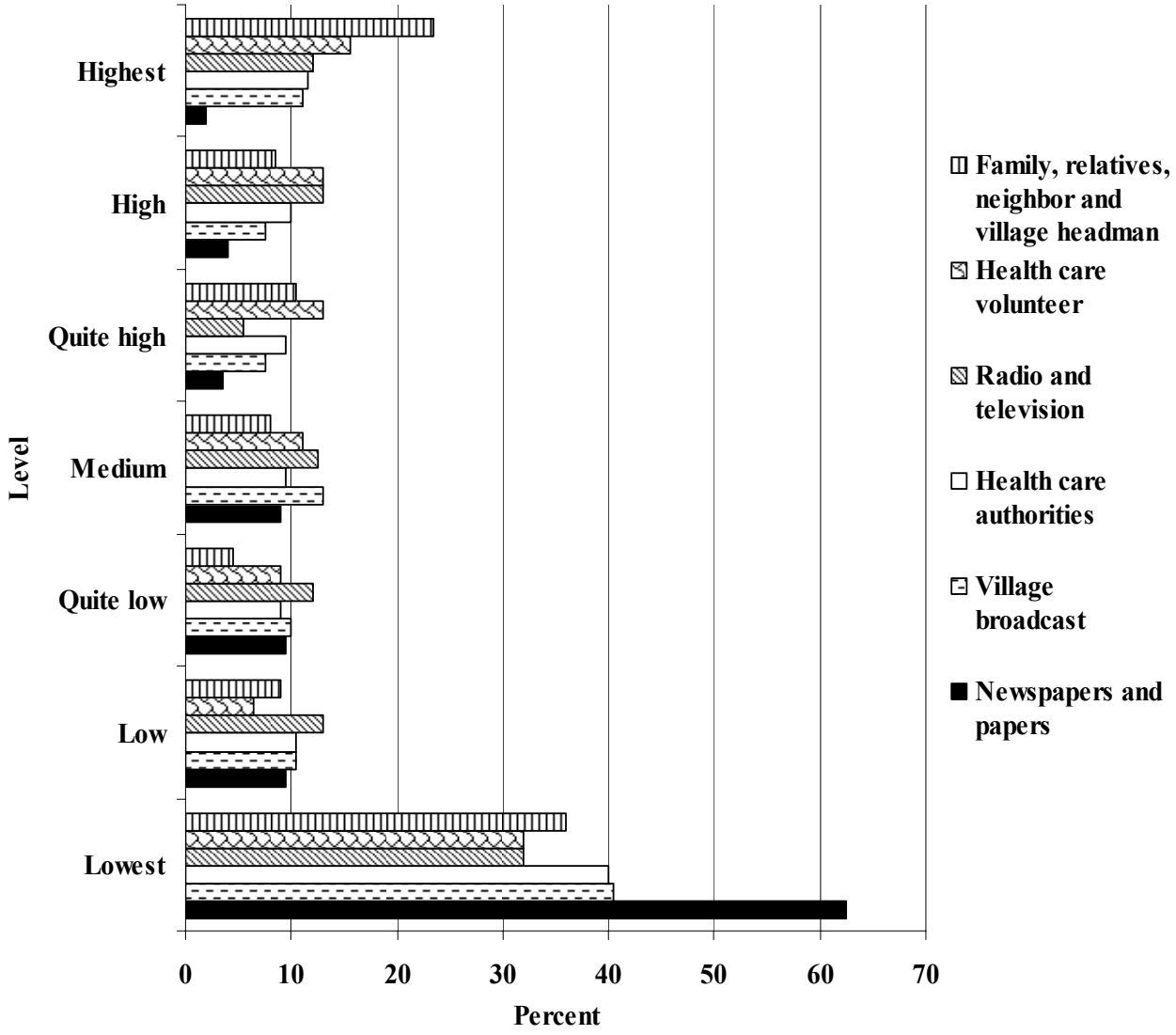


Source: Own survey (2004)

8.2.6 The Channel of Households' Perception of Health Insurance Information

The success of distributing health insurance depends somewhat on knowing the ways of how the household is getting its information. Figure 8.6 depicts the sources of information, which a household can access. It shows that newspapers, journals, brochures and posters are used little as information source because poor households generally display a low level of education and some are illiterates.

Figure 8.6 Role of Different Source of Media and Social Group On The Perception of Health Insurance Information of Household

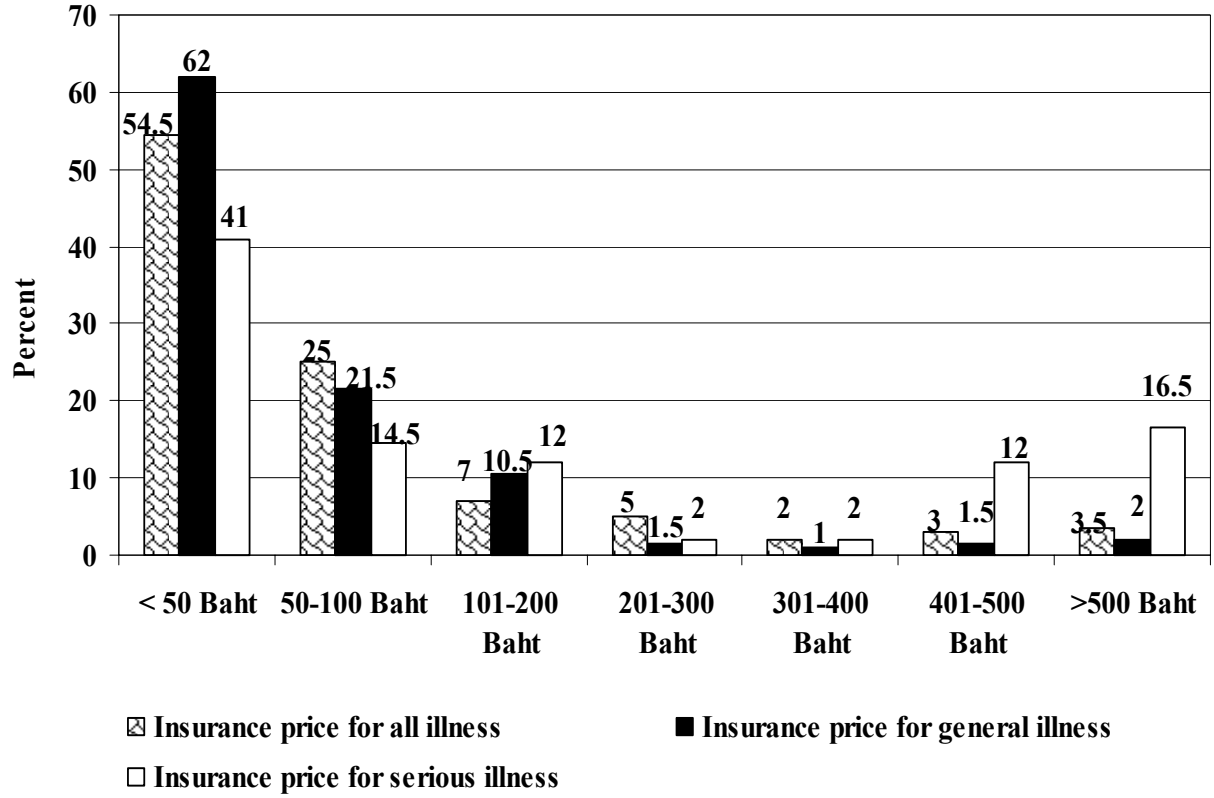


Source: Own survey (2004)

8.2.7 The Price of Health Insurance

Figure 8.7 shows the health insurance price, which households can afford and expect to pay. Assuming there are three types of health insurance, i.e., insurance covering all sorts of illness, insurance covering some sorts of illness such as cough and general illness, and insurance for specified serious illnesses, the willingness to pay does not vary between the three types. Most households decide to pay a premium below 50 Baht (US$ 1.3) per time visit for all insurance types. For the insurance which covers just serious illnesses, some households gave the opinion that they would be willing to pay a higher price.

Figure 8.7 The Price of Health Insurance which Households Can Afford and Expect to Pay in Percent



Source: Own survey (2004)

Table 8.3 shows the tendency of household in having insurance. About 81.5% of the households wished to have health insurance to reduce the uncertainty before getting sick. About 18.5% of the households stated that they would like to acquire insurance after they get sick.

Table 8.3 The Tendency of Household in Having Insurance

Insurance	Frequency	Percent
Have insurance before getting sick to cover risks	163	81.5
Do not wish to have insurance before getting sick	37	18.5
Total	200	100

Source: Own survey (2004)

8.2.8 The Satisfaction of the Premium Payment of Households

The survey comprised a question about the households' opinion towards the payment mode for insurance if there were a new insurance product in the market. The majority of households replied that their preference to pay is per

hospital visit as in the existing 30 Baht health insurance program of the Thai Government. However, it should be pointed out that this system does not reflect a true insurance system, but rather asks the sick to pay a contribution to the health costs of the Government. About 21% of the household chose to pay the premium per year (Table 8.4).

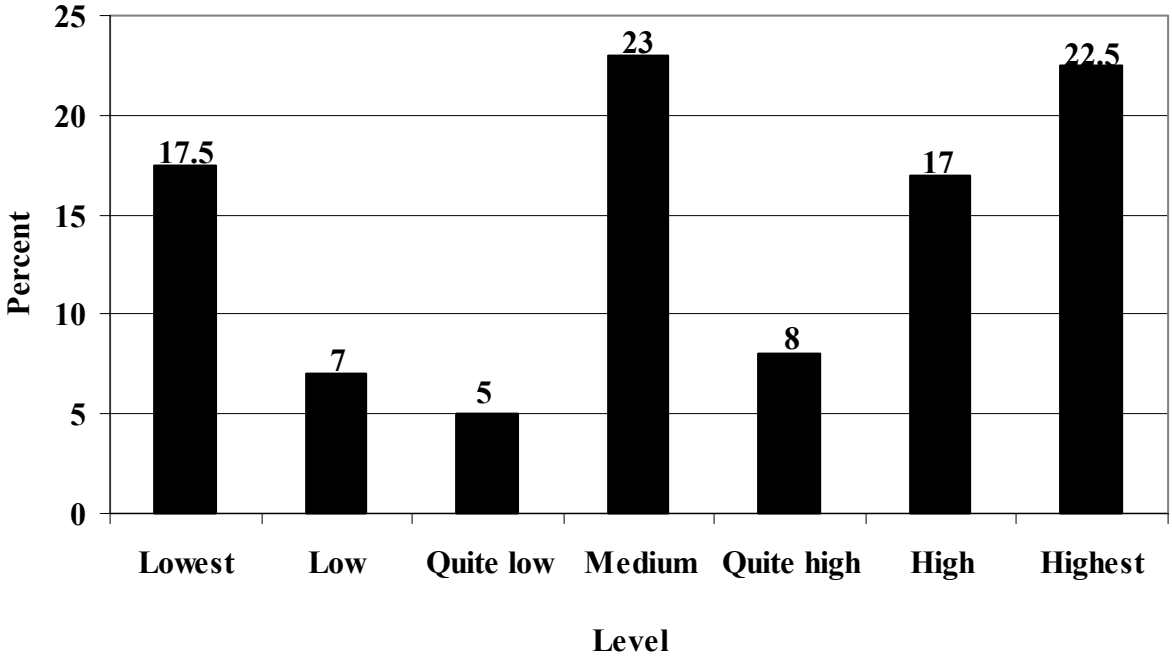
Table 8.4 The Selection Ways of Household to Pay Health Insurance Premium in Percent

The ways to pay insurance premium	Frequency	Percent
Pay per time visit hospital	147	73.5
Pay per month	11	5.5
Pay per year	42	21.0
Total	200	100.0

Source: Own survey (2004)

Households were asked about their ability to carry the costs when somebody in the household gets seriously ill. Most of the households reported that they have the ability to pay because they have 30 Baht Health Insurance Card. Prior to having the Health Insurance Card, they said that it was difficult to cope with the expenses in case of a household member having an accident or getting ill (Figure 8.8).

Figure 8.8 The Ability to Pay of Household When Get Serious Illness in Percent



Source: Own survey (2004)

8.3 Logistic Regression Analysis of Household Demand for Health Insurance

This section has the purpose to estimate the household demand for health insurance. The data used relate to household health, accessibility to health insurance information, decision making process of household members regarding acquiring health insurance, household health protection, illness of household member, benefit of health insurance, experience of using health insurance, health insurance price and willingness to pay, health seek behavior, and policy implication for health insurance development.

8.3.1 Econometric Model

The factors affecting the demand for health insurance are analyzed using a binary logistic regression model. The logistic model is specified as follows:

$$Log_e\left(\frac{P_x}{1-P_x}\right) = \beta_0 + \beta_1 X_{1i} + \ldots + \beta_k X_{ki} \tag{8.1}$$

Or $$Logit(P_x) = Log_e\left(\frac{P_x}{1-P_x}\right) \tag{8.2}$$

Where

P_x = the probability of purchasing health insurance concept

$1-P_x$ = the probability of not purchasing health insurance concept

The explanatory variables are as follows; 1) gender, 2) age, 3) household income, 4) number of family member, 5) tribe, 6) household health risks, 7) severity of household sickness, 8) accessibility to health insurance information, 9) role of people to encourage to acquire health insurance, 10) past experience of using health insurance concept, 11) the perception of the benefit of health insurance, 12) price satisfaction on health insurance concept, and 13) number of time consulting doctor.

8.3.2 Estimated Household Demand for Health Insurance

The result from the household demand model for health insurance is presented in this section. The household demand model for health insurance captures two things from the left hand side simultaneously, that are, the probability of purchasing health insurance and the probability of not purchasing health insurance. The independent variables used in the estimation of the regression analysis are shown in Table 8.5.

Table 8.5 shows that the number of times consulting a doctor, price satisfaction, accessibility to health insurance information, gender, and household health risks have a positive effect on household's decision to purchase health insurance. Those variables are significant at the 95% confidence interval.

The odds ratio (Exp (B)) is interpreted as follows. The higher the odds ratio means the higher the probability of purchasing health insurance. The household health risk variable has the strongest impact on a household's decision to purchase health insurance.

Table 8.5 Factors Determining a Household's Decision on Insuring Health Insurance in Mae Rim District, Chiang Mai Province, Northern Thailand

Variable in the Equation	B	S.E.	Wald	Sig	Exp(B)
Number of times consulting a doctor (NCD)	0.3735	0.1392	7.2031	0.0073	1.4528
Price satisfaction (PS)	1.269	0.4867	6.7973	0.0091	3.5574
Accessibility to health insurance information (AHII)	1.2405	0.4908	6.3878	0.0115	3.4573
Gender (GEN)	1.3464	0.5982	5.0665	0.0244	3.8437
Household health risks (HHR)	1.84	0.5112	12.9535	0.0003	6.2964
Constant	-9.1987	2.2153	17.2424	0.0000	
Log Likelihood	88.316				
Chi-Square	50.29				
Df	5				
Significance	0				
Percentage of correct predictions	90%				

Source: Own survey in 2004, 2006.

Note: The dependent variable is a household's insuring for heath insurance.
Wald statistic tests the significance of individual logistic regression coefficients for each independent variable.
Exp (B) presents the predicted change in odds for a unit increase in the predictor

The Wald test shows the most important factors determining the purchase of health insurance. It found that the most important factor are household health risks (Wald=12.95), the number of times consulting a doctor (Wald=7.20), price satisfaction (Wald=6.80), accessibility to health insurance information (Wald=6.39), and gender (Wald=5.10).

The result can be written in a logit regression model in Equation (8.3):

$$Log_e\left(\frac{P_x}{1-P_x}\right) = -9.20 + 1.84(HHR) + 0.37(NCD) + 1.27(PS) + 1.24(AHII) + 1.35(GEN) \quad (8.3)$$

The detail of the relationship of each factor from the equation and the estimation of the probability of purchasing or not purchasing health insurance is explained as below in more detail.

Health risks

The assumption is that other factors, which affect the purchase of health insurance, are held constant. It was found that the household health risks variable has a positive relation to the probability of purchasing health insurance (dependent variable) at the 1%-level of significant. The coefficient of the relationship between household health risks and the dependent variable equals 1.84. The value of Exp(B) is 6.30, which means that if households have a high health risk, the probability of purchasing insurance will increase 6.30 times when compared to the probability of not purchasing concept.

Number of times consulting a doctor

Assuming that all other factors are held constant, it was found that the number of times that a household is consulting a doctor has a positive relation to the probability of purchasing health insurance (dependent variable) at the 1% significance level. The value of Exp(B) is 1.45.

Price satisfaction

The price satisfaction variable is positively related to purchasing health insurance at the 1% significance level. The value of Exp(B) is 3.56, indicating that if households have a high price satisfaction, the probability of purchasing

health insurance will increase by 3.56 times when compare to the probability of not purchasing concept.

Accessibility to health insurance information

Assuming other factors, which effect on purchase or not purchase health insurance concept, is held constant. It found that accessibility to health insurance information variable has the positive relation to purchase or not purchase health insurance concept variable (dependent variable) at the level of significant at 0.0115. The coefficient of the relationship between information accessibility variable and dependent variable is 1.2405. The value of Exp(B) equal to 3.50, which mean that if households have high information accessibility, the probability of purchasing concept will increase to 3.50 times when compare to the probability of not purchasing concept.

Gender

Assuming other factors, which effect on purchase or not purchase health insurance concept, is held constant. It found that gender variable has the positive relation to purchase or not purchase health insurance concept variable (dependent variable) at the level of significant at 0.0244. The coefficient of the relationship between gender variable and dependent variable is 1.40. The value of Exp(B) equal to 3.84, which mean that if households are male, the probability of purchasing concept will increase to 3.84 times when compare to the probability of not purchasing concept.

Table 8.6 presents the predicted of the probability of purchasing and not purchasing group. The result shows that 173 households has the probability to purchase and 5 households in purchase group has the probability of not to purchase, which has the percentage of correct prediction at 97.19 %. In overall, the total percentage of correct prediction is 90 %.

Table 8.6 Predicted Probability of not Purchase and Purchase Health Insurance in Number of Respondents and Its Percent Correct

Observed group	Predicted		Percent correct
	Probability of not purchase	Probability of purchase	
Non purchased group	7	15	31.82%
Purchased group	5	173	97.19%
Overall			90.00%

Source: Own survey (2004)

8.3.3 The Development of Health Care Services

The respondents were interviewed as to their opinion regarding the use of health insurance and health care service. Most of the households said that they encounter few problems related to health insurance. Some households recommended that hospitals should increase their number of doctors and health staff so that patients will receive faster service (Table 8.7).

Table 8.7 The Problems of Health Care Service

Problem	Percent						
	Lowest	Low	Quite low	Medium	Quite high	High	Highest
Can not access service because of long queue and slow service	31.5	6.0	5.0	10.5	11.0	14.5	21.5
Do not get service when I go to a non-registered hospital	63.0	6.0	1.5	10.0	3.0	6.5	10.0
Health card covers not all illness	53.0	4.5	3.5	14.0	9.5	8.0	7.5
The card covers not the transfer to other hospital	74.5	3.5	2.0	4.5	3.5	4.5	7.5
Not satisfied with quality of medicine	53.5	6.5	3.0	10.5	7.0	13.5	6.0
Without card, no hospital service	70.0	5.5	3.0	7.5	5.0	4.0	5.0

Source: Own survey (2004)

8.4 Summary of Important Findings

General characteristics of household's health were described by percentage. The result show that the average time respondents get gentle sick is 1 to 2 times last 12 month. Sixty one percent of total has no serious illness. It is 6.5 % of total get severity illness. However, 42% of the respondents stated that the health expenses still represented a relatively high burden to their household budget.

Another part of this chapter examines the household demand on health insurance. Multiple logistic regression analysis was used to analyze factor affecting purchasing or not purchasing health insurance cards. When consider to the behavior of household decision on purchasing health insurance, it found that factor which effecting on purchasing decision depend on various factors, that are, gender, age, household income, number of family member, tribe, household health risks, severity of household sickness, accessibility to health insurance information, role of people to encourage to acquire health insurance, past

experience of using health insurance card, the perception of the benefit of health insurance, price satisfaction on health insurance card and number of time consulting doctor. The result show that factors affecting purchasing the health insurance cards are in the following of important: number of times consulting a doctor, price satisfaction, accessibility to health insurance information, gender and household health risks. The ability of these five factors in predicting the chance of purchasing or not purchasing the health insurance cards is high at 90% confidence interval.

9 CONJOINT ANALYSIS ON THE SUPPLY ON HEALTH INSURANCE

This chapter has the aim to provide concepts as the new alternative health insurance products to support the exiting health insurance system in Thailand and to help the Government to reduce health supporting cost. The potential supply for adapted health micro-insurance is to be estimated on the basis of the 200 household interviews using the so-called Choice Based Conjoint (CBC) analysis. The analysis will be particularly useful as it compares to the governmental health policy that already provides 30 Baht Health Insurance Cards for the rural poor.

The present chapter is structured as follows. Section 9.1 describes concepts of designing health insurance. Section 9.2 presents conjoint analysis model for health insurance concepts. Section 9.3 adds characteristics and descriptive statistics of samples. Section 9.4 shows main effects and two-way effects of health insurance attributes. Section 9.5 illustrates Multinomial Logit analysis of health insurance concepts. Section 9.6 goes into the estimation and comparison of utility of health insurance concepts. Section 9.7 explains the result of market simulation analysis of health insurance concepts. This chapter ends with section 9.8, which are conclusions and recommendations to enhance health insurance concepts.

9.1 Characteristics and Concepts of Designing Health Insurance

In providing health insurance, this study considers five attributes of insurance that are, premium price, client's institution option, coverage level, accessibility and co-payment.

Premium Price: The national health insurance policy of Thailand aims at providing health care service for the poor, which cover most of diseases. The Baht amount the farm household will pay for the health insurance per hospital visit is 30 Baht (US$ 0.8). Originally, the price was even lower, too low to cover the costs of claims. This policy is originated from a desire to charge only "what people can afford" without full consideration of the incurring costs. The health insurance products in this study are provided at three different prices, beginning from the base price 30 Baht, medium price with 60 Baht (US$ 1.6) and higher price to 90 Baht (US$ 2.4).

Client's institution option: There are medical health care institutions such as local health care units, public and private hospitals. Especially local health care units are located close to the community, easy to reach and economize on transportation cost. In Thailand, the existing 30 Baht health care concept is

limited to registered hospitals. In providing insurance, the health care concepts in this study provide more options to potential customers in accessing services in any hospital.

Coverage level: Coverage levels were 1.Outpatient services that cover visits to a range of health service providers. 2. Long-term illness and other chronic illnesses and sickness relating to old age. 3. Medications and diagnosis. 4. Transfer system from local hospital to other hospital in emergency cases. The area of coverage of health insurance in Thailand identified in the study is medication. The conditions of medication in insurance are different between medical expenses, which cover only drug in national drug lists and medical expense, which cover drug outside national drug lists.

Accessibility: Claims payments that are made directly to the health care provider without requiring people to waste time generating own funds to pay for the care. Rapid payment of claims and simple processes are key components that increase accessibility for the poor. Under the Thai health insurance system, poor people pay 30 Baht per time they visit a hospital and do not need to claim for the payment. Therefore, the choice task in health insurance concept in this study will not include claims payment.

Co-payment: The expenses that health insurance will pay, represents a percentage of total medical expenses. In this study, co-payment will not be considered because farm households have no experience in co-payment.

Therefore, the study of health insurance for the poor will consider premium price, client's institution option and coverage level because in offering insurance to the poor, one has to consider the poor's relatively low level of education. An important issue to design the attributes and levels to provide health insurance for the poor is the new health insurance concept and should not be far from their knowledge and imagination. The attributes should not have so many attributes, to avoid confusion (Table 9.1).

Table 9.1 Health Insurance Concepts and Their Empirically Researched Attributes, Levels and Detail

Attribute	Attribute Levels	Detail of insurance	
Price/ Premium	BRAND 30 Baht	-Payment premium :	30 Baht per time use
		-Insurance period:	1 year
		-Medical treatment:	100%
		-Medicines and dressing material, medicaments:	100%
		-Accident and third party liability coverage :	No
		-Dentures:	No
		-Burial or transfer cost:	No
	BRAND 60 Baht	-Payment premium :	Monthly 60 Baht
		-Insurance period:	1 year
		-Medical treatment:	100%
		-Medicines and dressing material, medicaments:	100%
		-Accident and third party liability coverage :	Yes
		-Accident-related aids:	100% up to 500 Baht.
		-Dentures:	No
		-Burial or transfer cost:	No
	BRAND 90 Baht	-Payment premium :	Monthly 90 Baht
		-Insurance period:	1 year
		-Medical treatment:	100%
		-Medicines and dressing material, medicaments:	100%
		-Accident and third party liability coverage :	Yes
		-Accident-related aids:	100% maximum 1,000 Baht
		-Dentures:	60% maximum 1,000 Baht after a qualifying period of 8 months.
		-Burial or transfer cost:	2,000 Baht

Source: Own survey (2004)

Table 9.1 Health Insurance Concepts and Their Empirically Researched Attributes, Levels and Detail (Continue)

Attribute	Attribute Levels	Detail of insurance
Client institution	Any hospital	Access service in any hospital. 90 Baht Concept: No service charge. 60 Baht Concept: Plus service charge 30 Baht per time. 30 Baht Concept: Plus service charge 60 Baht per time.
	Registered hospital	Registered hospital: local health care center, public hospital, normally close to the living area of the insurer. Paid-in-full for the registered hospital. (All insurer must to registered the hospital name into the Concept)
Coverage level	Cover medical expenses only drug in national drug list	Paid-in-full for drug in national drug list.
	Cover medical expenses at all kinds of drug	Paid-in-full for drug in national drug list Outside national drug list: pay 20%, limit 5 times per year.

Source: Own survey (2004)

9.2 Conjoint Analysis Model for Health Insurance Concepts

The basic conjoint analysis (CA) model may be represented by following formula (Malhotra, 2004):

$$Y = \sum_{i=1}^{n} \sum_{j=1}^{m} \beta_{ij} Xij \qquad (8.1)$$

Conjoint analysis in this study is used to quantify and predict client preferences for various levels of attributes. For this purpose, CA frequently employs additive models. The models discussed in Chapter 4 are: the cluster and the componential segmentation model and depicted below (Schrieder, 1994).

$$Y = \sum_{i=1}^{n}\sum_{j=1}^{m}\beta_{ij}Xij + \sum_{i=1}^{n}\sum_{k=1}^{m}\gamma_{jk}Z_k + \varepsilon \qquad (8.2)$$

Y denotes the clients' overall preference, respectively choice for the service alternatives under investigation. These alternatives are described in terms of j-levels for i-attributes. β_{ij} is the part-worth[19] utility associated with the j^{th}-level of the i^{th}-attribute. The part-worth utility measures the relative importance of X_{ij} in estimating the dependent variable. X_{ij} is a control variable to flag either presence (X_{ij}=1) or absence (X_{ij}=1) of the j^{th}–level for the t^{th}–attribute. For a concise overview of the health insurance profiles (constructs) analyzed here, refer to health insurance topic in Chapter 4 above. The attribute of the health insurance profile analyzed here are:

Y = Household health insurance profile choice;
X = Explanatory health insurance concept variable;
Z = Respondent's explanatory background variable;
ε = Error term;

X_i for i = 1 to 3: (1) Premium,
(2) Hospital, and
(3) Coverage

The levels for each attribute are:
X_{ij} for j = 1 to 3: (1) 30 Baht
(2) 60 Baht
(3) 90 Baht
X_{2j} for j = 1 to 2: (1) Registered Hospital
(2) Any Hospital

[19] The contribution of various attribute levels to the overall utility is called part-worth utility.

X_{3j} for j = 1 to 2: (1) Cover expenses only drug in national drug lists

(2) Cover expenses of drug outside national drug lists

The componential segmentation model emphasizes the interaction between service profile X, and the respondents' profile. This requires the extension of the additive model by a vector Z_k that describes the respondents in terms of demographic, socioeconomic and health background variables. Interaction between a person's background variable and the attribute levels X_{ij} is represented by the parameter $\gamma_{jk}.Z_k$ [20], denotes the vector of background variables (Schrieder, 1994).

Componential segmentation can explain the variability of Y for alternative X_{ij} in three ways: (1) variability due to the produce/service attributes; (2) variability due to the persons attributes; and (3) variability due to the interaction between the produce/service and person attributes (Green and Srinivasan, 1978; Moore, 1980). Significant interactions indicate that different sample segments may have different preferences (utility values) for an attribute alternative X_{ij}. The analysis of interaction effects increases the explanatory power since the reaction of market segments to a particular produce/service can be predicted (Green and Srinivasan 1990; Moore 1980; Schrieder 1994).

The contribution of CA is explores in the following section with respect to the design of health insurance concept for the rural poor of Thailand. CA was utilized to determine the importance of selected attributes and the result from the estimation will support for the health insurance development.

[20] The demographic and socio-economic background variables analyzed in this study are: gender, tribe, income, type of health card and illness phenomenon.

9.3 Descriptive Statistics of Samples

The summary statistics for demographic information, health seek behavior and health risks occurrences of households are shown in Table 9.2. Data were collected in Mae Rim district, Chiangmai province. Men and women accounted for 53% and 47% of the households, respectively.

Thai and Hmong hill tribes accounted for 73% and 27% of the households, respectively. The average monthly household income was between 3,000-5,000 Baht (US$ 78.9- US$ 131.6) with 41%.

The households were asked which types of social security services they have presently. The 30 Baht health insurance is the most popular with 88% of households participating in it. Others social security services in the region are the old age health insurance card, and others, accounting for the remainder.

According to the number of times that a respondent had been visiting a doctor and used health insurance during the past twelve months, it was found that 49% of all households visited a doctor less than two times. Fourteen percent of the households had been visiting a doctor more than eight times during the past year.

When household members get moderately sick, the most frequently applied alternative health seek behaviour is to buy drugs from a pharmacy shop with 39%. The next alternative health behaviour is to go to local health care unit with 36%. Others alternative health behaviour are do not cure, go to public hospital, have own treatment, use clinic service and use traditional medicine, amounting for the remainder.

However, public hospital was most selected when a household member was severely sick with 77%. Some of them gave the reason that because the hospital provides fulfilled medical treatment and already for the operation in the emergency case (Table 9.2).

Table 9.2 Descriptive of Household Health Insurance Card Holding, Times Consulting Doctor, Tribe, Health Seek Behaviour, Income by Gender in Percent

	Gender					
	Men (N=106)		Women (N=94)		Total (N=200)	
	Number	Percent	Number	Percent	Number	Percent
Village						
Moo 1 Pong Yang Nai	10	9.43	18	19.15	28	14.00
Moo 2 Pong Yang Nok	11	10.38	21	22.34	32	16.00
Moo 3 Muang Kam	22	20.75	13	13.83	35	17.50
Moo 4 Kong Hae	13	12.26	12	12.77	25	12.50
Moo 5 Pong Krai	5	4.72	7	7.45	12	6.00
Moo 6 Mae Sa Mai	22	20.75	7	7.45	29	14.50
Moo 7 Buak Chan	10	9.43	3	3.19	13	6.50
Moo 8 Pang Lung	10	9.43	4	4.26	14	7.00
Moo 9 Pha Nok Kok	3	2.83	9	9.57	12	6.00
Tribe						
Thai	71	66.98	75	79.79	146	73.00
Hmong hill tribe	35	33.02	19	20.21	54	27.00
Household income per month						
< 3,000 Baht (US$ 78.9)	22	20.75	14	14.89	36	18.00
3,000 Baht and 5,000 Baht (US$ 78.9-US$ 131.6)	40	37.74	41	43.62	81	40.50
5,001 Baht and 10,000 Baht (US$ 131.6-US$ 263.2)	33	31.13	23	24.47	56	28.00
10,001 Baht and 15,000 Baht (US$ 263.2-US$ 394.7)	4	3.77	5	5.32	9	4.50
15,001 Baht and 20,000 Baht (US$ 394.7-US$ 526.3)	-		6	6.38	6	3.00
> 20,000 Baht (US$ 526.3)	7	6.60	5	5.32	12	6.00
Card Type HH holding						
Pay health expenses by own (No insurance)	2	1.89	2	2.13	4	2.00
30 Baht health insurance	92	86.79	83	88.30	175	87.50
Social security health insurance	4	3.77	2	2.13	6	3.00
Old age health insurance	7	6.60	2	2.13	9	4.50
Others	1	0.94	5	5.32	6	3.00

Source: Own survey (2004)

Table 9.2 Descriptive of Household Health Insurance Card Holding, Times Consulting Doctor, Tribe, Health Seek Behavior, Income by Gender in Percent (Continue)

	Gender				Total	
	Men (N=106)		Women (N=94)		(N=200)	
	Number	Percent	Number	Percent	Number	Percent
Times consulting doctor last 12 month						
Less than 2 times	54	50.94	43	45.74	97	48.50
From 3 to 4 times	21	19.81	17	18.09	38	19.00
From 5 to 6 times	15	14.15	16	17.02	31	15.50
From 7 to 8 times	4	3.77	2	2.13	6	3.00
More than 8 times	12	11.32	16	17.02	28	14.00
Health seek behavior in case gentle sick						
Do not cure	9	8.49	10	10.64	19	9.50
Own treatment	8	7.55	3	3.19	11	5.50
Buy drug from pharmacy shop	38	35.85	39	41.49	77	38.50
Traditional medicine	2	1.89	-	-	2	1.00
Public hospital	7	6.60	6	6.38	13	6.50
Private hospital	-	-	-	-	-	-
Local health care unit	39	36.79	32	34.04	71	35.50
Clinic	3	2.83	4	4.26	7	3.50
Health seek behavior in case hard sick						
Do not cure	-	-	1	1.06	1	0.50
Own treatment	-	-	1	1.06	1	0.50
Buy drug from pharmacy shop	2	1.89	-	-	2	1.00
Traditional medicine	-	-	-	-	-	-
Public hospital	78	73.58	76	80.85	154	77.00
Private hospital	6	5.66	2	2.13	8	4.00
Local health care unit	15	14.15	12	12.77	27	13.50
Clinic	4	3.77	2	2.13	6	3.00
Others	1	0.94	-	-	1	0.50

Source: Own survey (2004)

9.4 Main Effects and Two-Way Effects of Multi-Attributes of Health Insurance Concepts

The analysis of main effects is presented in Tables 9.3 to 9.7. By default, CBC estimates utilities for all main-effects. Main effects reflect the impact of each attribute on product choice measured independently of the other attributes (Sawtooth, 2000).

Table 9.3 Attribute Main Effects in Percent of All Respondents, Significance Levels of Attributes, by Gender

Attribute Levels & Chi-square Significance	Gender		Total
	Men (N=106)	Women (N=94)	(N=200)
Premium			
30 Baht	0.32	0.28	0.30
60 Baht	0.15	0.19	0.17
90 Baht	0.16	0.21	0.18
Within Att. Chi-Square	54.25	11.54	58.35
D.F.	2	2	2
Significance	p < .01	p < .01	p < .01
Hospital			
Registered Hospital	0.15	0.17	0.16
Any Hospital	0.30	0.31	0.30
Within Att. Chi-Square	47.86	34.58	82.10
D.F.	1	1	1
Significance	p < .01	p < .01	p < .01
Coverage			
Cover expenses only drug in national drug lists	0.12	0.13	0.12
Cover expenses of drug outside national drug lists	0.30	0.31	0.30
Within Att. Chi-Square	70.16	57.85	127.88
D.F.	1	1	1
Significance	p < .01	p < .01	p < .01

Source: Own calculation.

Result regarding the total sample (N=200) will be discussed first. After that, the sample will be analyzed according to its socio-economics characteristics to determine possible difference in health insurance concept preference that can be attributed to the socio-economic variables (Schrieder, 1994). It is hypothesized that different gender of respondents exhibit different

utility functions. Table 9.3 depicts preference shares by gender and all respondents.

According to the gender, men and women, the overall trends in the percentage distribution of attribute level preference are comparable. All attributes were significant with $p < 0.01$.

The result in Table 9.3 are based on the calculation of a proportion for each level, based on how many times a concept including that level is chosen, divided by the number of times a concept including that level occurred. The analysis of attribute's main effects in percent of all respondents is presented. Each of the main effects is the proportion of times when a concept containing that attribute level occurs that the concept is selected by respondents (Sawtooth, 2000).

The price premium of 30 Baht was the lowest, having been selected in one third of all cased when it occurred. However, a premium of 60 and 90 Baht was less popular, having been selected 17% and 18% of all times it occurred, respectively. Since the price for insurance has three levels, each level appeared exactly once in each task, and the sum of proportions for the three premiums (not shown) is 0.65. The balance, 0.35, is the proportion of tasks in which respondents selected "None".

When looking at the premium by gender, men selected the 30 Baht level more often than women. This does not surprise intuitively. However, it is surprising that the higher premium of 90 Baht was selected more often by women than men because women may realize on quality of health care protection more than men.

The hospital attribute has two levels, which are "any hospital" and "registered hospital". The "any hospital" level was the most popular, having been selected 30% of total of the times it occurred. "Registered hospital" was least popular, having been selected only 16% of total of times it occurred. This indicates already a definite weakness from the perspective of the insured of the present 30 Baht Health Insurance Card of the Thai Government. The sum of proportions for the two hospitals (not shown) is 0.46. The balance, 0.54, is the proportion of tasks in which respondents selected "None".

The coverage of insurance was divided into two options. The concepts which covered medication not listed on the national drug list have been selected 30% of total of times it occurred.

Table 9.4 demonstrates the preference shares by tribe. The significance levels of all attributes were at $p < 0.01$. At the higher premium level, local northern Thai households had the tendency to select "premium 60 Baht" and "premium 90 Baht" more often than members of the Hmong hill tribe. For the hospital selection, both local northern Thai and Hmong hill tribe households had the tendency to select "any hospital" more than "registered hospital". About the coverage, both groups selected "cover expense of drug outside national drug lists".

Table 9.4 Attribute Main Effects in Percent of All Respondents, Significance Levels of Attributes, by Tribe

Attribute Levels & Chi-square Significance	Tribe: Thai (N=146)	Tribe: Hmong hill tribe (N=54)	Total (N=200)
Premium			
30 Baht	0.30	0.30	0.30
60 Baht	0.18	0.14	0.17
90 Baht	0.20	0.13	0.18
Within Att. Chi-Square	31.55	31.50	58.35
D.F.	2	2	2
Significance	p < .01	p < .01	p < .01
Hospital			
Registered Hospital	0.17	0.14	0.16
Any Hospital	0.31	0.28	0.30
Within Att. Chi-Square	60.50	21.64	82.10
D.F.	1	1	1
Significance	p < .01	p < .01	p < .01
Coverage			
Cover expenses only drug in national drug lists	0.13	0.10	0.12
Cover expenses of drug outside national drug lists	0.31	0.28	0.30
Within Att. Chi-Square	90.99	37.23	127.88
D.F.	1	1	1
Significance	p < .01	p < .01	p < .01

Source: Own calculation.

Analyzing the main effects of the attributes along the income ranges of the sample; all attributes were significant except the premium for income range more than 10,001 Baht per month (US$ 263)[21]. The lowest income group with income less than 3,000 Baht per month (US$ 78) selected the 30 Baht premium with 40%. The highest income group with income more than 10,001 Baht chooses “30 Baht premium” accounts for only 25%. All income groups of respondents select more “any hospital” than “registered hospital” (Table 9.5).

[21] In 2006, the Baht was the average at an exchange rate of $1 = 38 Baht and 1 Euro = 49 Baht.

Table 9.5 Attribute Main Effects in Percent of All Respondents, Significance Levels of Attributes, by Income

Attribute Levels & Chi-square Significance	Income per month <3,000 Baht (N=36)	3,000-5,000 Baht (N=81)	5,001-10,000 Baht (N=56)	>10,001 Baht (N=27)
Premium				
30 Baht	0.40	0.29	0.27	0.25
60 Baht	0.14	0.17	0.18	0.19
90 Baht	0.08	0.19	0.23	0.21
Within Att. Chi-Square	53.76	19.79	6.49	2.07
D.F.	2	2	2	2
Significance	p < .01	p < .01	p < .05	not sig
Hospital				
Registered Hospital	0.16	0.16	0.16	0.16
Any Hospital	0.31	0.30	0.31	0.29
Within Att. Chi-Square	15.43	33.86	23.2	9.65
D.F.	1	1	1	1
Significance	p < .01	p < .01	p < .01	p < .01
Coverage				
Cover drug in national drug lists	0.11	0.14	0.11	0.12
Cover drug outside national drug lists	0.32	0.29	0.32	0.30
Within Att. Chi-Square	32.48	34.16	45.6	18.68
D.F.	1	1	1	1
Significance	p < .01	p < .01	p < .01	p < .01

Source: Own survey (2004)

The sample had been classified into 2 groups. The first group, which had 175 households, was the household that had 30 Baht Health Insurance Card. The second group, which had 25 households, was the group who had other type of health insurance card. While all attributes in the group of household that hold 30 Baht Health Insurance Card were significant, the respondents' preference in the other card holding group was sufficient polarized regarding hospital and coverage. There was also differentiated according to those households. Those households that participated already in the 30 Baht Insurance Card would prefer to select 30 Baht premium as same as households that had other cards. At the 60 Baht premium, households that had other cards had a higher preference on this premium than households that had 30 Baht Insurance Card (Table 9.6).

Table 9.6 Attribute Main Effects in Percent of All Respondents, Significance Levels of Attributes, by Card Holding

Attribute Levels & Chi-square Significance	Health insurance card holding	
	30 Baht Health insurance (N=175)	Other (N=25)
Premium		
30 Baht	0.30	0.27
60 Baht	0.17	0.21
90 Baht	0.19	0.15
Within Att. Chi-Square	55.66	4.73
D.F.	2	2
Significance	p < .01	not sig
Hospital		
Registered Hospital	0.16	0.18
Any Hospital	0.31	0.28
Within Att. Chi-Square	78.19	4.95
D.F.	1	1
Significance	p < .01	p < .05
Coverage		
Cover drug in national drug lists	0.12	0.12
Cover drug outside national drug lists	0.30	0.30
Within Att. Chi-Square	111.53	16.36
D.F.	1	1
Significance	p < .01	p < .01

Source: Own survey (2004)

The main effects of the attributes were analyzed along sub-samples differentiated according to the frequency of illnesses in the households over the past year. It became evident that the preference in the attribute describing the 'premium option' was not significant for the respondents who were often to consult a doctor with more than 7 times in last 12 months. However, all attributes were significant for the respondents who consulted doctor less than six times. The general main effect trends showed a lesser preference for 30 Baht premium for the respondent who had higher number of times to consult doctor. The 60 Baht premium was popular among household who went to consult doctor with 3-4 times, while the most frequently illness group had a strong preference for the 90 Baht premium. Considering to the hospital attribute, registered hospital contained the high preference for the respondent who consulted doctor more than 7 times (Table 9.7).

Table 9.7 Attribute Main Effects in Percent of All Respondents, Significance Levels of Attributes, by Illness Phenomenon

Attribute Levels & Chi-square Significance	Illness phenomenon <2 times (N=97)	3-4 times (N=38)	5-6 times (N=31)	>7 times (N=34)
Premium				
30 Baht	0.31	0.30	0.29	0.27
60 Baht	0.15	0.23	0.14	0.20
90 Baht	0.19	0.18	0.16	0.20
Within Att. Chi-Square	42.53	6.68	12.99	3.63
D.F.	2	2	2	2
Significance	p < .01	p < .05	p < .01	not sig
Hospital				
Registered Hospital	0.16	0.17	0.12	0.19
Any Hospital	0.29	0.35	0.31	0.28
Within Att. Chi-Square	35.35	20.65	24.64	5.89
D.F.	1	1	1	1
Significance	p < .01	p < .01	p < .01	p < .05
Coverage				
Cover drug in national drug lists	0.13	0.12	0.10	0.13
Cover drug outside national drug lists	0.29	0.36	0.29	0.31
Within Att. Chi-Square	45.37	39.18	25.26	20.89
D.F.	1	1	1	1
Significance	p < .01	p < .01	p < .01	p < .01

Source: Own calculation.

The analysis of two-way effects (Table 9.8) regarding health insurance attributes can be attained by orthogonal design. The two-way effects analyzed in this section are:

(1) Premium × Hospital,
(2) Premium × Coverage,
(3) Hospital × Coverage, and
(4) None option.

A large Chi Square value suggests a significant interaction effect between the two attributes (Sawtooth, 2000). The result of the two-way effect contingency table clearly indicates that interaction effect between the attribute of

premium and hospital, premium and coverage, and hospital and coverage are significant.

Each effect is classified 'not significant', 'significant with $p < 0.05$', and 'significant with $p < 0.01$' (Sawtooth, 2000). The two-way effect of attributes 'premium' and 'coverage' within gender has a significance level of $p < 0.05$.

Results regarding the total sample (N=200) will be discussed first. Thereafter, the sample will be analyzed with respect to gender to determine the possible difference in the preference of health insurance concept between genders.

At the first sight, the high preference for '30 Baht premium and any hospital', account for 40%. The next attribute of premium and coverage, it becomes evident that the availability of '30 Baht premium and coverage of drug outside national drug lists' prompts a highest share of the respondents, account for 51%. Finally, the attribute of hospital and coverage can explain the higher acceptance rate of 'any hospital and cover drug outside national drug lists', account for 42%.

Analyzing the two-way effects between the attributes by gender describe women express higher preference than men in the attribute of higher premium (two-way effect: '60 Baht × Registered Hospital', '60 Baht × Any Hospital', '90 Baht × Registered Hospital', and '90 Baht × Any Hospital'). The effect of premium for women group also reflects high preference in the attribute of premium and coverage. Furthermore, women also have higher preference than men in the attribute of 'registered hospital × cover drug outside national drug lists' and 'any hospital × cover drug in national drug lists'.

Table 9.8 Attribute Main Effects and Two-way Effects of Attribute in Percent of All Respondents, Significance Levels of Attributes, by Gender

Attribute Levels & Chi-square Significance	Gender		Total
	Men (N=106)	Women (N=94)	(N=200)
Premium × Hospital			
30 Baht × Registered Hospital	0.24	0.21	0.23
30 Baht × Any Hospital	0.42	0.37	0.40
60 Baht × Registered Hospital	0.12	0.17	0.15
60 Baht × Any Hospital	0.19	0.22	0.21
90 Baht × Registered Hospital	0.03	0.08	0.06
90 Baht × Any Hospital	0.28	0.34	0.31
Interaction Chi-Square	20.74	15.50	34.31
D.F.	2	2	2
Significance	$p < .01$	$p < .01$	$p < .01$
Premium × Coverage			
30 Baht × Cover drug in national drug lists	0.14	0.13	0.14
30 Baht × Cover drug outside national drug lists	0.55	0.47	0.51
60 Baht × Cover drug in national drug lists	0.08	0.10	0.09
60 Baht × Cover drug outside national drug lists	0.18	0.23	0.21
90 Baht × Cover drug in national drug lists	0.11	0.16	0.13
90 Baht × Cover drug outside national drug lists	0.21	0.26	0.23
Interaction Chi-Square	7.59	8.00	15.87
D.F.	2	2	2
Significance	$p < .05$	$p < .05$	$p < .01$
Hospital × Coverage			
Registered Hospital × Cover drug in national drug lists	0.13	0.13	0.13
Registered Hospital × Cover drug outside national drug lists	0.18	0.21	0.19
Any Hospital × Cover drug in national drug lists	0.10	0.13	0.12
Any Hospital × Cover drug outside national drug lists	0.42	0.41	0.42
Interaction Chi-Square	23.85	7.22	28.73
D.F.	1	1	1
Significance	$p < .01$	$p < .01$	$p < .01$
None			
None chosen	0.35	0.31	0.33

Source: Own calculation.

9.5 Multinomial Logit Analysis of Health Insurance Concepts

This section introduces a more sophisticated (and stronger) technique for analyzing CBC data called "multinomial logit analysis". A utility is a measure of relative desirability or worth. When computing utilities using logit, every attribute level in a conjoint project is assigned a utility (also referred to as a part-worth). The higher the utility, the more desirable is the attribute level. Levels that have high utilities have a large positive impact on influencing respondents to choose a product (Sawtooth, 2000).

Conjoint analysis begins with the estimation of the part-worth utilities for the total sample. This entails examining the part-worth coefficients, as the size and sign indicate the degree and direction in which respondents prefer a particular level of an attribute. Logit analyses are often evaluated by Chi Square statistics. The Chi Square test showed that the overall model was significant at the 1% level. A t-test was used to test the null hypothesis that the part-worth estimates are equal to zero. The estimated coefficients for all attribute levels were significant at the 1% level of confidence (Mclennon, 2002).

The relative importance of product attributes was calculated using the part-worth utility values from the ordered multinomial logit model. To determine the relative importance of an attribute, each attribute's highest and lowest part-worth utilities are utilized. The difference between the highest and lowest part-worth values establishes the utility range for the given attribute. Once the utility range for all attributes is determined, the relative importance of each attribute is calculated by dividing the utility range for the attribute by the sum of all attributes (Harrison et al., 1998).

The equation used is,

$$RI_i = \left[\frac{\text{Utility Range}}{\sum \text{Utility Range} \; \forall \; \text{attributes}} \right] \times 100 \tag{9.3}$$

where RI_i is the relative importance for the *i*th attribute.

The results presented in Table 9.9 indicates that the coverage of medicine that describes the benefit of health insurance concept was determined to be the first most relevant attribute, accounting for almost 30% of the preference rating. The second most important attribute contributing 24%, was the selection of the hospital. The third important attribute was the premium, contributing 13% to the total of relative important.

To aid in the interpretation of the effects of individual characteristics on health insurance preferences, several demographic variables were included in

the model. The socio-demographic characteristics used were gender, tribe, monthly income, holding of real other health card, and illness phenomenon (see Tables 9.9 to 9.13).

From Table 9.9 to 9.13, the number of parameters estimated here are 5, obtained by adding the total number of levels and subtracting the number of attributes. With five degrees of freedom, a Chi Square of about 15 would be significant at the 1% level. The obtained value of Chi Square, for example in Table 9.9 is at 369.33, this value is safely larger than 15, so we would conclude that respondent choices are significantly affected by the attribute composition of the concepts.

The t-Ratio is a measure of the significance of the difference between that level's effect and the average of zero for all levels within the attribute (Sawtooth, 2000). In Table 9.9, all attributes are significant.

Table 9.9 depicts the estimation results regarding gender and all respondents. The relatively large coefficient (effect) for the 'premium of 30 Baht' suggests that this type of premium increases the average respondent's preferences for health insurance concepts. The presence of this attribute will increase utility with a part-worth value of 0.66. A 'coverage drugs in national drug lists' causes a reduction in part-worth utility as indicated by the negative coefficient. This suggests that consumers in general want more drug coverage, and even the coverage of all drugs in the national drug list would not add to consumer utility. The attribute, 'none' option had the second largest positive coefficient of 0.64. In general, the presence of a 'none' option increases the average consumer's overall preference for health insurance concepts. The level of 'any hospital' had the lowest effect on respondents' utility. However, if the coverage includes drugs outside the national drug lists, the average consumer preference for health insurance increased by 0.52. The 'registered hospital' level decreased overall preference and utility by 0.27, which suggests that health care concepts that rely on a pre-determined list of registered hospitals decrease the average respondent preference for health insurance.

According to gender, men and women are differing significantly in the perception of the relative importance of premium attribute levels. Table 9.9 shows, e.g., those men perceive a higher utility from the 'premium of 30 Baht' than women. The presence of this attribute will increase their utility with a part-worth value of 0.89. This finding can be explained that men might prefer the low cost of insurance because men have a strong health.

Table 9.9 Multinomial Logit Estimation of Average Utility Values for Health Insurance Attributes, by Gender

	Gender				Total	
	Men		Women			
	Effect	t Ratio	Effect	t Ratio	Effect	t Ratio
Premium						
30 Baht	0.89283	9.40704	0.40646	4.16365	0.65899	9.73349
60 Baht	-0.40433	-4.21172	-0.30719	-3.21073	-0.35371	-5.23762
90 Baht	-0.48850	-3.91823	-0.09926	-0.77046	-0.30528	-3.42456
Relative importance in %	12.11%		14.89%		13.42%	
Hospital						
Registered Hospital	-0.29079	-4.62447	-0.25621	-4.11994	-0.2708	-6.14989
Any Hospital	0.29079	4.62447	0.25621	4.11994	0.2708	6.14989
Relative importance in %	23.11%		24.82%		23.92%	
Coverage						
Cover national drug list	-0.54642	-8.7381	-0.48373	-7.54752	-0.51472	-11.5325
Cover all drug list	0.54642	8.7381	0.48373	7.54752	0.51472	11.53253
Relative importance in %	30.19%		29.08%		29.67%	
NONE	0.78076	8.35798	0.49148	4.99772	0.64184	9.52322
Relative importance in %	34.59%		31.21%		33.00%	33.00%
Chi Square	252.33		131.97		369.33	369.33

Source: Own survey (2004)

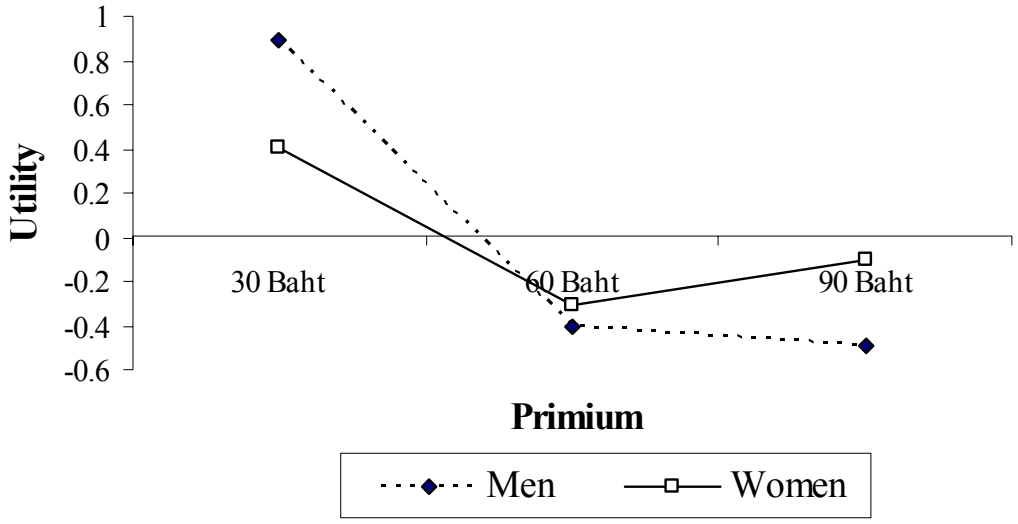
For interpreting the results, it is helpful to plot the utility functions. The utility function values for each attribute given in Table 9.9 are graphed in Figure 9.1. As it can be seen from Table 9.9 and Figure 9.1, the respondents have the greatest preference for a 30 Baht premium when evaluating health concepts. Men have more preference on this premium than women. Second, the 90 Baht premium and 60 Baht premium are least preferred. However, for the 60 Baht premium and 90 Baht premium, women have higher preference than men.

The ‘any hospital’ attribute level is most preferred for both sexes, followed by ‘registered hospital’ (see Figure 9.2). This implies that they do like to the health insurance card to identify ‘any hospital’ on the health card. It may easy for the household to be flexible to use health institution service. However, in the comparison to the present 30 Baht Health Insurance Card, households have to specific the name of registered hospital on the card and it can be used at the hospital, which is identified as on the card.

As may be expected, ‘coverage of drug outside national drug list’ has the highest utility and ‘coverage of drug inside national drug list’ has the lowest

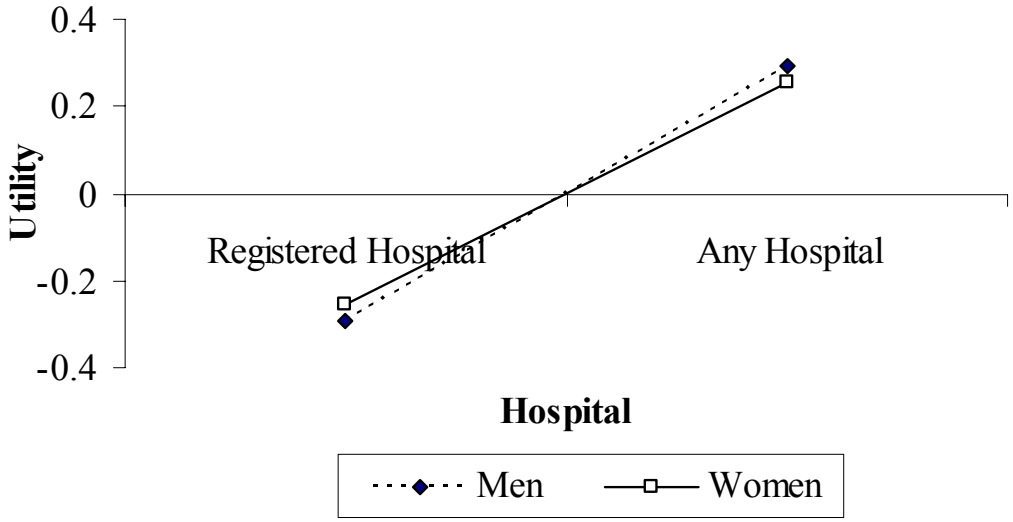
utility. This might because household compared the coverage to the present 30 Baht Health Insurance Card, households might would like to expand the coverage of drug to cover drug outside national drug list in order to save their money because some item of drug outside national drug lists are expensive because they are imported from foreign country (Figure 9.3).

Figure 9.1 Utility Function of Premium Attributes Classified by Gender



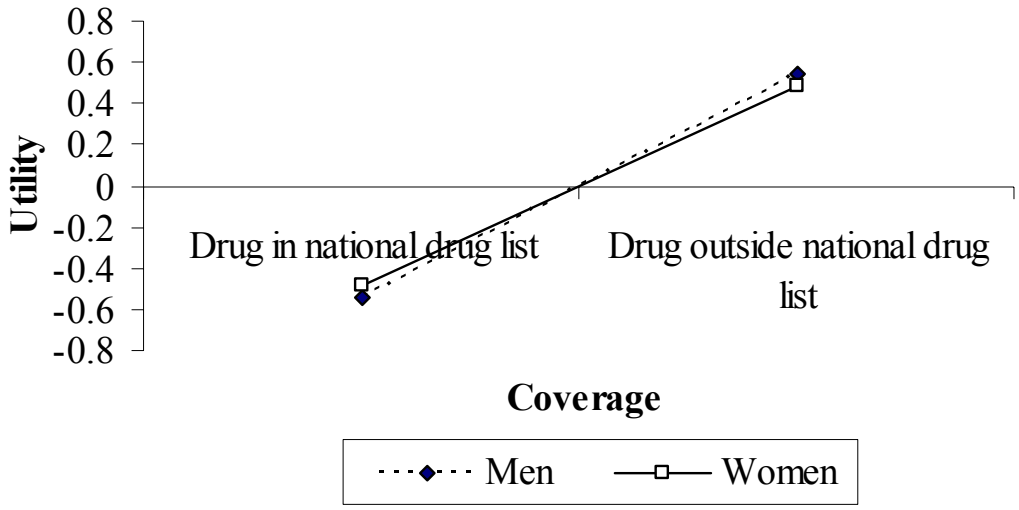
Source: Own survey (2004)

Figure 9.2 Utility Function of Hospital Attributes Classified by Gender



Source: Own survey (2004)

Figure 9.3 Utility Function of Coverage Attributes Classified by Gender



Source: Own survey (2004)

Table 9.10 assigns a high degree of relative importance to the 'coverage' attribute among Hmong hill tribe. At least 31% of the total multi-attribute importance is attached to this attribute. When comparing the preference for the premium among tribes, it is interesting that there is a relatively large coefficient (effect) for the 'premium of 30 Baht' among the Hmong. It suggests that this type of premium increases the average respondent's preferences for the health insurance concepts. The presence of this attribute will increase utility with a part-worth value of 0.97.

Table 9.10 Multinomial Logit Estimation of Average Utility Values for Health Insurance Attributes, by Tribe

	Tribe			
	Thai		Hmong	
	Effect	t Ratio	Effect	t Ratio
Premium				
30 Baht	0.55171	6.99642	0.96606	7.18961
60 Baht	-0.33927	-4.36678	-0.40062	-2.89172
90 Baht	-0.21244	-2.04742	-0.56544	-3.15642
Relative importance in %	14.95%		9.26%	
Hospital				
Registered Hospital	-0.27386	-5.41386	-0.26591	-2.94277
Any Hospital	0.27386	5.41386	0.26591	2.94277
Relative importance in %	25.34%		20.06%	
Coverage				
Cover national drug list	-0.49188	-9.59796	-0.58966	-6.42129
Cover all drug list	0.49188	9.59796	0.58966	6.42129
Relative importance in %	29.00%		31.48%	
NONE	0.5021	6.32165	1.02493	7.79072
Relative importance in %	30.71%		39.20%	
Chi Square	234.6509		150.0453	

Source: Own survey (2004)

Table 9.11 suggests that the health concept preference is differing among income groups. The households, which have an average income of less than 3,000 Baht (US$ 78.9) per month, are the poorest. Among the very poor households, the most important attribute was the ‘coverage’, amounting 34% to the preference rating. However, among the income group with more than 10,001 Baht (US$ 263.2), the most important attribute was the choice of ‘coverage’, amounting 27% to the preference rating.

Table 9.11 Multinomial Logit Estimation of Average Utility Values for Health Insurance Attributes, by Income

Attribute Level	Income per month							
	< 3,000 Baht		**3,000-5,000 Baht**		**5,001-10,000 Baht**		**> 10,001 Baht**	
	Effect	t Ratio	Effect	t Ratio	Effect	t Ratio	Effect	t Ratio
Premium								
30 Baht	1.79342	9.52115	0.57823	5.50141	0.32091	2.50411	0.29371	1.60712
60 Baht	-0.34827	-1.8747	-0.29555	-2.83668	-0.43702	-3.44602	-0.33936	-1.8791
90 Baht	-1.44514	-5.65816	-0.28268	-2.06747	0.11612	0.6839	0.04565	0.18961
Relative importance in %	8.33%		13.99%		15.48%		14.20%	
Hospital								
Registered Hospital	-0.23599	-1.92322	-0.30927	-4.45734	-0.25489	-3.16776	-0.24946	-2.13956
Any Hospital	0.23599	1.92322	0.30927	4.45734	0.25489	3.16776	0.24946	2.13956
Relative importance in %	25.93%		24.49%		21.73%		24.07%	
Coverage								
Cover national drug list	-0.73651	-6.38044	-0.39568	-5.82845	-0.59241	-6.76303	-0.534	-4.26591
Cover all drug list	0.73651	6.38044	0.39568	5.82845	0.59241	6.76303	0.534	4.26591
Relative importance in %	33.80%		27.78%		30.95%		27.16%	
NONE	0.92253	5.06407	0.61716	5.95714	0.53806	4.16556	0.63942	3.523
Relative importance in %	31.94%		33.74%		31.85%		34.57%	
Chi Square	166.48874		124.05301		96.6024		42.14925	

Source: Own survey (2004)

The results in Table 9.12 below illustrate the preference of respondent among concept type the respondent have. The biggest group of respondents holds the 30 Baht Health Insurance Card. The next group of respondents has other card types or non 30 Baht Health Insurance Card group. Among the respondent who use the 30 Baht health Insurance Card, coverage is the most important attribute, with 30%. For the respondents who have other card type, 'coverage' is also being a major important attribute, contributing 26% to the preference rating. When compare the percentage of relative importance of

attribute between these groups, it found that the respondents who have other card type have a higher percentage of relative importance on 'premium' than the respondents who have 30 Baht Health Insurance Card.

Table 9.12 Multinomial Logit Estimation of Average Utility Values for Health Insurance Attributes, by Card Type Holding

Attribute Level	Card Type			
	30 Baht Health Card		Other	
	Effect	t Ratio	Effect	t Ratio
Premium				
30 Baht	0.66781	9.20132	0.62654	3.28204
60 Baht	-0.3989	-5.49725	-0.05048	-0.2705
90 Baht	-0.26891	-2.83195	-0.57606	-2.208
Relative importance in %	13.05%		16.00%	
Hospital				
Registered Hospital	-0.28838	-6.09345	-0.15536	-1.27689
Any Hospital	0.28838	6.09345	0.15536	1.27689
Relative importance in %	23.90%		24.00%	
Coverage				
Cover national drug list	-0.51642	-10.80974	-0.50601	-4.02031
Cover all drug list	0.51642	10.80974	0.50601	4.02031
Relative importance in %	30.19%		26.00%	
NONE	0.63647	8.82549	0.69985	3.66369
Relative importance in %	32.86%		34.00%	
Chi Square	334.98763		39.04623	

Source: Own survey (2004)

The illness phenomenon of respondent varies from other household members. It can be seen in Table 9.13, respondent who get sick less than 4 times a year has low health risks, whereas respondent who get sick more than 7 times a year has high health risks. Considering premium, respondent who go to see doctor between 3 to 4 times have high considering on premium, with 17.54% and this group also give the important of the hospital, with 27.19%. Coverage attribute has the high relative important to respondent who consult doctor more than 7 times, accounting for 30.39% of the preference rating.

Table 9.13 Multinomial Logit Estimation of Average Utility Values for Health Insurance Attributes, by Illness Phenomenon

Attribute Level	Illness phenomenon							
	< 2 times		3-4 times		5-6 times		> 7 times	
	Effect	t Ratio	Effect	t Ratio	Effect	t Ratio	Effect	t Ratio
Premium								
30 Baht	0.73559	7.57466	0.62129	3.90854	0.78891	4.40998	0.43693	2.70515
60 Baht	-0.49382	-4.98963	-0.03945	-0.25776	-0.4586	-2.52118	-0.26602	-1.67689
90 Baht	-0.24177	-1.91579	-0.58185	-2.69584	-0.33031	-1.44753	-0.17091	-0.78613
Relative importance in %	12.20%		17.54%		12.37%		13.24%	
Hospital								
Registered Hospital	-0.2562	-3.9728	-0.32222	-3.29489	-0.46269	-3.79482	-0.12785	-1.25094
Any Hospital	0.2562	3.9728	0.32222	3.29489	0.46269	3.79482	0.12785	1.25094
Relative importance in %	23.02%		27.19%		22.04%		24.51%	
Coverage								
Cover national drug list	-0.47032	-7.42823	-0.57905	-5.68364	-0.59206	-4.76674	-0.50623	-4.7606
Cover all drug list	0.47032	7.42823	0.57905	5.68364	0.59206	4.76674	0.50623	4.7606
Relative importance in %	30.24%		29.82%		26.88%		30.39%	
NONE	0.69401	7.29114	0.34094	2.03859	1.00192	5.74801	0.52899	3.25044
Relative importance in %	34.54%		25.44%		38.71%		31.86%	
Chi Square	184.5616		78.96046		92.08902		42.25712	

Source: Own survey (2004)

9.6 The Estimation and Comparison of Utility of Health Insurance Concepts

The above section illustrated different type of health insurance concepts and segmented preferences among socio-economic groups of households. This section uses utility (part-worth) information to estimate the respondents' interest (preference) for different product concepts (Sawtooth, 2000) to present the relative attractiveness of precisely defined health insurance concepts consisting of the preceding analyzed attribute. The hypothetical concepts are assessed by adding up earlier estimated mean utility levels of attribute levels. The total value of the utility levels is used as exponent and then converted in percentage shares of households likely to select that concept. Thereafter, the relative attractiveness can be expressed by predicting the proportion of respondents that would select one of the proposed health insurance concepts (Schrieder 1994).

The result of the estimating utilities with Logit shows that respondents prefer lower price levels to higher ones. The health insurance concept 30 Baht reflects the highest preference.

The information in Table 9.14 demonstrates that health insurance concepts are evaluated across all respondents. The first two concepts are concept (9) and (6). Both concepts offer maximum average utility value for the attribute of 'premium'. Concept (9) allows the insured to use so-called 'non-registered hospitals'.

Table 9.14 Total Utility Levels of Two Health Insurance Concepts, Concept (9) and (6), Across All Respondents

Concept (9)		**Concept (6)**	
Attribute Levels	Average Utility Value	**Attribute Levels**	Average Utility Value
30 Baht	0.65899	30 Baht	0.65899
Any Hospital	0.2708	Registered Hospital	-0.2708
Cover expenses of drug outside national drug lists	0.51472	Cover expenses of drug outside national drug lists	0.51472
Total Utility	1.44451	Total Utility	0.90291
Exp (Total Utility)	4.239774	Exp (Total Utility)	2.466771

Source: Own survey (2004)

The distribution of the percentage proportion of respondents' choice in Table 9.15 depicts, concept (9) is preferred over concept (6). The percentage of respondents who would select concept (9) is 63% and concept (6) 37%.

Table 9.15 Simulation of the Relative Attractiveness of Concept (9) and (6) in Terms of Percentage Proportion of Respondents to Choose Either Concept

	Exp (Total Utility)	**Percentage Population**
Concept (9)	4.239774	63.21845
Concept (6)	2.466771	36.78155
	6.706545	

Source: Own survey (2004)

The health insurance concept (9) distinguishes itself from concept (10) in that it offers the premium 90 Baht, which contains higher coverage for the insured. Thus, concept (9) should be strongly preferred to concept (10) by the respondents. If forced to choose between concept (9) and concept (10), about 72% of the respondents would choose concept (9) and 28% would choose concept (10) (see Tables 9.16 and 9.17).

Table 9.16 Total Utility Levels of Two Health Insurance Concepts, Concept (9) and (10), Across All Respondents

Concept (9)		**Concept (10)**	
Attribute Levels	Average Utility Value	**Attribute Levels**	Average Utility Value
30 Baht	0.65899	90 Baht	-0.30528
Any Hospital	0.27080	Any Hospital	0.27080
Cover expenses of drug outside national drug lists	0.51472	Cover expenses of drug outside national drug lists	0.51472
Total Utility	1.44451	Total Utility	0.48024
Exp (Total Utility)	4.239774	Exp (Total Utility)	1.616462

Source: Own survey (2004)

Table 9.17 Simulation of the Relative Attractiveness of Concept (9) and (10) in Terms of Percentage Proportion of Respondents to Choose Either Concept

	Exp (Total Utility)	Percentage Population
Concept (9)	4.239774	72.39759
Concept (10)	1.616462	27.60241
	5.856236	

Source: Own survey (2004)

In the following Table 9.18 and 9.19, bringing concepts (9) to compare to concept (2), it can be shown that concept (9) is dominating over concept (2). Concept (2) differs from concept (9) in the insurance premium. The respondents displayed a higher percentage for concept (9) than concept (2).

Table 9.18 Total Utility Levels of Two Health Insurance Concepts, Concept (9) and (2), Across All Respondents

Concept (9)		**Concept (2)**	
Attribute Levels	Average Utility Value	**Attribute Levels**	Average Utility Value
30 Baht	0.65899	60 Baht	-0.35371
Any Hospital	0.27080	Any Hospital	0.27080
Cover expenses of drug outside national drug lists	0.51472	Cover expenses of drug outside national drug lists	0.51472
Total Utility	1.44451	Total Utility	0.43181
Exp (Total Utility)	4.239774	Exp (Total Utility)	1.540042

Source: Own survey (2004)

Table 9.19 Simulation of the Relative Attractiveness of Concept (9) and (2) in Terms of Percentage Proportion of Respondents to Choose Either Concept

	Exp (Total Utility)	Percentage Population
Concept (9)	4.239774	73.35482
Concept (2)	1.540042	26.64518
	5.779817	

Source: Own survey (2004)

Therefore, the result suggests that rural households have a very preference for the '30 Baht premium' because most rural households are poor and this premium level is already known to them from the public health insurance card. Households can afford this premium under their income limitation. Most households in the survey have already the 30 Baht Health Card and they still have a strong preference and willingness to pay this premium. It was also found that the coverage of drugs outside the national drug lists is an important attribute. At present, under the 30 Baht Health Card, drugs outside the national drug list are not covered. So, household concentrate on this attribute. Yet it is clear that such an extension of coverage can not be attained at the present low premium level. Under the exiting 30 Baht Health Card, hospitals are limited to

registered hospitals. The conjoint analysis showed, however, that households would prefer more flexibility in the choice of hospital services.

9.7 Market Simulation Analysis of Health Insurance Concepts

Within the marketing tradition, results from conjoint analysis studies are commonly used in market simulation models (Green, et al. 2001; Deal, 2003). These simulations take the relatively abstract part-worth utilities and turn them into information more useful and understandable from a managerial perspective. When individual-level data are not available, a Share of Preference (SP) model can be used on the aggregate-level data. The SP model involves summing the utilities for each alternative. The utilities are the exponentiated and then converted to percentages that sum to 100. One drawback of the SP model is that it is susceptible to the independence of irrelevant alternatives (IIA) property, which is commonly associated with the aggregate logit model (Orme, 2002).

This section presents the estimated utilities and uses them to explore the values and importance that household's selection on the various attributes of health insurance. These results are then used in share of preference to show household preferences among sets of competing health insurance concepts. Results from modelling at an aggregate scale are used to provide some understanding of the importance of incorporating heterogeneity.

Usually the first step in using the market simulator is to define a "Base Case Scenario". A base case typically reflects a current (or future) market scenario: your brand vs. the relevant competition (Sawtooth, 2006).

This work assumes concept (9) as the base case scenario in the market. Next let us assume that government is interested in entering four new possible products that may appeal to the insured and government want to investigate its potential with respect to the existing product. Table 9.20 first presents the product specification and its share of preference. It notes that concept (9) is the most preferred product.

Table 9.20 Product Specification and Its Share of Preference

Attribute	Product				
	Product 9	**Product 6**	**Product 10**	**Product 2**	**Product 8**
Premium	30	30	90	60	30
Hospital	2	1	2	2	2
Coverage	2	2	2	2	1
Product Shares of Preference	42.26	24.83	9.14	10.77	13.00

Source: Own survey (2004)

Table 9.21 assumes that there will be some change in the attributes of concept (9). In case 1, the premium of product (9) is changed to 60 Baht, other attributes are held constant. Under this scenario, product (6) contains maximum utility. Consumers will also have a high preference for product (6), if product (9) changes the premium to 90 Baht.

Table 9.21 Sensitivity Analysis of the Changes in Attributes

	Product Specifications	Product 9	Product 6	Product 10	Product 2	Product 8
Based case scenario	Premium	30	30	90	60	30
	Hospital	Any	Registered	Any	Any	Any
	Coverage in/outside national drug lists	Outside	Outside	Outside	Outside	Inside
	Product Shares of Preference	42.26	24.83	9.14	10.77	13.00
Case 1	Product Shares of Preference	15.73	36.24	13.34	15.73	18.97
Case 2	Product Shares of Preference	13.66	37.13	13.66	16.11	19.43
Case 3	Product Shares of Preference	30.07	30.07	11.07	13.05	15.74
Case 4	Product Shares of Preference	18.37	35.1	12.92	15.23	18.37

Source: Own survey (2004)

Note: Case 1 is product (9) change premium to 60 Baht, other products remain the same.

Case 2 is product (9) change premium to 90 Baht, other products remain the same.

Case 3 is product (9) change hospital to registered hospital; other products remain the same.

Case 4 is product (9) change coverage to cover drug in national drug lists, other products remain the same.

9.8 Summary of Important Findings and Recommendations

In providing insurance for the poor, there are many factors to be considered such as household socio-economics, the incidence of health, the affordability of household and others. Results from this study of demand for health insurance indicate that the number of times consulting a doctor, price satisfaction, the accessibility to health insurance information, gender, and household health risks have a positive effect on household's decision to purchase health insurance.

In order to estimate the relative empirical importance of health insurance concepts, CA was used to determine how respondents with different demographic characteristics rate different health insurance concepts. CA provides the means to determine which attribute characteristics contribute

positively or negatively to respondents' total preferences of health insurance concepts.

An ordered logit regression analysis was used to estimate the rating on the 18 hypothetical health insurance products. The product profiles receiving the highest rating was "product (9)" which had the attributes 'premium 30 Baht', 'coverage of drug expenses outside national drug list' and 'select any hospital'.

The attribute that was found to be most significant in providing utility to the respondents was "premium 30 Baht" and "coverage drug expenses outside national drug lists". This was evident in the significance of the parameter estimates.

The relative importances of attributes were coverage and hospital with 30% and 24%, respectively. Results suggest that respondents have definitive preferences for health insurance and, in general, need more information on the benefit of doing health insurance. The results of the CA indicate that on the whole, differences in gender, tribe, monthly income, health concept holding, and illness phenomenon were significant determinants for health insurance.

Several important findings emerge from the analysis of the determinants of consumer attitudes towards these types of health insurance products. Consumers in general do use "premium 30 Baht" as a source of information when purchasing health insurance concepts and "coverage of drug outside national drug list" play even greater roles when consumers are choosing new concepts. Therefore, health insurance concept, which essentially are new concepts, need to be cheapest for consumers to willingly purchase them.

10 QUALITATIVE AND QUANTITATIVE ASSESSMENT OF VULNERABILITY TO POVERTY IN NORTHERN THAILAND

Many argue that poverty is intimately close to "vulnerability". However, there is no consensus about how to define and measure vulnerability. This chapter proposes an empirical measure that allows the setting of a vulnerability to poverty by applying the Thailand poverty line as a benchmark. Risks as the source of vulnerability was first presented in Chapter 6.

In this chapter, we examine the linkage between poverty and vulnerability to poverty by the classification of vulnerable farm households. There are ten different stages to the process of estimating vulnerability in this chapter. Section 10.1 first presents the background of vulnerability and the Thai poverty line. Next, Section 10.2 describes factors responsible for increasing vulnerability. The knowledge of these factors is important to understand how non-poor households can become poor in the future. Afterwards, Section 10.3 discusses the selection of vulnerability indicators. Then, Section 10.4 presents the econometric model to estimate vulnerability. Next, Section 10.5 displays the framework of poverty and vulnerability. Furthermore, Section 10.6 illustrates the results from the econometric approaches to estimating vulnerability to poverty by means of the Feasible Generalized Least Square (FGLS) approach. Moreover, Section 10.7 presents the results of vulnerability to poverty and observed consumption. Section 10.8 is the specification of vulnerable groups in Northern Thailand. Section 10.9 goes into the detail of comparing the household characteristics of poverty. Finally, Section 10.10 ends with the conclusion and policy recommendations.

10.1 Vulnerability, Poverty Incidence and Thailand's Official Poverty Line: Classified by Regions Between 1998 and 2002

Poverty is one of the chronic social problems of Thailand, and both the former and current government has set different strategies to eradicate it. Various interventions have been undertaken to strengthen the grassroots economy, as well as reduce the incidence of poverty. However, it is difficult to solve these problems due to the complexity of the economy and society, and especially the vulnerability of the household itself. There is widespread poverty in Thailand, and many households suffer spells of chronic and transient poverty. Also, the ability of households to cross a given income threshold or poverty line is very small.

In Thailand, the poverty line has been utilized for assessing and monitoring the poverty situation (Table 10.1). The average for the whole

kingdom of Thailand's poverty line in 2002 was 922 Baht per capita, per month. When comparing poverty lines between regions, it was found that Northern Thailand's poverty line in 2002 was 830 Baht per capita, per month, lower than other regions.

Table 10.1 Thailand's Official Poverty Line, Classified by Regions Between 1988 and 2002

Region/Areas	Poverty lines (Baht per capita per month)								
	1988	**1990**	**1992**	**1994**	**1996**	**1998**	**2000**	**2001**	**2002**
Central	**476**	**526**	**599**	**622**	**714**	**876**	**882**	**925**	**930**
Rural/Non-municipal	462	509	581	601	691	864	856	862	866
Urban/Municipal								1,082	1,089
Old Municipal	592	659	744	784	895	968	1,059		
District	466	508	585	603	698	871	861		
North	**459**	**498**	**563**	**581**	**702**	**791**	**777**	**828**	**830**
Rural/Non-municipal	448	486	549	566	696	779	758	781	783
Urban/Municipal								1,011	1,009
Old Municipal	585	626	706	752	846	938	996		
District	445	485	555	569	662	781	766		
Northeast	**443**	**477**	**577**	**611**	**698**	**880**	**864**	**890**	**898**
Rural/Non-municipal	435	469	570	599	687	869	850	856	864
Urban/Municipal								1,059	1,068
Old Municipal	597	641	734	773	883	1,064	1,057		
District	439	472	571	607	696	871	857		
South	**466**	**518**	**582**	**624**	**716**	**843**	**841**	**879**	**890**
Rural/Non-municipal	441	492	553	593	684	804	797	806	819
Urban/Municipal								1,123	1,129
Old Municipal	620	682	763	829	951	1,108	1,100		
District	446	496	559	596	706	812	805		
Bangkok	**587**	**684**	**752**	**835**	**950**	**1,019**	**1,101**	**1,109**	**1,112**
Bangkok Vicinity	**506**	**604**	**666**	**658**	**774**	**935**	**972**	**1,027**	**1,021**
Rural/Non-municipal	474	537	596	614	710	894	884	896	886
Urban/Municipal								1,113	1,110
Old Municipal	568	681	749	838	931	1,015	1,107		
District	469	510	591	620	721	895	890		
Whole Kingdom	**473**	**522**	**600**	**636**	**737**	**878**	**882**	**916**	**922**
Rural/Non-municipal	445	485	566	592	690	840	825	835	841
Urban/Municipal								1,086	1,090
Old Municipal	590	672	746	816	930	1,020	1,086		
District	452	492	573	598	693	848	836		

Source: NESDB (2002)

The poverty line plays a significant role as a benchmark for distinguishing chronic poverty from transient poverty. Many households are not currently in poverty, but they recognize that they are vulnerable, and that shocks or difficulties such as drought, heavy rainfall, a bad harvest, an illness, and unexpected expenses can easily push them into poverty. This aspect of vulnerability has a great influence on the livelihood of household.

Many argue that poverty is intimately close to "vulnerability". However, there is no consensus about how to define and measure "vulnerability". The key difference between poverty and vulnerability is that vulnerability is the ex-ante risk of falling into poverty in the future, while poverty is a present or ex-post measure of household welfare (Mansuri and Healy 2002).

Vulnerability in this study is defined as the probability of experiencing a loss in the future relative to some welfare benchmark. Thailand suffers from high levels of poverty and vulnerability to poverty and inadequate social risk management. The vulnerable groups in Northern Thailand are of course important study areas, but the overall objective of this research is to conduct an operational assessment of vulnerability and social protection interventions within all of Thailand. Moreover, the study's concept of vulnerability expands the scope of poverty analysis into a dynamic, forward-looking dimension by identifying those who are in danger of becoming poor in the future. Therefore, this study emphasizes policy recommendations for reducing rural poverty rates.

Growth has manifested itself in various ways during the last three and a half decades. One is the increase in average household and personal income, and the other is the reduction of the incidence of poverty.

The National Statistical Office (NSO) conducted a large-scale household income and expenditure survey for all of Thailand's regions in 1962/63. This survey eventually provided the first series of income and expenditure data that poverty researchers have continued to use ever since.

The relative income position of the Thai people had already been established at that time. That is to say, Bangkok's population had the highest income, and the Northeast had the lowest income. This pattern has not changed in the past 30 years, although the relative income positions of the people of the South, Central and North do switch from time to time.

Since 1974, researchers on poverty in Thailand have used two significant techniques to measure the extent of poverty in the country. One technique is based on the concept of a household consumption function, where a household expenditure survey produces data that can be used to compute the average consumption function of households in various settings. From this typical Keynesian consumption function, a 'break-even' point is calculated, which provides the level of income completely used up as expenditure. This income level is regarded as the upper limit of poverty in the country, whereby some lower income limit is set as a lower limit to represent the minimum level under which a household or a person could be defined as poor. This level is the

proportion of the 'break-even' income that is spent entirely on food, for example. The incidence of poverty is thus measured as the proportion of households or population living under this lower boundary.

The other technique employs the concept of the minimum amount of food that a person needs in order to survive. This concept of 'nutritional adequacy' is then translated into actual food items and their prices. The minimum amount of income required to purchase said basket of food, plus some necessary non-food items such as clothing, shelter, and medicine, are regarded as the poverty line. The incidence of poverty is obtained by counting the number of households or population having income less than this poverty line, and is presented as a proportion of the total population.

Until now, the first technique, which can be called the 'Consumption Function (CF) Technique' has only been used once (see Medhi and Chintana, 1975), whereas the second technique, which can be called the 'Nutritional Adequacy (NA) Technique' has been much more popular and is regarded as the technique of choice (see Oey Meesook, 1979; and the World Bank, 1980). Despite its popularity, the NA Technique still suffers from a lack of technical refinements. The technique was used once to obtain the poverty line for 1975/76, and that line was used again and again in later years simply by applying price adjustments, without taking into account the changes in household and population structures, their new consumption patterns, and changed standards of living. Indeed, this lack of technical improvement in the standard technique led to a new attempt to draw a poverty line, as will be explained later.

Due to different study techniques and various definitions and uses of units of analysis, it is not possible to have one uniform series of estimates about the incidence of poverty in Thailand. Instead, it is possible to group important poverty studies into 4 series with specific characteristics. In this research, the poverty incidence series II to IV, which were the new poverty incidences in Table 10.2, are shown.

Table 10.2 Poverty Lines and Incidence of Poverty in Thailand, Series II to IV

	Series II			Series III				Series IV[4]		
Region and area	**1975/6**	**1981**	**1986**	**1988[1]**	**1988[2]**	**1990**	**1992**	**1988**	**1990**	**1992**
North	33.2	21.5	25.5	20	22.3	16.7	13.7	49.9	40.3	39.2
Municipality	17.8	8	6.9	10.5	10.5	10.5	3.6			
Sanitary district	19.2	16.2	20.2	15.1	36.4	24.1	17.6	48.8	41.3	29.7
Village	36.4	23.3	27.7	21.6	21.6	16.4	14.2	50.1	40	41.4
Northeast	44.9	35.9	48.2	34.6	36.3	28.4	22.7	67.1	62	55
Municipality	20.9	18	18.7	18.6	18.6	17.7	9.9			
Sanitary district	24.7	20.8	33.3	18.6	41.8	36.9	31.8	53.3	53.1	45.1
Village	48.5	37.9	50.5	36.8	36.8	28.3	22.5	69	63.3	56.2
Centre	13	13.6	15.6	12.9	14.8	13.1	6	40.7	34	23.2
Municipality	11.5	11.7	8.9	7.7	7.7	6.6	0.9			
Sanitary district	8	11.6	11.4	5.9	18.7	19.4	9.2	41.2	35.7	19.7
Village	14.3	14.2	17.4	15	15	12.2	6.1	40.5	45.3	24.3
South	30.7	20.4	27.2	19.4	20.5	17.7	12.1	48.7	42.5	31.9
Municipality	21.7	15.2	8.6	10.8	10.8	9.6	5.9			
Sanitary district	18.1	15.2	8.1	10.2	25.7	29	15.1	34.9	39.1	24.2
Village	33.8	22.2	31.2	21.7	21.7	17.9	12.7	52.2	55.5	33.5
Bangkok	7.8	3.9	3.5	3.5	4.1	2.3	1.22	14.7	8.3	5
City core	6.9	3.7	3.1	2.7	2.7	2.1	1.1	14.2	9.5	4.5
Surrounding provinces	-	-	-	6.6	9.6	2.7	1.7	18.8	4.2	6.4
Whole Kingdom	30	23	29.5	21.2	22.8	18.6	13.7	48.8	43.2	36.5
Municipality	12.5	7.5	5.9	6.1	6.1	5.4	2.5			
Sanitary district	14.8	13.5	18.6	12.2	29.6	25.8	17.2	31.2	27.8	18.8
Village	36.2	27.3	35.8	26.3	26.3	20.7	15.7	55.7	49.3	42.4
Poverty Lines[3]										
Urban	2,916	5,151	5,834	6,203	6,203	6,996	7,632	10,382	11,700	12,764
Rural	1,981	3,454	3,823	4,076	4,076	4,404	4,968	6,868	7,416	8,366

Source: Hutaserani and Jitsuchon (1988)

Note: 1 Applying the rural poverty line to sanitary districts.

2 Applying the urban poverty line to sanitary districts.

3 Baht per person, per year. This is based on a new poverty line.

4 The data for Municipal areas and Sanitary districts are combined to represent urban areas, whereas data for villages are used to represent rural areas.

Poverty continues to fall, and after lowering the poverty headcount below the 1996 pre-crisis level for the first time in 2002, Thailand was able to further reduce the number of poor by about 2 million people between 2002 and the first

half 2004[22], as the poverty headcount fell from 15.6 % to 12.0 % (see Table 10.3). These numbers use a new series of upward-adjusted poverty lines, which raise measured poverty by about 50% and more accurately reflect the current consumption patterns of the poor (see Appendices 1 for discussion on Thailand's poverty line).

Table 10.3 National Poverty Headcount Based On Old and New Poverty Line of Thailand, in Percent of Population

(Percent of Population)

	Based on old poverty line	Based on new poverty line
2000	14.2	21.3
2001*	12.9	19.1
2002	9.8	15.6
2004, First half	n.a.	12

Source: NSO (2004)

Note: *Based on special round of SES (smaller sample sizes)

10.2 Indicator of Increasing Vulnerability to Poverty

The extent of vulnerability is dependent on a household's or a community's assets, for example their natural capital, social capital, human capital, physical capital, and financial capital. Moser (1996) elaborates this concept, stating that vulnerability is inextricably linked with asset ownership, where assets are as follows:

1. **Labor**, which is a valuable asset possessed by most poor people;
2. **Human capital**, such as education, skills, and health, which determine the ability to emerge from poverty and make enhanced use of the labor;
3. **Productive assets** such as land and housing, and tools for production;
4. **Household relations**, which determine the equitable distribution of resources within a family, for example, ensuring that women have equitable access to food and education; and
5. **Social capital**, the relationship between households and within communities based on kinship, religion, and mutual interdependence (Mani, 2003).

The interrelationship between ownership of assets and vulnerability is indicated in Table 10.4.

[22] Preliminary estimates of the National and Economic and Social Development Board based on the latest round of the Socio-Economic Survey (SES).

Table 10.4 Potential Indicators of Increasing and Decreasing Vulnerability for an Individual, Household, and Community

Type of vulnerability	Indicator of increasing vulnerability	Indicator of decreasing vulnerability
	Individual	
Labor	-Loss of permanent job -Decline in secure wage employment -Increase in short-term, casual, minimum wage employment -Acquisition of physical disability	-Increase in household members working, especially women -Increase in home-based enterprises -Increase in jobs held by individual workers
Human capital	-Decline in access to or quality of social and economic infrastructure -Decline in school attendance or increase in the dropout rate -Decline in health clinic attendance	-Substitution of private for public services, such as water pumps, private health care, and private education
	Household	
Housing	-Increased perception of threat of eviction -Deterioration in housing stock -High level of overcrowding	-Resolution of tenure insecurity -Use of plot for intergenerational "nesting"
Household relations	-Erosion of household as a social unit due to change in structure, marital breakdown, or split households -Household extension that reduces the ratio of earners to non-earners—especially the addition of "hidden (unwed or separated mothers)" female household heads -Inability of women to balance multiple responsibilities and community participation -Older daughters undertaking child care -Elderly lacking caregiver -Increase in domestic violence	-Household extension that increases the ratio of earners to non-earners -Sharing of childcare, cooking, and space -Reduction in domestic violence
Social capital	**Community**	
	-Increasing public insecurity in public places -Decline in inter-household reciprocity -Erosion of community-level organization	-Community-based solutions to crime -Inter-household reciprocity -Active, community-based organizations

Source: Moser (1996)

10.3 Discussion and Selection of Vulnerability Indicators

This research work was conducted in Northern Thailand. Primary data were collected in nine villages in the Mae Rim district, Chiang Mai province. The random sample consists of 200 households; 142 local northern and 58 Hmong households. The majority of the population lives in rural areas. The selection of indicators in this study was gathered from various vulnerability research studies.

Table 10.5 Selections of Variables For Analyzing Vulnerability to Poverty

Variables	Selected Variable
Total consumption	/
Consumption per capita	
Total income per year	
Income per capita, per year	
Agricultural income per year	
Total non-agricultural income per year	
Household size (in numbers)	/
Household size squared	
Age of head of household (years)	
Age of head of household square	
Dependency ratio (UNDP formula)	
Dependency ratio (NSO formula)	
Dependent population	
Number of children in the household	
Male head of household	
Female head of household	
Family member: no education	
Family member: primary education	
Family member: secondary education	
Family member: post-secondary education	
Education of head of household: no school	
Education of head of household: primary	
Education of head of household: secondary	
Education of head of household: higher	
Education of head of household (year)	
Education of head of household (level)	
Literacy of head of household: reads	
Literacy of head of household: cannot read or write	

Source: Own survey (2004)

Table 10.5 Selections of Variables For Analyzing Vulnerability to Poverty (Continued)

Variables	Selected variable
Employed head of household	
Occupation of head of household	
Number of employed	
Number of unemployed	
Number of pensioners	
Non-farm full-time employees (adult)	
Occupation 1: agriculture/forest	
Occupation 4:Service Sector and trading	
Owned land	
Cultivated land	
Own animals(1=have, 0=no)	
Livestock value	/
Monetary assets	/
Other asset value	/
Toilet1	
Water source	
Housing condition	
Condition of sleeping rooms in household(1=normal,2=good)	
Risk expense, last 5 years	
Risk expense, t-1	/
Expected risk expense, future	
Other crop loss: insect, plant disease, 1999-2002	
Other crop loss: insect, plant disease, 2003-2004	
Other crop loss: insect, plant disease, future	
Low production price, 1999-2002	
Low production price, 2003-2004	
Low production price, future	
Birth of daughter, 1999-2002	
Birth of daughter, 2003-2004	
Birth of daughter, future	
Chronic disease of other family member, 1999-2002	
Chronic disease of other family member, 2003-2004	
Chronic disease of other family member, future	
Crop loss (weather), 1999-2002	
Crop loss (weather), 2003-2004	
Crop loss (weather), future	

Source: Own survey (2004)

Table 10.5 Selection of Variables For Analyzing Vulnerability to Poverty (Continued)

Variables	Selected variable
Low production, 1999-2002	
Low production, 2003-2004	
Low production, future	
Prolonged sickness of other working family member, 1999-2002	
Prolonged sickness of other working family member, 2003-2004	
Prolonged sickness of other working family member, future	
Drought, 1999-2002	
Drought, 2003-2004	
Drought, future	
Local heavy rainfall, 1999-2002	
Local heavy rainfall, 2003-2004	
Local heavy rainfall, future	
Chronic disease of head of household, 1999-2002	
Chronic disease of head of household, 2003-2004	
Chronic disease of head of household, future	
Alcohol problems of other family member, 1999-2002	
Alcohol problems of other family member, 2003-2004	
Alcohol problems of other family member, future	
Higher input price, 1999-2002	
Higher input price, 2003-2004	
Higher input price, future	
Birth of son, 1999-2002	
Birth of son, 2003-2004	
Birth of son, future	
Prolonged sickness of head of household, 1999-2002	
Prolonged sickness of head of household, 2003-2004	
Prolonged sickness of head of household, future	
Number of last 5-year risk occurrence	
Number of last year risk occurrence	/
Number of future risk occurrence	
Severity of risk	

Source: Own survey (2004)

10.4 Econometric Model to Estimate Vulnerability to Poverty

Feasible generalized least square methodology was employed to find the vulnerability measurement in this study.

By assuming that consumption is log-normally distributed, the estimates can be used to form an estimate of the probability that a household with characteristics X_h will be poor, or the household's vulnerability to poverty level.

$$\hat{V}h = \hat{\Pr}(\ln c_h < \ln c | X_h) = \phi\left[\frac{\ln c - X_h \hat{\beta}}{\sqrt{X_h \hat{\theta}}}\right].$$

10.5 Categorization of Poverty and Vulnerability

The attempt here is to relate the concept of vulnerability to the concept of poverty. This study follows the schema of Chaudhuri (2001) and is presented in Figure 10.1 below. Based on current consumption, the population is classified as poor or not, depending on whether their current consumption exceeds the poverty line. Of this group, the group for which expected consumption is less than the poverty line is termed the chronic poor. Based on the properties of the log normal distribution, this group also has high vulnerability, defined as a greater than 0.5 likelihood of falling into poverty. Households that are poor today, but whose expected consumption exceeds the poverty line are termed transient poor, and this group is further divided into those that face high vulnerability (<0.5), those who are characterized as the frequently poor, and a group that faces low vulnerability (<0.5) who are termed the infrequently poor.

Among the non-poor, those whose expected consumption is less than the poverty line, and who therefore have a high vulnerability, are characterized as vulnerable to chronic poverty. Non-poor households whose expected consumption exceeds the poverty line, but who face a high vulnerability are termed vulnerable to frequent poverty. The non-poor who face a low vulnerability are termed the low vulnerability non-poor. We can also make a distinction by dividing the highly vulnerable group into those that are vulnerable due to having low expected consumption (which includes the chronic poor and those vulnerable to chronic poverty) and those that are vulnerable due to a high consumption variability (which includes the frequently poor and those vulnerable to frequent poverty) (Alayande, 2002).

The poverty and vulnerability categories are illustrated in the diagram below.

Figure 10.1 Poverty and Vulnerability Classification Schemes

		Observed poverty status based on current consumption			
		Poor	Non-Poor		
Vulnerability	High vulnerability > 0.5	Chronic poor	Vulnerable to chronic poverty	Expected consumption < poverty line	**Expected consumption**
		Frequently poor	Vulnerable to frequent poverty	Expected consumption > poverty line	
	Low vulnerability < 0.5	Infrequently poor	Low vulnerability Non-poor		

Source: Bidani and Richter (2001)

Note: **Poor** = chronic poor + frequently poor + infrequently poor

Chronic poor = chronic poor

Transient poor = frequently poor + infrequently poor

High vulnerability group = chronic poor + frequently poor + vulnerable to chronic poverty + vulnerable to frequent poverty

Low expected consumption = chronic poor + vulnerable to chronic poverty

High variability of consumption = frequently poor + vulnerable to frequent poverty

Total vulnerable group = infrequently poor + high vulnerability group = observed poor + high vulnerability non-poor

10.6 Result from Econometric Approaches Estimating Vulnerability to Poverty with FGLS

Estimated vulnerability at household level is calculated using information from the survey in 2004. The method (feasible generalized least squares—FGLS) is employed to determine how log consumption impacts the welfare status of households in the study area. It is recognized that one of the basic

assumptions of ordinary least square (OLS) is that the error term must have a mean zero and constant variance, and that once this constant variance assumption is violated, there is bound to be heteroscedasticity. The relaxation of the constant variance assumption (Chaudhuri 2000) is a method of determining how the variance of the error term (i.e., now a measure of log consumption) impacts overall well-being (proxies by expenditure on food and non-food items) (Oluwatayo 2004).

The results of the model for the log consumption equation and variance of the log consumption (OLS) are shown in Table 10.6 below.

Upon subjecting the data to analysis, the first stage of the OLS reveals that 56.23 % of the variation in log consumption (a measure of well-being) can be explained by the following factors: household size, household size square, education of the head of household above secondary school, non-farm full-time employees adult, livestock value, other asset value, risk expenses in previous year, crop loss from the variation of weather, prolonged sickness of other working family member, chronic disease of head of household, alcohol problems of other family member, and number of last year risks (risks which occurred in 2003). The rest, 43.77%, can be attributed to the disturbance term.

The low R^2 value is not uncommon, and is due to the measurement error (from unobserved and omitted variables) associated with the use of cross-sectional data in consumption studies. However, this measurement error indirectly accounts for the importance of the disturbance term, a variable capturing idiosyncratic factors (which includes risk associated with income). All the variables included in the analysis have some influence on household well-being. For instance, chronic disease of a head of household has a negative influence on the consumption expenditure of households in the study area (Oluwatayo 2004).

In general, most of the model's coefficients (log consumption and variance of log consumption) come up with expected signs. In all samples, household size, livestock value, other asset value, risk expenses in previous year and number of previous year's risks are positively significant in explaining welfare in the study area.

For example, a strong relationship is apparent between log consumption and alcohol problems of other family members, whereby the household which has alcohol problems of other family members has a positive effect on log consumption. An increase in alcoholic family members leads to an increase in log consumption of 0.85 Baht. Households with a high number of alcoholics have higher consumption than households with no family members who are alcoholics.

On the other hand, education of a head of household above secondary school also has a strong relationship with log consumption, but in a negative direction. An increase of one level of education of the head of household above secondary school leads to a decrease in log consumption of 0.91 Baht.

Households with higher education have less consumption than households with lower education.

Table 10.6 Model for Estimating Vulnerability to Poverty by OLS

Variable	Total			
	OLS			
	log (ctn)	P>|t|	Var (ctn)	P>|t|
HH size	0.5224495	0.000	0.1813841	0.286
	(0.0699109)		(0.1696469)	
HH size square	-0.0200081	0.000	-0.0108596	0.283
	(0.0041523)		(0.0100761)	
Edu.head: higher	-0.9123894	0.005	0.7519998	0.331
	(0.3178565)		(0.7713152)	
Non-farm full-time employees adult	-0.1674128	0.015	-0.2894384	0.083
	(0.0684806)		(0.1661761)	
Livestock value	0.0000173	0.000	5.62e-07	0.932
	(2.71e-06)		(6.58e-06)	
Other asset value	3.45e-07	0.000	7.63e-08	0.733
	(9.20e-08)		(2.23e-07)	
Risks expenses in last year	1.37e-06	0.005	-1.21e-08	0.992
	(4.82e-07)		(1.17e-06)	
Crop loss: weather	-0.6081413	0.013	-0.15922	0.786
	(0.2418866)		(0.5869655)	
Prolonged sickness of other working family member	-0.5950342	0.028	0.9522154	0.146
	(0.2689447)		(0.6526251)	
Chronic disease of HH head	-0.7953854	0.008	0.1469757	0.838
	(0.296742)		(0.7200786)	
Alcohol problems of other family member	0.8509862	0.018	0.1302496	0.88
	(0.3561604)		(0.8642641)	
Number of last year risks occurrence	0.2273215	0.025	-0.2076473	0.396
	(0.1004781)		(0.2438217)	
Constant	7.195299	0.000	-1.80514	0.005
	(0.2588878)		(0.628221)	
Observation	200.000	200	200	
R-squared	0.5623		0.0437	
Prob (F)	0.000	0.000	0.000	0.000

Source: Own survey (2004)

Note: Log(ctn) = Log of consumption.
Var(ctn) = Variance of consumption.
Standard errors are in parenthesis.

Table 10.7 Model for Estimating Vulnerability to Poverty by FGLS

Variable	Total			
	FGLS			
	log (ctn)	P>|z|	Var (ctn)	P>|t|
HH size	2.123598	0.000	1.003346	0.000
	(0.086749)		(0.0240794)	
HH size square	-0.1074422	0.000	-0.0532708	0.000
	(0.0059361)		(0.0016477)	
Edu.head: higher	-0.0879954	0.899	0.2829741	0.143
	(0.6931538)		(0.1924023)	
Non-farm full-time employees adult	-0.2807649	0.061	-0.0999501	0.017
	(0.1497249)		(0.0415599)	
Livestock value	0.0000166	0.005	3.36e-06	0.043
	(5.94e-06)		(1.65e-06)	
Other asset value	7.62e-07	0.000	2.94e-07	0.000
	(1.99e-07)		(5.52e-08)	
Risks expenses in last year	3.20e-07	0.761	-2.82e-07	0.336
	(1.05e-06)		(2.92e-07)	
Crop loss: weather	-0.9378419	0.076	-0.3421845	0.021
	(0.5291596)		(0.1468816)	
Prolonged sickness of other working family member	-0.0693554	0.906	0.0312099	0.848
	(0.5876032)		(0.1631041)	
Chronic disease of HH head	-0.3792226	0.559	0.0269286	0.881
	(0.6491174)		(0.1801789)	
Alcohol problems of other family member	-0.1270578	0.870	-0.3414808	0.115
	(0.7762707)		(0.2154735)	
Number of last year risks occurrence	1.438687	0.000	0.7036369	0.000
	(0.1982914)		(0.0550408)	
Constant	No constant		No constant	
Observation	200	200	200	
R-squared			0.9875	
Prob (F)	0.000	0.000	0.000	0.000

Source: Own survey (2004)
Note: Log(ctn) = Log of consumption.
Var(ctn) = Variance of consumption.
Standard errors are in parenthesis.

The results of the regression model by FGLS are illustrated in Table 10.7, which presents the determinants of vulnerability to poverty by FGLS and variance of consumption. The signs of the coefficients found that risks expenses

in last year have a positive impact on log consumption but a negative impact on variance of consumption.

Household size square, non-farm full–time employees adult, crop loss from weather and alcohol problems of other family member have a negative impact on log consumption, as well as on variance of consumption. If, for example, a household faces crop loss from bad weather, it is probably very difficult to smooth consumption, maybe because they undertake highly risky livelihoods. The prolonged sickness of other working family member and chronic disease of household head both decrease log consumption without affecting its variance.

Livestock value tends to increase log consumption and also to increase consumption variance. This suggests that a household may have enough livestock to smooth their consumption during times of hardship. So households may either sell the animals or rent them out.

Household size and number of last year risk both have a positive effect on log consumption and its variance. Results regarding household size is consistent with the fact that the higher household sizes expect an increase in log consumption and its variance. Besides, the higher the number of risk that hit a household the previous year, the more expenditure that household needed to manage risk, which effected household consumption and its variance.

10.7 Vulnerability to Poverty and Observed Consumption

The relationship between vulnerability and poverty is illustrated in Figures 10.2 to 10.5. Figure 10.2 demonstrates this relationship for the whole study area, while the remaining graphs focus on the total poor, the extremely poor, and the non-poor. Each figure uses scatter plots to illustrate the density of the two distributions (consumption and vulnerability) for the sample being considered.

All of the figures have a horizontal line at the 0.5 vulnerability level, separating those who are more likely to be poor – the vulnerable to be found in the upper part of the graph – from those less likely to be poor – the non-vulnerable to be found in the lower part of the graph. The graphs have vertical lines at the level of total poverty lines (the left-hand line) and at the mean of consumption (the right-hand line). These lines separate the extremely poor from the moderately poor and the non-poor (Figure 10.2).

Figure 10.2 illustrates the negative relationship between vulnerability and the logarithm of consumption. The relationship between vulnerability and current consumption is negative, as expected, but with a lot of variation along a hypothetical trend.

Figure 10.2 The Relationship Between Predicted Vulnerability and Log Consumption of Total Household

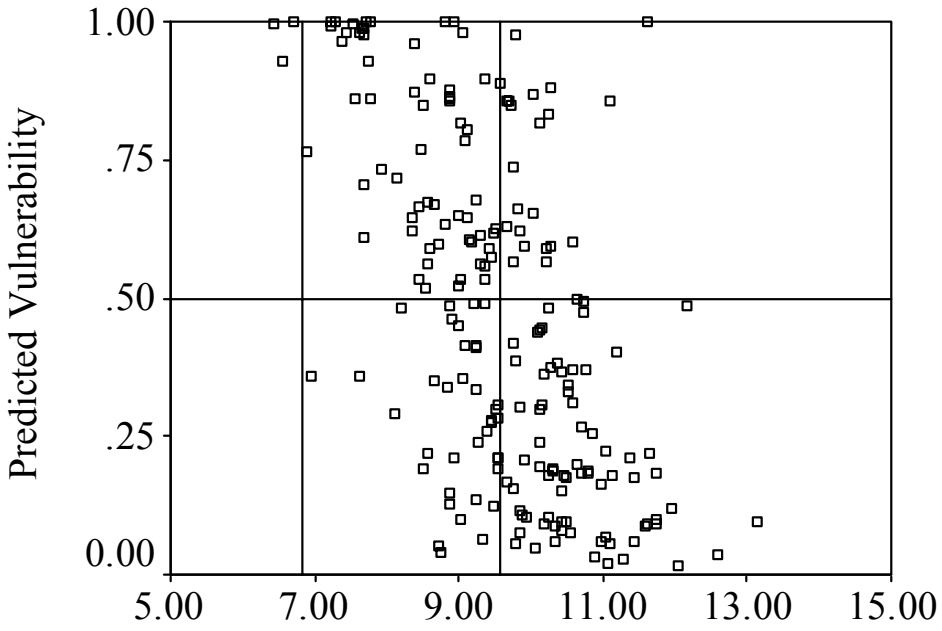


Figure 10.3 focuses on the "extremely poor" portion of the above graph. As expected, almost all of the extremely poor are among the highly vulnerable. The scatter plot of the graph signals that almost all households have a vulnerability index in excess of 0.854, with a vulnerability index in excess of 68.5 %. The rate of exit from the extreme poverty pool is extremely low. This means that the majority of the extremely poor in 2004 were also poor in 2005. This segment of the population is likely to benefit from social programs that increase their human capital and other assets.

Figure 10.3 The Relationship Between Predicted Vulnerability and Log Consumption of the Extreme Poor

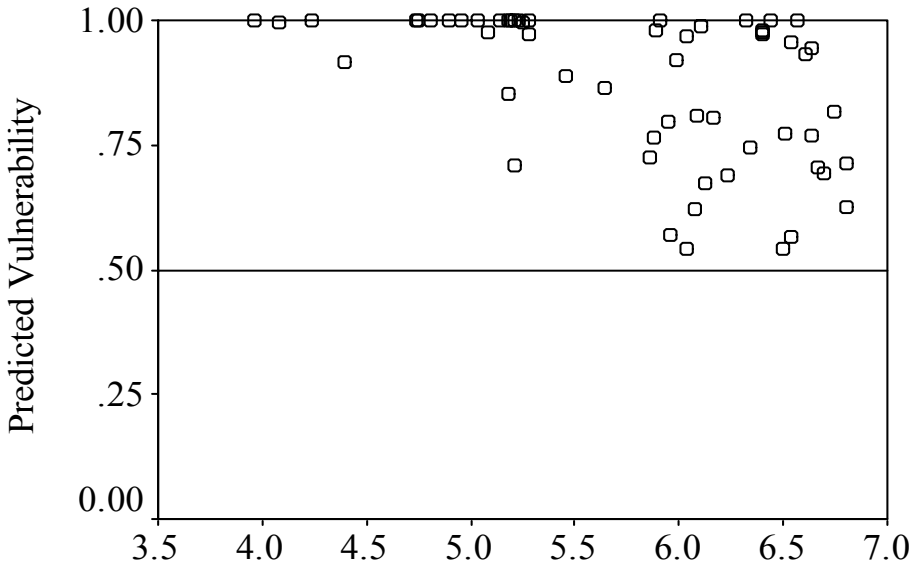


Figure 10.4 The Relationship Between Predicted Vulnerability and Log Consumption of Total Poor

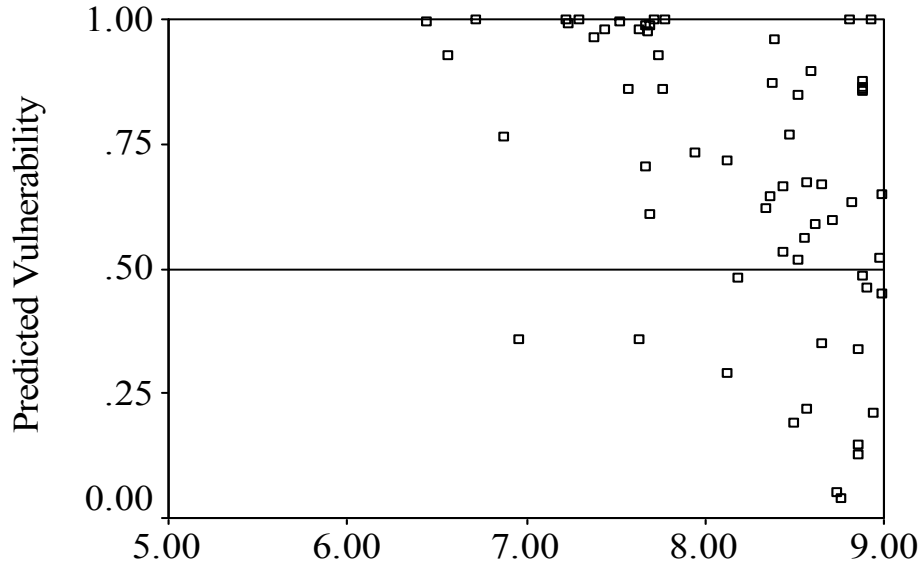
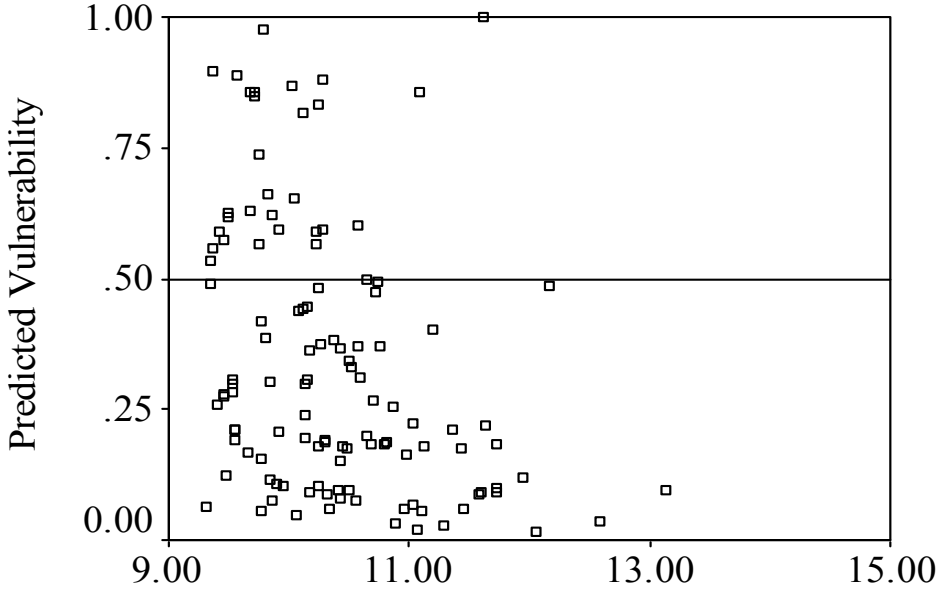


Figure 10.4 presents the joint distribution of vulnerability and consumption among the total poor. From the scatter plot, it can be seen that the total poor have a vulnerability index in excess of 0.6678. This means that the currently poor households will still be poor in the next period.

Finally, Figure 10.5 presents the joint distribution of vulnerability and consumption for the non-poor. From the scatter plot, it can be seen that the non-poor have a vulnerability index of 0.2768. Some of the non-poor are not vulnerable, and those who are vulnerable have consumption levels close to the poverty line.

Figure 10.5 The Relationship between Predicted Vulnerability and Log Consumption of Non-Poor



Non Poor

10.8 Specification of Vulnerable Groups in Mae Sa Watershed

Poverty line measurement in Thailand based on the concept of physical subsistence is called the "absolute" approach. People are defined as poor if they do not have sufficient income to satisfy their basic needs. The poverty line defines the minimum basic needs of the people and is the threshold income below which one is considered to be poor (NSO, 1999).

Poverty and vulnerability in Thailand arises as a result of transient rather than chronic conditions. The main causes of poverty were the lack of land ownership, lack of capital, education and skills, debts, irregular employment, large families, aging and sickness and uncontrollable outside forces (Taneerananon, 2005). This could be a result of chronic condition (e.g. low level of assets and endowments) or a transient situation (e.g. a temporary setback due to shocks). In terms of vulnerability, the main causes are low expected consumption and high variance of consumption. In order to provide policy advice, the literature of (e.g. Bidani and Richter, 2001) should be followed: the pool of vulnerable households are divided into two mutually-exclusive groups, namely (1) those who are vulnerable due to the high volatility of their consumption or the HV vulnerable, and (2) those who are vulnerable due to their low expected mean consumption or the LM vulnerable (Alayande, 2004).

The results demonstrated in Figure 10.6 show that while 42% of the populations in the study area were poor in 2003, the majority of these are chronically poor (11% of the population). The information from this figure also shows that almost one-third, i.e., 30.5% of the total population, is transitorily poor.

In a similar vein, 43.5% of the total population is estimated to be vulnerable to future poverty. This is dominated by low expected mean consumption (LM vulnerability) which accounts for 31% of total vulnerability (or 13.5% of the total population) with almost one-third accounted for by high consumption volatility (or 30% of the total population) as shown in Table 10.6. Therefore, it is important to include the chronic poverty and vulnerable households in the context of planning government policy implications on poverty reduction in rural Thailand in order to build up the wealth of the poor.

The importance of the distinction between the transient poor and the chronic poor and between the high volatility consumption (HV-vulnerable) and the low expected mean consumption (LM-vulnerable) is underscored by the different questions that they pose. The distinction between the transient poor and the chronic poor is based on the question: How often is the household poor? The distinction between HV-vulnerable and LM- vulnerable households is based on the question: Why is the household poor, (Alayande, 2004).

Figure 10.6 Poverty and Vulnerability Classification Schemes

		Observed poverty status based on current consumption			
		Poor 41.5%	Non-Poor 58.5%		
Vulnerability	High vulnerability > 0.5 43.5%	Chronic poor (LM vulnerable) 11%	Vulnerable to chronic poverty (LM vulnerable) 2.5%	Expected consumption <poverty line 13.5%	**Expected consumption**
		Frequently poor (HV vulnerable) 18%	Vulnerable to frequent poverty (HV vulnerable) 12%	Expected consumption >poverty line 86.5%	
	Low vulnerability < 0.5 56.5%	Infrequently poor 12.5%	Low vulnerability Non-poor 44%		

Source: Own survey (2004)

Note: **Poor** = chronic poor + frequently poor + infrequently poor

Chronic poor = chronic poor

Transient poor = frequently poor + infrequently poor

High vulnerability group = chronic poor + frequently poor + vulnerable to chronic poverty + vulnerable to frequent poverty

Low expected consumption = chronic poor + vulnerable to chronic poverty

High variability of consumption = frequently poor + vulnerable to frequent poverty

Total vulnerable group = infrequently poor + high vulnerability group = observed poor + high vulnerability non-poor

10.9 Comparison of Vulnerability to Poverty and Household Characteristics

In Table 10.8, vulnerability is classified by village, ethnicity of household head, gender of household head, age of household head, education of household head, household size and quantity of land owned.

Empirical results show that 43.5% of households are in the vulnerable group, while the rest, or 56.5% of households, are in the non-vulnerable group. There are some differences between vulnerability to poverty in each village. In the aggregate, the number of vulnerable households is highest in Pang Luang, with 78.6%. This is consistent with the reality that this village is located in a very steeply sloped mountain area that is difficult to reach and far away from other villages in the study area. Other villages, such as Khong Hae, Pong Krai and Pong Yang Nok, also have higher percentages of vulnerable households than non-vulnerable households.

When considering the ethnicity of household head, it is shown that the Hmong hill tribe households have less vulnerability to poverty than northern local Thai households (non-hill tribe) with 77.6%. This may be because Hmong hill tribe households generally have a large family size, with family members helping each other work and acquire income. Furthermore, Hmong hill tribe households have low expenditures for luxury consumer goods. For example the amount of furniture in Hmong hill tribe houses is low, while non-hill tribe households perhaps have higher vulnerability to poverty because they have high expenditures and loans to acquire assets in response to their demand.

An assessment of the household head's gender suggests that female-headed households fall into the vulnerable group more than male-headed households. As can be seen from the table, 71.4% of the female-headed households are in the vulnerable group, whereas the male-headed households have an incidence level of 40.2%. The reasons female-headed households contribute more to the vulnerable group probably stems from the difficulties that female heads of households have in finding jobs, in doing hard farm jobs and because they tend to earn less than male-headed households.

According to the age of household head, there are no significant differences between age group and vulnerability to poverty. However, the younger households aged less than 30 is in the vulnerable group, with 53.3%, due to their limited experience in earning a livelihood.

A classification of vulnerability to poverty by the household head's level of education depicts the levels of vulnerability as being higher in households having attended vocational schools, which is estimated to be 60% of the population. This may be the result of this group of people not being able to find jobs in their village appropriate to their degree. Normally, work in a village is an agricultural job that does not require much education. On the other hand, a

household head that has a bachelor's degree has more alternatives. That's why they are in the non-vulnerable group at 66.7%.

Generally, in the modern urban society of Thailand, the household trend is to have a small family. On the other hand, the rural household lifestyle is very different, with rural household's having a more extended family. The family size for rural households is large, and it is advantageous for them to use their family for agricultural work, which reduces the cost of farm work. The higher the number of working family members, the less vulnerable in household is. The information in the tables shows that a household size of 7-9 people is the least vulnerable group. On the other hand, 95.8% of households with less than 3 people are in the vulnerable group.

In terms of classifying vulnerability to poverty by quantity of land owned, 91.7% of rural households possessing more than 20 rai of land fall into the non-vulnerable group, whereas 34.5 - 49% of households that own less than 20 rai of land are vulnerable. The reason for this may be because in agricultural farm work, land is the main factor of agricultural production. Thus, households which possess a large area of land would have a higher possibility of increasing their production, and thus lessening their vulnerability to poverty.

Table 10.8 Comparison of Vulnerability to Poverty and Household Characteristics Classified by Non-vulnerable and Vulnerable Households in Percentage of Population

	% of population		Total
	Non-vulnerable	Vulnerable	
Overall	56.5	43.5	100
Village			
Pong Yang Nai	50.0	50.0	100
Pong Yang Nok	47.1	**52.9**	100
Muang Kam	60.0	40.0	100
Khong Hae	40.0	**60.0**	100
Pong Krai	41.7	**58.3**	100
Mae Sa Mai	86.2	13.8	100
Buak Jan	84.6	15.4	100
Pang Luang	21.4	**78.6**	100
Pha Nok Kok	75.0	25.0	100

Source: Own survey (2004)

Note: The vulnerable are persons who face more than a 50% chance of being poor next year.

Table 10.8 Comparison of Vulnerability to Poverty and Household Characteristics Classified by Non-vulnerable and Vulnerable Households in Percentage of Population (Continued)

	% of population		Total
	Non-vulnerable	Vulnerable	
Ethnicity of HH head			
Hmong hill tribe	77.6	22.4	100
Non-hill tribe	47.9	**52.1**	100
Gender of HH head			
Male	59.8	40.2	100
Female	28.6	**71.4**	100
Age of the HH head			
Less than 30	46.7	**53.3**	100
30-39	59.6	40.4	100
40-49	60.0	40.0	100
50-59	55.0	**45.0**	100
Over 60	53.5	**46.5**	100
Education of HH head			
Cannot read or write	61.9	38.1	100
Can read and write	62.5	37.5	100
Primary school	53.9	46.1	100
Secondary school	59.3	40.7	100
Vocational school	40.0	**60.0**	100
Bachelor's degree	**66.7**	33.3	100
HH size			
1-3 people	4.2	**95.8**	100
4-6 people	67.8	32.2	100
7-9 people	**100.0**	0.0	100
More than 10 people	80.0	20.0	100
Quantity of land owned			
<5 rai	51.0	49.0	100
6-10 rai	65.5	34.5	100
11-20 rai	62.5	37.5	100
> 20 rai	**91.7**	8.3	100

Source: Own survey (2004)

Note: The vulnerable are persons who face more than a 50% chance of being poor next year.

10.10 Summary of Important Findings

Thailand's official policy is to reduce poverty and income inequality among the poor. To eradicate poverty, it needs to understand the livelihood of the poor. Some poor households are poor because of the scarcity of physical assets, but not in food security. Other poor households are identified as poor due to the flow of income below the poverty line. Therefore, identifying the poor is different from approach to approach.

This chapter provides an overview of poverty group classification. The advantage of this classification can assist the development policy-maker in helping the poor, which is the real target group. The study found that some households are classified as poor when using the PCA approach but are in the non-vulnerable group. This is possible because these households may not have encountered risks or shocks in the past. The effect of risk leads some households to become vulnerable. Some poor households not affected by past risks may have a better wealth status in the following period. Therefore, identifying the poor into chronological and transient poor, and vulnerable and non–vulnerable, will be helpful for the government.

In summary, the result found that approximately 42% of the populations in the study area were poor in 2003, the majority of which are chronically poor (11% of the population). Almost one-third of the population is transitorily poor, i.e., 30.5% of the total population. Furthermore, approximately 43.5% of the population is estimated to be vulnerable to poverty in the future. This is dominated by low expected mean consumption (LM vulnerability) accounting for 31% of total vulnerability (or 13.5% of the total population) and almost one-third accounted for by the high volatility of consumption (or 30% of the total population). Therefore, it is important to include the chronic poverty and vulnerable households in the context of planning government policy implications on poverty reduction in rural Thailand.

11 CONCLUSIONS AND POLICY RECOMMENDATIONS

This chapter provides a summary of the overall dissertation, the conclusion of the major findings and some policy recommendations for poverty reduction and health care policy for rural households. In addition to the principal component of poverty, participatory rural appraisal livelihood difficulties were analyzed. Moreover, the following components were considered: analysis of risks and risk management strategies, logit analysis of household on demand on health insurance, conjoint analysis on health insurance, and assessment of vulnerability to poverty of rural farm household in Northern Thailand.

11.1 Summary and Conclusions

During the last decade, the percentage of Thailand's population living below the poverty line has declined by half, to 11.4 % in 1996. However, the proportion in rural areas has increased to 12.9 %. Poverty, which means having insufficient food, income and other inputs to maintain an adequate standard of living, is a massive problem. Poverty may mean vulnerability to shocks to the livelihood systems and inability to cope with and recover from them. In its Ninth National Economic and Social Development Plan, Thailand has targeted poverty reduction and set four main objectives, which include attacking poverty and inequality, increasing the potential of the poor, strengthening the poor-dependent economic sector and strengthening the participation process (Bhumibhamon 2002).

As is well-known, rural farm households in Thailand are very poor. Their livelihood hardship is a consequence of the continuous occurrence of crisis and shocks. The long-term effect of crisis and shock leads households to shortages of income flow, for which they require cash or income to diminish and recover from the shocks. The livelihood of a farm household can be sustainable only when they can cope with and recover from stresses and shocks and attain or enhance their capabilities and assets, both now and in the future. Shocks or risks are separated in human, economic and asset risks. Some are associated with the idiosyncratic (individual) and some to the covariate (mass) risk category. If a risk becomes effective and creates a shock or crisis that affects just one person (one family/household), it is classified as an individual risk. If the risks effect the livelihood of a group of people bound together, e.g. by the same profession (e.g. farming) or the same region of residence, it is classified as a covariate risk.

There are different kinds of risks that hit households. One of the major risks which affect household income directly is health risk. In the past, Thai households had very high health expenses. Statistics suggest that health expenditure in Thailand has dramatically increased since 1980, from 3.8% to

6.2% of GDP in 1998. During this period, the health expenditure per capita increased from 545 Baht (US$ 27) in 1980 to 4,663 Baht (US$ 113) in 1998.

This research attempts to explain the relationship between poverty, livelihood difficulties, risk and risk management and vulnerability to poverty of farm households in Northern Thailand. Furthermore, this study proposes a health insurance concept addressing risks and poverty of farm households.

In line with the objective was to analyse risk and risk management strategies of vulnerable rural households in Northern Thailand, the overall objectives of this research were:

1. To identify major factors that determine rural household poverty and to describe the incidence of household poverty.
2. To analyse the livelihoods, difficulties and strategies of rural farm households.
3. To appraise risk and its costs to farm households and to identify risk management strategies.
4. To estimate the demand for health insurance as one crucial risk to livelihood and to describe the incidence of illness in the household, as well as the development of health care services.
5. To design health insurance concepts which correspond to household demand.
6. To measure household vulnerability to poverty and to classify the group of vulnerable and non-vulnerable rural farm households.

This study was conducted in Tambol Pong Yang, Mae Rim, which is a mountainous district of Chiangmai province and is representative of the northern mountainous region of Thailand. There are nine villages in the study area: Ban Pong Yang Nai, Ban Pong Yang Nok, Ban Muang Kam, Ban Kong Hae, Ban Pong Krai, Ban Mae Sa Mai, Ban Buak Jan, Ban Pang Lung and Ban Pha Nok Kok. The villages where the Hmong hill tribes live are Ban Mae Sa Mai, Ban Buak Jan and Ban Pha Nok Kok. Data were collected in 2 types of questionnaires: the first questionnaire was structured to analyze poverty, livelihood difficulties, risk and risk management and vulnerability to poverty, and the second analyzed health insurance.

Data were collected for the first questionnaire by interviewing two groups of farm households: a so called hill-tribe known as Hmong and a local people known as Khon Muang. The random sample consists of 200 households: 142 local northern and 58 Hmong households.

Primary data from the second questionnaire on health insurance was collected in the Mae Rim district. The survey covered 200 households, 146 of which are Thai and 54 Hmong.

Firstly, the result of a principal component analysis (PCA) was utilized to determine the important factors affecting household poverty. Furthermore, a poverty index was developed. The PCA retained 16 out of 65 possible poverty determining variables. Six of the 16 variables relate to the human resource

factor: (1) percentage of adults who can write, (2) percentage of adults who completed primary school, (3) percentage of adults with non-farm occupation, (4) number of children, (5) percentage of unemployed to employed, and (6) family size. There are two variables that relate to food security and which were significant: (7) crop yield and (8) value of main crop yield. Four variables relating to the dwelling show a high correlation to poverty. These are the (9) housing condition, (10) quality of latrine, (11) water system, and (12) furniture. Four variables related to assets: (13) value of transportation assets, (14) farmland owned, (15) value of assets per adult equivalent, and (16) value of agricultural assets. The explicit factors relevant for assessing poverty are the dwelling conditions, assets, human resources, and food security, respectively. The factor which can lead the poor to become even poorer is the human resource factor, where e.g. the number of dependents is comprised.

The poverty comparison between farm households living in the highlands and lowlands found that Hmong households, which normally live in mountainous regions, are relatively poorer than the local northern households. This finding leads to the conclusion that factor analysis is very helpful in planning well-targeted and efficient poverty alleviation policies. The poverty comparison within the area of study found that poor groups below average poverty are mostly found among the highland village of Ban Buak Jan, Pang Luang, Pha Nok Kok and Mae Sa Mai. Poverty is significant in these villages and in a few in Pong Yang Nai, Pong Yang Nok and Muang Kam, which is located in the lowlands. On the other hand, Khong Hae is in the highlands, but is relatively less poor. The poverty in Buak Jan accounts for most of all villages' poor households. At the village level, most of the poor live in rural and highland areas.

Secondly, the aim of participatory rural appraisal (PRA) is to explore livelihoods, risk and risk management strategies of farm households in Northern Thailand. The so-called social learning and sustainable livelihood framework are applied to guide the analysis and interpretation of the qualitative data. PRA tools were used together with the sampled rural households in Pong Yang Nok village in the Mae Rim district, Chiang Mai province. PRA is a data collection method that enables local people to share, enhance, and analyze their knowledge of life and conditions, and to plan and act. The PRA activities in this study comprised various activities such as a village walk, drawing a village map, seasonal calendars, seasonal analysis, a Venn diagram, brainstorming and focus group discussions, time line, trend line matrix, fishbone diagram and wealth ranking.

Results of the PRA showed that the most pressing problem plaguing households is their debt. Households try to honor their debt repayment obligations, but it appears that the frequent occurrence of income shocks and their low risk management capacities prevent them from doing so. Land issues relate to the second most important problem area. Often, farm households lack sufficient land and have land certificate problems. Another pressing problem

negatively influencing households' livelihoods are droughts, which lead to water shortages, higher fertilizer prices and middleman problems. The results of the PRA provided an overview of all livelihood problems; they concentrated on livelihood shocks related to idiosyncratic and covariate risks. One idiosyncratic risk of main importance is poor health.

Thirdly, this work analyzed the risk which households experienced at different time periods, the cost of risks, and the risk management strategies of households. It thus demonstrated that the existence of risk significantly affects people's lives. Risk creates uncertainty, which in turn influences people in making their decisions. Risk also makes individuals face some probability of experiencing income shocks. An income shock could make some people's income fall below the poverty line. In other words, risk makes some people vulnerable to poverty.

Results of the risk and risk management analysis found that there are five major types of risks frequently encountered in rural areas: 1) Natural risks (fire, heavy rainfall, heavy wind, damage to house, and drought); 2) Theft risks (theft of livestock, crop and consumer goods); 3) Production risks (crop loss from weather, crop loss from insects, storage loss, low production prices, low production, higher factor price, death of chickens); 4) Life-cycle risks/human risks (birth of children, funeral costs, unemployment, sudden moving away of working family member, old age, death of working member, son is placed in jail, risks of being cheated); 5) Health risks (prolonged sickness, chronic disease, working disability, alcohol problems of head of household and other family member).

Most households experienced multiple shocks. More than a quarter of them reported experiencing two shocks during the same time, while less than a tenth of them reported experiencing three or more shocks. Households reported experiencing 32 risks, of which the top ten risks make up approximately 80%. The vast majority of risks are production risks, health risks and natural risks. After analyzing what risks hit households, the risks are ranked in order. Crop loss from insects, low production price and birth[23] of a daughter are the risks that hit most households in each period. The risk-hit households are completely different in each period. In the analysis of risk levels, shocks are classified by the severity of their effect on a household. The results show that slightly more than 80% of households experienced badly to very severe risks. Over 30.5% of the risks that hit households fell into the bad category. Risks ranking at a normal level, which are not too bad and easy to recover from, have the same percentage, 9%, and 1.5% reported no risk.

The analytical cost of risk management provides details of what risks most affect a household. If households spend a lot of money managing risks, their income and wealth will probably go down. The effect of a decrease in

[23] Birth is one of life cycle risks (Holzmann and Jorgensen, 2000).

wealth is to raise their unsustainable livelihood. Therefore, risk management cost analysis helps households better understand how to manage them. In the last five years, 46 risks were managed at a cost of between 10,000-19,999 Baht (US$ 263-526); 44 risks were managed at an average cost of less than 5,000 Baht (US$ 132). Some households managed risks such as crop loss from insects and plant disease, crop loss from weather, and heavy rainfall, with the highest cost of more than 100,000 Baht (US$ 2,632). In the last year, most risks were managed at a cost of less than 5,000 Baht. Forty-seven risks which affected households were managed with between 20,000-29,999 Baht (US$ 526-789). In the future, households reported that they expect to handle most risks between 10,000-19,999 Baht (US$ 263-526). In the last five years, there were no occurrences of risks such as the death of chickens from bird flu or storage loss, but since last year these risks have become more important. In the previous twelve months, households lost a lot of money on these risks; for example, heavy rainfall, crop loss from insect or plant disease, low production, low production price, death of chickens from bird flu. The poor are disproportionately more exposed to agricultural-related shocks, health shocks and natural shocks than are the non-poor. Crop loss from insects, low production price, crop loss from weather and drought threaten the extremely poor more than they do the non-poor. On the other hand, low production is more of a threat to the non-poor, because they hire the extremely poor to do farm work and they therefore take the risk of production being low.

Households have their ways of managing risks and shocks. Most commonly they will concentrate on coping with shocks once they have occurred (e.g., borrowing money to pay for medical care, reducing food consumption to reduce expenditure, working more to acquire more income, or sending children to work to make up for lost income). They apply adaptive strategies e.g. saving, asking help from close relatives within social networks, to long-term change. The shocks that hit households can be idiosyncratic (striking an individual household), or covariant (striking the community).

Despite the large number of reported shocks, most households in the study area were able to manage and recover from them. The main adaptive strategies are saving cash, diversification of income sources, asking help from relatives, health check-up, less risky production system and adoption of new production technology, which account for 82.5% of the total adaptive strategies. Meanwhile, 72.1% of the main coping strategies are credits from a bank, reduce saving, additional work performed by the head of household and other adult family members. There is an interesting point in coping strategies that households prefer to ask for credits from a bank rather than relatives and friends. This may be because their relatives are also poor. When the shocks strike households, they can often be curbed by support from the local community or the extended family through some sort of a mutuality arrangement. On the other hand, when a whole community is struck (as in the case of natural disasters),

local mutual support systems may become ineffective because almost everyone will need help at the same time.

The most selective adaptive strategy households choose to cope with risks is saving in cash, with 21.9%. The next categories are diversification of income sources, asking help from family/relatives, health check-up or health protection, less risky production, and adoption of new production (38.8% of total). The remaining strategies contain a low percentage of less than 5%, such as crop diversification, shifting cultivation, etc.

The explicit coping strategies used by households are bank credits and reduce savings[24] with a percentage of more than 25%. Other coping strategies are additional work of other adult family members and the head of household, credit from relatives, reduction of food consumption, credit from money lender, credit from other sources, and so on. Households have various strategies for recovering from risks, and the duration is different from household to household. Most of the risks (58.8% of total) can be managed within 12 months. However, 25.2% of risks are long-run risks.

To sum up, households consider strategies to deal with risks once they have occurred. The types of instruments available to households will shape the way in which they manage risks, which, in turn, will affect their vulnerability.

Fourthly, health risk is one of the major risk stresses to a household. For this reason, households have adopted a variety of risk reduction mechanisms to mitigate the effects of risks. There also exist a variety of formal instruments dealing with individual and idiosyncratic risks, for example, social insurance instruments and health insurance. Therefore, this study examined health insurance for the poor in order to provide recommendations for reducing health expenditures at the household level, and also to advise the government to provide alternative health insurance products.

The incidence of illness shows how important health insurance is. The frequency of household illness within a year is closely related to the health expenses. Health costs burden the household and may cause household income shortage. The illness can also develop into mild, normal, or serious illness. The average time respondents got mildly ill was 1 to 2 times during the previous 12 months. Sixty-one percent of the total had no serious illness, while 6.5 % became severely ill.

Respondents reported that the burden of health expenses became lower after they had signed up for health insurance. However, 42% of the respondents stated that the health expenses still represented a relatively high burden to their household budget. The respondents were asked about their first choice of treatment when falling ill. The first choice for medical treatment service that households selected was the local health unit because of its proximity to the villagers. The next choice was the state hospital because there were more

[24] Saving is one of coping strategies (Holzmann 2003).

complete medical instruments than the local health unit; households went there when they became severely ill. The third choice was purchasing medicine from the pharmacy because the price of medicine was cheaper in comparison to travelling to consult a doctor at state hospital.

The relationship between a particular social group and the practice of engaging in health insurance is very weak. However, it is interesting that the village head man, the voluntary health care staff, and health care authorities all play an important role in the decision-making process when households consider taking out health insurance.

The success of distributing health insurance depends somewhat on knowing the ways that the household receives its information. Newspapers, journals, brochures and posters are used little as information sources because poor households generally display a low level of education and some are illiterate.

Regarding the health insurance costs that households can afford and expect to pay the following was formed: assuming there are three types of health insurance, i.e., insurance covering all illnesses, insurance covering some illnesses such as cough and general illness, and insurance for specified serious illnesses, the willingness to pay does not vary between the three types. Most households decide to pay a premium below 50 Baht per visit for all insurance types. For the insurance which covers just serious illnesses, some households stated that they would be willing to pay a higher price.

Considering the tendency of a household to have insurance, about 81.5% of the households wished to have health insurance to reduce their uncertainty before getting sick. About 18.5% of the households stated that they would like to acquire insurance after they get sick. The survey also contained a question about the households' opinion towards the mode of payment for insurance if there were a new insurance product in the market. The majority of households replied that their payment preference is per hospital visit as in the existing 30 Baht health insurance program[25] of the Thai Government. Households were also asked about their ability to carry the costs when somebody in the household gets seriously ill. Most of the households reported that they have the ability to pay because they have a 30 Baht Health Insurance Card. Prior to having the Health Insurance Card, they said that it was difficult to cope with the expenses when a household member had an accident or became ill.

[25] The 30 Baht Health Coverage Scheme is a government project to provide health insurance for poor people in Thailand. Under the new program, the "30 Baht health plan", people register as patients with local health care providers and can then obtain all needed medical care for a co-payment of 30 Baht. The system is financed jointly from taxes and contributions by workers and employers, while health care providers are reimbursed on a capitation basis (WHO 2003).

According to the logistic regression analysis of household demand for health insurance, the data used relate to household health, accessibility to health insurance information, decision-making process of household members in acquiring health insurance, household health protection, illness of a household member, the benefit of health insurance, experience with using health insurance, health insurance price and willingness to pay, health seeking behaviour, and policy implications for health insurance development.

The results indicate that (1) the household health risks variable has a positive relation to the probability of purchasing health insurance. If households have a high health risk, the probability of purchasing insurance will increase 6.30 times when compared to the probability of not purchasing. (2) The number of times that a household consults a doctor has a positive relation to the probability of purchasing health insurance. (3) The price satisfaction variable is positively related to purchasing health insurance. If households have a high price satisfaction, the probability of purchasing health insurance will increase by 3.56 times when compared to the probability of not purchasing. (4) The accessibility to health insurance information variable has a positive relation with the purchasing or not purchasing health insurance variable. If households have high information accessibility, the probability of purchasing concept will increase to 3.50 times when compared to the probability of not purchasing. (5) The gender variable has a positive relation to the purchasing or not purchasing health insurance concept variable. If households are male, the probability of purchasing will increase to 3.84 times when compared to the probability of not purchasing.

Fifthly, conjoint analysis on health insurance aims to provide concepts for new, alternative health insurance products to support the exiting health insurance system in Thailand, and to help the government reduce health support costs. The analysis will be particularly useful when compared to the governmental health policy that already provides 30 Baht Health Insurance Cards to the rural poor.

The households were asked which types of social security services they presently have. The 30 Baht Health Insurance is the most popular, with 88% of households participating in it. Others social security services in the region are the old age health insurance card and others account for the remainder. However, the public hospital was selected most when a household member was severely sick, with 77% respondents. Some gave the reason that the hospital provides full medical treatment and is ready in the case of an emergency operation.

The price premium of 30 Baht was the lowest, having been selected in one third of all cased when it occurred. A premium of 60 and 90 Baht was less popular, having been selected 17% and 18% of all times it occurred, respectively. The hospital attribute has two levels, which are “any hospital” and “registered hospital”. The “any hospital” level was the most popular, having been selected 30% of the times it occurred. “Registered hospital” was the least

popular, having been selected only 16% of the times it occurred. Insurance coverage was divided into two options. The concepts which covered medication not listed on the national drug list were selected 30% of the total times it occurred.

Finally, the study examines the linkage between poverty and vulnerability to poverty by the classification of a vulnerable group of farm households, and proposes an empirical measure that allows the setting of a vulnerability to poverty by applying Thailand's poverty line as a benchmark.

The results demonstrated that while 42% of the populations in the study area were poor in 2003, the majority of these are chronically poor (11% of the population). The information further shows that almost one-third of the population is transitorily poor i.e., 30.5% of the total population. This is dominated by a low expected mean consumption (LM vulnerability- the low expected mean consumption) accounting for 31% of total vulnerability (or 13.5% of the total population) and almost one-third was accounted for by high volatility of consumption (or 30% of the total population).

Empirical results show that 43.5% of households are in the vulnerable group, while the rest of households (56.5%) are in non-vulnerable group. There are some differences between vulnerability to poverty in each village. In the aggregate, the number of vulnerable households is highest in Pang Luang, with 78.6%. This is consistent with the fact that this village is located in a very steeply sloped mountain area, which is difficult to reach and far away from other villages in the study area. Other villagers in, for example Khong Hae, Pong Krai and Pong Yang Nok, also have a higher percentage of vulnerable households than non-vulnerable households.

11.2 Policy Recommendations

It has been noted that poverty reduction is the main target in Thailand. However, health insurance policies can also be a formal mechanism for alleviating poverty. Therefore, the empirical result of the study proposes a number of policy implications related to poverty and health insurance policy, which will be discussed below.

11.2.1 Health Care Policy

Rural Health Insurance plays a key role in alleviating health risks and poverty, especially the 30 Baht health insurance scheme. Most households are satisfied with this health card. However, the existing health insurance system can be improved in some areas. For example, one result of the study indicates that households encounter problems related to health insurance; some

households recommended that hospitals increase the number of doctors and health staff so that patients receive faster service.

A second recommendation is that some households can afford a health insurance premium a little bit higher than 30 Baht per doctor visit. In order to help the government reduce expenditures to support the health care system for the poor, it would be possible to slightly increase health insurance premiums. However, the premium should not exceed 60 Baht per doctor visit because many households can not afford the price due to their poverty. Furthermore, the distribution of the 30 Baht health insurance card should be quicker, because some households receive their card only a few months before it expires. Finally, the target group of the 30 Baht health insurance card should be considered; these household groups are poor and should be the main group to help.

11.2.2 Poverty Reduction Policy

The reduction of poverty in rural Thailand has been worked on for a long time. However, Thailand's economic growth is concentrated in the central region, while development in rural areas has been neglected. The inequality between urban and rural areas has caused many problems and hardships to individual households and also to society.

The field research survey explored the real picture of rural Thailand; the poorest households have few assets, lack social opportunity and encounter several kinds of risks as well. Thus, the direction of rural development in Thailand should return to rural investment. For example, in rural areas where households have problems with water shortages, the government should promote a policy that will help them have enough water for agricultural activities. In the research area, it is difficult to access households, and infrastructure such as roads, electricity and telecommunication should be much more invested in because when the poor have enough basic infrastructures, they can access markets and can sell their agricultural production in time. Moreover, it would reduce their expenditure and risks.

Another suggestion for reducing poverty is rural education. Education plays a significant role in rural development. Indeed, information from the study found that some poor households are illiterate. It is difficult to help illiterate households to overcome poverty because they are always being cheated and have limited power when negotiating the trade of their agricultural products. Further, many households employ only their own agricultural skills in keeping their farm. Thus, some government institutions or development organizations should encourage and develop their skills and knowledge in order to help them increase their occupational skills.

Rural risks and inadequate risk management lead the household to become more vulnerable. Some poor households, when they encounter risks,

become poorer and vulnerable. Some households lack the budget to cover their risks. Hence, micro-finance for the rural poor is important. The government should manage micro-financing through developmental projects such as One Tambon One Product Project (OTOP) under which households produce their own product and sell it to increase their income. Another risk that households face is crop risks. Generally, agricultural crops rot easily. In the area of study, litchi and flowers could not be sold in time. Farm households should thus be helped to quickly distribute their products to market. This would help households have a sustainable livelihood and vulnerability. Moreover, the government should target chronic poverty and vulnerable groups in the context of planning governmental policy implications on poverty reduction in rural Thailand in order to build up the wealth of the poor.

12 GERMAN SUMMARY (Deutsche Zusammenfassung)

Dieses Kapitel fasst die Haupterkenntnisse und einige Politikempfehlungen für Armutreduzierung und Gesundheitspolitik für landwirtschaftliche Haushalte in Nordthailand zusammen. Neben den Faktoren der Armut wurden auch die Risiken von kleinen landwirtschaftlichen Betrieben in Nordthailand analysiert. Außerdem wurden die folgenden Analysen durchgeführt: Analyse von Risiken und Risikomanagementstrategien, binäre Logit-Analyse zum Status der Krankenversicherung in armen landwirtschaftlichen Haushalten, Conjoint-Analyse hinsichtlich Krankenversicherung und die Gegenüberstellung der Verwundbarkeit der Lebensgrundlage (*Vulnerability*) zur Armut des landwirtschaftlichen Haushalts in Nordthailand.

12.1 Armut und Verwundbarkeit der Lebensgrundlage in Nordthailand

Der Prozentsatz der Bevölkerung Thailands, der unterhalb der Armutlinie lebt, ist zwischen Mitte der 1980er und 1996 um die Hälfte auf 11.4% gesunken. Jedoch hat sich der Anteil der Armen in den ländlichen Gebieten auf 12.9% erhöht. Armut bedeutet verwundbar gegenüber Krisen zu sein und eventuell nicht in der Lage zu sein, sich von Krisen zu erholen. In seinem 9. Nationalen Ökonomischen und Sozialen Entwicklungsplan hat Thailand die Armutsreduzierung als eines von vier Zielen definiert (Bhumibhamon 2002).

Wie weithin bekannt ist, sind landwirtschaftliche Haushalte in Thailand sehr arm. Die Verwundbarkeit ihrer Lebensgrundlage ist eine Konsequenz des ununterbrochenen Auftretens von Krisen. Der langfristige Effekt der Krisen ist, dass die Haushalte unter geringem Einkommen leiden und keine effektiven Krisenmanagementstrategien haben, um sich schnell davon zu erholen. Die Lebensgrundlage eines landwirtschaftlichen Haushalts kann nur dann nachhaltig sein, wenn die Familie es schafft, sich von diesen Krisen wieder zu erholen, ohne die dabei eingesetzten Ressourcen unwiederbringbar zu verlieren. Krisen werden in menschliche, wirtschaftliche und Gefahren für Güter unterschieden. Einige sind idiosynkratisch (Individualrisiken) und andere kovariat (Massenrisiken). Wenn eine Krise auftritt, die eine Person (oder eine Familie) bedroht, wird sie als idiosynkrativ eingestuft. Wenn die Gefahren den Lebensunterhalt einer größeren Gruppe von Leuten bedrohen, die z.B. den gleichen Beruf (z.B. Landwirtschaft) oder den gleichen Wohnsitz haben, wird sie als kovariate Gefahr eingestuft. Es gibt unterschiedliche Arten der Krisen, die Haushalte bedrohen. Eine der Hauptgefahren, die das Haushaltseinkommen direkt beeinflussen, ist das Gesundheitsrisiko. Statistische Daten belegen, dass sich die öffentlichen Aufwendungen für Gesundheit in Thailand drastisch seit 1980 erhöht haben, von 3.8% auf 6.2% des Bruttoinlandsprodukts (BIP) im Jahr

1998. Während dieser Periode erhöhten sich die Gesundheitsaufwendungen pro Kopf von Baht 545 (US$ 27) 1980 auf Baht 4.663 (US$ 113) im Jahr 1998.

Aus diesem Grund hat diese Untersuchung versucht, das Verhältnis zwischen Armut, Lebensunterhaltschwierigkeiten, Gefahr, Risikomanagement und Verwundbarkeit zur Armut der Bauernhaushalte in Nordthailand zu erklären. Ausserdem schlägt diese Studie ein Krankenversicherungkonzept für das Vermindern von Risiken und von Armut der Bauernhaushalte vor. Die Zielsetzung dieser Forschung war, Risiken und Risikomanagementstrategien der verletzbaren landwirtschaftlichen Haushalte in Nordthailand zu analysieren. Im einzelnen sollten folgende Ziele erreicht werden:

1. Hauptfaktoren identifizieren, die für die Armut landwirtschaftlicher Haushalte verantwortlich sind und das Ausmaß der Armut beschreiben.
2. Den Lebensunterhalt, die Schwierigkeiten und die Risikomanagementstrategien der landwirtschaftlichen Haushalte analysieren.
3. Die Risiken der Lebensgrundlagen und deren Kosten bewerten, um effektive Risikomanagementstrategien zu kennzeichnen.
4. Die Nachfrage nach Krankenversicherung als ein entscheidendes Instrument zur Reduzierung der Gesundheitsrisiken auf den Lebensunterhalt schätzen und die Ausdehnung der Krankheit im Haushalt, sowie die Entwicklung der Gesundheitspflegedienstleistungen beschreiben.
5. Angepasste Konzepte für Krankenversicherungen entwerfen, die der Haushaltsnachfrage entsprechen.
6. Das Verhältnis von Verwundbarkeit (Vulnerability) zur Armut messen und die Gruppe der verletzbaren und nicht-verletzbaren landwirtschaftlichen Haushalte einstufen.

Diese Studie wurde in Tambol Pong Yang, Mae Rim, Chiangmai Provinz durchgeführt. Diese Region ist gebirgig und ein Repräsentant der Nordgebirgsregion von Thailand. Es gibt neun Dörfer in der Studie: Ban Pong Yang Nai, Ban Pong Yang Nok, Ban Muang Kam, Ban Kong Hae, Ban Pong Krai, Ban Mae Sa Mai, Ban Buak Jan, Ban Pang Lung und Ban Pha Nok Kok. Die Dörfer, in denen die ethnische Minderheit der Hmong leben sind Ban Mae Sa Mai, Ban Buak Jan und Ban Pha Nok Kok. Daten wurden mittels zweier Fragebögen gesammelt: der erste Fragebogen war strukturiert auf die sozio-ökonomischen Lebensgrundlagen ausgelegt und der zweite analysierte den Bedarf an Krankenversicherung mittels der Conjoint Analyse.

Mittels des ersten Fragebogens wurden zwei Gruppen von Bauernhaushalten interviewt: ein so genannter Bergstamm bekannt als Hmong und lokale Leute bekannt als Khon Muang. Die Zufallsstichprobe besteht aus 200 Haushalten: 142 lokale und 58 Hmong Haushalte.

Primärdaten vom zweiten Fragebogen über Krankenversicherung wurden im Mae Kant Bezirk gesammelt. Die Übersicht umfaßte 200 Haushalte, von denen 146 thailandisch und 54 Hmong sind.

Erstens wurde das Resultat einer Hauptbestandteilanalyse (PCA) verwendet, um die wichtigen Faktoren festzustellen, die die Haushaltsarmut beeinflussen. Ausserdem wurde ein Armutindex entwickelt. Die PCA behielt 16 aus der möglichen 65 Variablen, die Armutsfaktoren eingrenzen. Sechs der 16 Variablen beziehen sich auf den Faktor Humankapital: (1) Prozentsatz der Erwachsenen, die schreiben können, (2) Prozentsatz der Erwachsener, die die Grundschule besuchten, (3) Prozentsatz der Erwachsenen mit außerlandwirtschaftlicher Beschäftigung, (4) Zahl der Kinder, (5) Prozentsatz der Arbeitslosen zu den beschäftigten Haushaltsmitgliedern und (6) Familiengröße. Es gibt zwei Variablen, die sich auf Nahrungsmittelsicherheit beziehen und die bedeutend waren: (7) Ernteertrag und (8) Wert des Haupternteertrags. Vier Variablen in bezug auf die Wohnstätte zeigen eine hohe Wechselbeziehung zur Armut. Diese sind der (9) Hauszustand, (10) Qualität von Latrine, (11) Wassersystem und (12) Wert der Möbel. Vier Variablen bezogen sich auf Güter im Haushalt: (13) Wert der Transportgüter, (14) Eigentum an Ackerland, (15) Wert der Güter pro Erwachsenäquivalent und (16) Wert der landwirtschaftlichen Güter. Der Faktor, der auf die Richtung der Armut den größten Einfluss hat ist das Humankapital.

Der Armutsvergleich zwischen den Bauernhaushalten, die in den Hochländern und Tälern leben fand, daß Hmong Haushalte, die normalerweise verhältnismäßig schlechter als die lokalen Nordhaushalte aufgestellt sind. Diese Ergebnisse zeigen, dass die Faktoranalyse für die Planung gut gerichteter und leistungsfähiger Armutsreduzierungspolitik sehr nützlich ist. Der Armutsvergleich innerhalb des Untersuchungsbereiches fand, daß Menschen, die bereits unterhalb der durchschnittlichen Armut leben, meistens in den Hochlanddörfern Ban Buak Jan, Pang Luang, Pha Nok Kok und Mae Sa Mai leben.

Zweitens ist es das Ziel der teilnehmenden landwirtschaftlichen Schätzung (PRA: *Participatory Rural Appraisal*), Risiken, Lebensunterhalt- und Risikomanagementstrategien der Bauernhaushalte in Nordthailand zu erforschen. Das sogenannte Soziallernen (*Social Learning*) und das *Sustainable Livelihood Framework* werden angewendet, um die Analyse und Interpretation zu machen. PRA-Werkzeuge wurden zusammen mit den landwirtschaftlichen Haushalten Pong Yang Nok im Mae Rim, Chiang Mai Provinz benutzt. PRA ist eine Datenerfassungsmethode, die es lokalen Leuten ermöglicht, ihr Wissen des Lebens und der Bedingungen mit anderen zu teilen, zu analysieren und Veränderungen zu planen und zu implementieren. Die PRA Tätigkeiten in dieser Studie enthielten verschiedene Tätigkeiten wie ein Dorfweg, ein Dorfdiagramm, Saisonkalender, Saisonanalyse, ein Venn Diagramm, Fokusgruppediskussionen,

Zeitlinie, Tendenzlinien-Matrix, *Fishbone* Diagramm und eine Wohlstandsklassifizierung (*Wealth Ranking*).

Resultate des PRA zeigten, daß das dringendste Problem, das Haushalte quält, ihre Schulden sind. Haushalte versuchen, ihren Verpflichtungen hinsichtlich der Schuldenrückzahlung nachzukommen, aber es scheint, daß das häufige Auftreten der Einkommenschläge und ihre niedrigen Risikomanagementkapazitäten sie daran hindern. Landknappheit bzw. Landunsicherheit sind der zweitwichtigste Problembereich. Häufig ermangeln Bauernhaushalte genügend Land und haben Eigentumsprobleme. Ein anderes dringend zu lösendes Problem, das den Lebensunterhalt der Haushalte negativ beeinflußt, sind Dürren, die zu Ernteausfällen, zusätzliche Düngemittelkosten und Zwischenhändlerprobleme führen. Die Resultate des PRA lieferten einen Überblick über alle Lebensunterhaltsprobleme; sie konzentrierten sich auf die Lebensunterhaltskrisen, die auf den idiosynkratischen und kovariate Gefahren bezogen wurden. Eine idiosynkratische Gefahr des Hauptwertes ist schlechte Gesundheit.

Zum dritten analysierte diese Arbeit die Kosten der Risiken zu unterschiedlichen Zeiten im Hinblick auf die Risikomanagementstrategien der Haushalte. Sie zeigte folglich, daß das Bestehen der Risiken erheblich die Lebensgrundlage der Landbevölkerung beeinflußt. Risiko verursacht Ungewißheit, die Entscheidungen mit beeinflussen. Das Management von Einkommenschlägen, je nach Strategie, kann dazu führen, dass Menschen temporär oder dauerhaft unter die Armutslinie fallen. Das heißt, Risiken erhöhen die Verwundbarkeit der Menschen und damit Armut.

Resultate der Risiko- und Risikomanagementanalyse waren, dass es fünf Hauptarten von Risiken gibt, die häufig in den ländlichen Gebieten angetroffen werden: 1) natürliche Gefahren (Feuer, schwerer Niederschlag, schwerer Wind, Beschädigung des Hauses und Dürre); 2) Diebstahlgefahren (Diebstahl der Vieh-, Getreide- und Verbrauchsgüter); 3) Produktionsgefahren (Getreideverlust durch Wetter und Insekten, Speicherverlust, niedrige Produktionspreise, niedrige Produktion, höherer Faktorpreis, Tod der Hühner); 4) Gefahren des Lebenszyklus (Geburt der Kinder, Begräbniskosten, Arbeitslosigkeit, plötzliches Versterben eines Arbeitsfamilienmitgliedes, Alter, Inhaftierung des Sohnes, Betrug); 5) Gesundheitsrisiken (verlängerte Krankheit, chronische Krankheit, Alkoholprobleme des Haushaltsvorstand und anderer Familienmitglieder).

Die meisten Haushalte erfuhren mehrfach Einkommensschläge. Mehr als ein Viertel von ihnen berichtete über das Erfahren von zwei Schlägen innerhalb des abgefragten Zeitraums. Jede zehnte Familie berichtete von drei oder mehr Krisen. Insgesamt wurden 32 Risiken dokumentiert, von denen die ersten zehn etwa 80% aller Risiken abbilden. Die beträchtliche Mehrheit sind Produktionsrisiken, Gesundheitsrisiken und natürliche Gefahren. In der Analyse, werden Schläge nach der Schwerwiegenheit eingestuft. Die Resultate zeigen, dass mehr als 80% der Haushalte, sehr ernste Krisen erfahren haben.

Die Analyse der Risikomanagementkosten zeigt, welche Gefahren am meisten den Haushalt beeinflussen. Wenn Haushalte einen Großteil des verfügbaren Einkommens für das Management von Risiken aufwenden, geht das Einkommen vermutlich nach unten. Folglich hilft die Kostenanalyse des Risikomanagements, besser zu verstehen, wie man Risiken effektiv handhabt. Die Analyse zeigte, dass während der letzten fünf Jahre, 46 Gefahren auftraten, die zwischen Baht 10.000-19.999 (US-$ 263-526) kosteten; 44 Gefahren traten auf, die durchschnittlich mit weniger als Baht 5.000 (US-$ 132) handhabbar waren. Einige Haushalte mussten sich aber auch mit Risiken auseinandersetzen (Getreideverlust, Krankheit), die mehr als Baht 100.000 (US-$ 2,632) kosteten. Für die Zukunft erwarten die Haushalte, dass die meisten Gefahren zwischen Baht 10.000-19.999 (US-$ 263-526) kosten werden. Die ärmeren Haushalte werden häufiger Einkommensschlägen ausgesetzt, die im Bereich Krankheit und Ernteverluste rangieren als die Nicht-Armen.

Haushalte haben ihre Arten des Handhabens von Risiken und von Schlägen. Normalerweise konzentrieren sie sich auf das Fertigwerden mit Schlägen, sobald sie aufgetreten, d.h. ex-post (z.B. Geld borgen, um für medizinische Behandlung zu zahlen, verringern des Nahrungsmittelverbrauchs, mehr arbeiten, oder Kinderarbeit). Sie wenden aber auch ex-ante Anpassungsstrategien an, z.B. Ersparnisse angreifen, bitten um Hilfe von nahen Verwandten innerhalb der informellen Sozialnetze. Krisen können in Individual- und Massenrisiken aufgeteilt warden.

Trotz der grossen Anzahl von Einkommensschlägen waren die meisten Haushalte in der Studie in der Lage, sie zu handhaben und sich zu erholen. Die Hauptanpassungsstrategien sind das Zurückgreifen auf Ersparnisse, die Diversifikation der Einkommenquellen, das Bitten um Hilfe innerhalb ihres Sozialnetztes, weniger riskante Produktionssysteme und Annahme von neuen Produktionstechnologien. Diese Strategien machten fast 83% der so genannten Anpassungsstrategien aus. 72% der ex-post Strategien (*Coping Strategies*) beziehen sich auf das Verbrauchen von Lagerbeständen, Kreditaufnahme bei Banken und zusätzliche Arbeit. Interessanterweise scheinen viele armen Haushalte es vorzuziehen, einen Kredit aufzunehmen statt ihre Sozialnetzwerke anzuzapfen. Dies kann sein, weil ihre Verwandten auch arm sind. Während Individualrisiken durch lokale Netzwerke aufgefangen werden können, gilt dies nicht für Massenrisiken.

Die meist gewählte Anpassungsstrategie um mit Gefahren fertig zu werden, ist die Einsparung von Bargeld (21.9%). Die nachfolgenden Strategien sind die Diversifikation der Einkommenquellen, Netzwerke, Gesundheitsvorsorge, weniger riskante Produktionszweige (38.8%). Die restlichen Strategien wurden von weniger als 5% der Befragten angewendet, z.B.: Sortendiversifikation und Wanderfeldbau.

Ein Viertel der *Coping* Strategien beziehen sich auf Kreditaufnahme und Verbrauch von Ersparnissen. Andere Strategien dieser Kategorie sind die

Erhöhung der Arbeit, die Reduzierung der Nahrungsaufnahme, Kredite von Kredithaien und so weiter. Die meisten Gefahren (58.8%) können innerhalb von zwölf Monaten gehandhabt werden. Jedoch sind 25.2% der Gefahren von langfristiger Natur.

Gesundheitsrisiken sind **viertens** eine der Hauptgefahren für die Lebensgrundlage der Haushalte. Aus diesem Grund haben Haushalte eine Vielzahl von Strategien entwickelt bzw. angenommen, um die Effekte von Gefahren abzuschwächen. Die wichtigste Anpassungsstrategie im Bereich der Gesundheitsrisiken sind Sozialversicherungsinstrumente wie beispielsweise die Krankenversicherung. Folglich überprüfte diese Studie mögliche Formen von Krankenversicherungen, um Empfehlungen für das Verringern von Gesundheitsrisiken zu entwickeln.

Die Verbreitung von Krankheit zeigt, wie wichtige Krankenversicherung ist. Die Häufigkeit von Krankheiten in einem Haushalt innerhalb eines Jahres gibt einen Hinweis auf die Kosten, auf die Haushalte reagieren müssen. Krankheit bzw. Kosten für die Wiederherstellung der Gesundheit belastet den Haushalt und kann Einkommensengpässe verursachen. Im Durchschnitt waren Mitglieder der befragten Haushalte während der vorhergegangenen zwölf Monate ein bis zwei Mal leicht erkrankt. 61% der Stichprobe hatten keine ernsten Krankheiten, während 6.5% ernsthaft erkrankt waren.

Einige Befragte berichteten, dass die Belastung durch Krankheitskosten niedriger wurde, nachdem sie eine Krankenversicherung abgeschlossen hatten. Jedoch gaben 42% der Befragten an, daß die Kosten trotzdem noch eine verhältnismäßig hohe Belastung zu ihrem Haushalt darstellen. Es wurde nach ihrer ersten Wahl hinsichtlich der eventuellen Krankheitsbehandlung gefragt. Die erste Wahl für die ärztliche Behandlung durch die Haushalte war der lokal angesiedelte Gesundheitsposten wegen seiner Nähe zu den Dorfbewohnern. Die näachte Wahl war das staatseigene Krankenhaus, weil es eine umfassendere Ausstattung als der örtliche Gesundheitsposten hat; Haushalte gingen dorthin, wenn ein Mitglied ernsthaft erkrankte. Die dritte Wahl war der Kauf von Medizin von der Apotheke, weil der Preis der Medizin im Vergleich zu den anderen Optionen niedriger war.

Das Verhältnis zwischen einer bestimmten Sozialgruppe und der Praxis des Engagierens in der Krankenversicherung ist sehr schwach. Jedoch ist es interessant, daß der Dorfvorstand und das freiwillige Gesundheitspflegepersonal eine wichtige Rolle im Entscheidungsprozeß spielen, wenn Haushalte erwägen, eine Krankenversicherung abzuschließen.

Hinsichtlich des Preises für eine ländliche Krankenversicherung, die sich ein Haushalt leisten kann, wurden in der Conjoint Analyse drei Arten von Krankenversicherung angeboten, die sich danach unterscheiden, welche Arten von Krankheit abgedeckt ist: (1) alle Arten von Krankheiten, (2) bestimmte Arten sowie leichte allgemeine Krankheitsfälle und (3) näher spezifizierte ernste Krankheiten. Die meisten Haushalte entschieden sich, eine Prämie unterhalb von

Baht 50 pro Besuch für alle Versicherungsarten zu zahlen. Für die Versicherung, die ernste Krankheiten umfaßt, gaben einige Haushalte an, daß sie bereit sein würden, einen höheren Preis zu zahlen.

Etwa 82% aller Haushalte gaben an, dass sie gerne eine Krankenversicherung hätten, um ihre Unsicherheit zu verringern. 18% der Haushalte meinten, daß sie erst eine Versicherung erwerben möchten, nachdem sie krank geworden sind, was natürlich nicht die gängige Praxis ist. Die Übersicht enthielt auch eine Frage über die Meinung der Haushalte in Richtung Zahlungsmodus für die Versicherung. Die Mehrheit der Haushalte antwortete, daß ihre Zahlungspräferenz dem entspricht, was im bestehenden staatlichen Baht 30 Krankenversicherungsprogramm (*30 Baht Health Insurance Program*) implementiert ist.[26] Haushalte wurden auch nach ihrer Fähigkeit gefragt, die entsprechenden Kosten zu tragen, wenn jemand im Haushalt ernsthaft krank wird. Die meisten Haushalte berichteten, daß sie die Zahlungsfähigkeit haben, weil sie eine staatliche 30 Baht Krankenversicherungskarte haben. Bevor sie diese Krankenversicherungskarte hatten, sei es schwierig gwesen, mit den Krankheitskosten fertig zu werden.

In der logistischen Analyse der Haushaltsnachfrage nach Krankenversicherung wurden folgende Variablen untersucht: Haushaltsgesundheit, Zugänglichkeit von Krankenversicherunginformationen, Entscheidungsprozeß der Haushaltsmitglieder hinsichtlich Erwerben von Krankenversicherung, Haushaltsgesundheitsschutz, Krankheit eines Haushaltsmitgliedes, Nutzen der Krankenversicherung, Erfahrung mit dem Verwenden von Krankenversicherung, Krankenversicherungpreis und Zahlungbereitschaft.

Die Resultate zeigen, dass (1) die Haushaltsgesundheitsrisikovariable eine positive Relation zur Wahrscheinlichkeit des Kaufens von Krankenversicherung hat. Wenn Haushalte ein hohes Gesundheitsrisiko haben, erhöht sich die Wahrscheinlichkeit des Kaufens von einer Versicherung um 6,3. (2) Die Häufigkeit mit der ein Haushalt einen Arzt konsultiert hat, erhöht ebenfalls die Kaufwahrscheinlichkeit von Krankenversicherung. (3) Der Preis beeinflusst natürlich auch die Wahrscheinlichkeit, eine Krankenversicherung zu erwerben. Wenn Haushalte eine hohe Preiszufriedenheit haben, nimmt die Kaufwahrscheinlichkeit um 3.56 zu. (4) Auch die Zugänglichkeit zu Krankenversicherungsinformationen hat einen positiven Effekt auf die Kaufentscheidung. Wenn Haushalte gut informiert sind, erhöht sich die Wahrscheinlichkeit des Kaufens um 3.50 im Vergleich zur

[26] Das 30 Bhat Krankenversicherungsprogramm ist ein staatliches Projekt. Unter dem Programm können sich Personen bei lokalen medizinischen Versorgungseinheiten registrieren und Gesundheitsvorsorge bei einer Zuzahlung von jeweils Bhat 30 bekommen. Das System wird über Steuern und Zuzahlungen von Arbeitern und Angestellten finanziert, während die medizinischen Versorgungseinheiten eine pro Kopf Zulage erhalten (WHO 2003).

Alternativentscheidung. (5) Die Geschlechtervariable, d.h. wenn der Haushaltsvorstand männlich ist, erhöht dies Wahrscheinlichkeit eine Versicherung abzuschließen auf 3.84 verglichen zum Nichtabschluss.

Fünftens zielte die Conjoint Analyse der Krankenversicherung darauf ab, Konzepte für neue, alternative Krankenversicherungsprodukte zur Verfügung zu stellen, um der Regierung eventuelle Hinweise geben zu können, die es ihr erlaubt ihre staatliche Stützung im Bereich der Gesundheitsfürsorge zu verringern. Die Analyse ist besonders nützlich, wenn sie mit der Regierungsgesundheitspolitik verglichen wird, die bereits die so genannte 30 Baht-Krankenversicherungskarte für die arme Bevölkerung in der Landwirtschaft zur Verfügung stellt. Die Haushalte wurden gefragt, welche Arten der Sozialversicherung sie momentan haben. Die 30 Baht-Krankenversicherungskarte ist mit 88% der Haushalte das populärste Versicherungsinstrument.

Die Versicherungsprämie von 30 Baht war die niedrigste und wurde von 30% der Befragten gewählt wenn sie in der Conjoint Analyse auftrat. Eine Prämie von 60 und 90 Baht war weniger populär und wurde in 17% und 18% aller Fälle gewählt, wenn sie auftrat. Das Krankenhausattribut hatte zwei Niveaus, es konnte "jedes mögliche Krankenhaus" gewählt werden oder nur "eingetragene Krankenhäuser". "Jedes mögliche Krankenhaus" war das populärste Attribut und wurde in 30% der Fälle ausgewählt, wenn es auftrat. Die Möglichkeit nur bestimmte "eingetragene Krankenhäuser" zu wählen, war das am wenigsten populäre Attribut mit 16%. Versicherungsabdeckung hinsichtlich Medikamente sah zwei Wahlmöglichkeiten vor. Die Möglichkeit auch Medikamente zu bekommen, die nicht auf der nationalen Medikamentenliste verzeichnet sind, wurde in 30% der Fälle gewählt, in denen sie auftrat.

Schließlich überprüft die Studie die Beziehung zwischen Armut und Verwundbarkeit zur Armut. Dazu werden die Gruppe der verletzlichen Bauernhaushalte klassifiziert. Die Arbeit schlägt ein empirisches Maß vor, das die Feststellung der Verwundbarkeit zur Armut erlaubt, indem es die Armutlinie Thailands als Festpunkt anwendet.

Die Resultate zeigten, dass 42% der Bevölkerungen in der Stichprobe 2003 unterhalb der Armutslinie leben und 11% zu den chronisch Armen gehören. Fast ein Drittel der Stichprobe gehört zu jenen, die als vorübergehend arm bezeichnet werden können, d.h. 30.5%. 13.5% der Stichprobe kann nur ein niedriges durchschnittliches Konsumniveau erreichen und 30% müssen mit einer großen Unbeständigkeit hinsichtlich des Konsumniveaus rechnen (LM Verwundbarkeit = *Low expected mean consumption*).

Empirische Resultate zeigen, daß 43.5% der Haushalte in der verletzbaren Gruppe sind, während der Rest der Haushalte (56.5%) in der nicht-verletzbaren Gruppe ist. Es gibt einige Unterschiede im Verhältnis von 'Verwundbarkeit zur Armut' in jedem Dorf. In der Gesamtheit ist die Zahl von verletzbaren Haushalten im Pang Luang mit 78.6% am höchsten. Dieses ist mit der Tatsache

gleichbleibend, daß dieses Dorf in einem sehr steilen Gebirgsbereich liegt, der schwierig und weit weg von anderen Dörfern im Studiengebiet ist. Andere Dörfer z.B. Khong Hae, Pong Krai und Pong Yang Nok, haben auch einen höheren Prozentsatz der verletzbaren Haushalte als nicht-verletzbare Haushalte.

12.2 Politikempfehlungen

Wie anfangs erwähnt, ist Armutsreduzierung das politische Hauptziel in Thailand. In diesem Kontext können auch gesundheitspolitische Ansätze in diese Richtung wirken. Folglich schlägt diese Arbeit auf der Basis der empirischen Ergebnisse eine Anzahl von den Politikimplikationen vor, die auf die allgemeine Armuts- und Gesundheitspolitik berichen.

12.2.1 Gesundheitspolitik

Landwirtschaftliche Krankenversicherung spielt eine Schlüsselrolle in der Reduzierung der Verwundbarkeit (*Vulnerability*) und Armut von ländlichen Haushalten. Die meisten Haushalte sind mit der durch den thailändischen Staat verbreiteten sogenannten 30 Baht Gesundheitskarte zufrieden. Jedoch kann das vorhandene Krankenversicherungsystem in einigen Bereichen verbessert werden. Beispielsweise deuten die Ergebnisse der Studie an, daß Haushalte durchaus noch einige Probleme mit der derzeit gängigen Krankenversicherung haben.

Ein anderes Ergebnis ist, daß es durchaus Haushalte gibt, die sich eigentlich schon eine etwas teurere Krankenversicherungsprämie als 30 Baht pro Arztbesuch leisten können. Tendenziell ist es also möglich die Prämie auf bis zu 60 Baht zu erhöhen, dies würde eine Senkung der Kosten im Gesundheitssystem Thailands implizieren. Generell sollte die Verteilung der Krankenversicherungkarte schneller sein, weil einige Haushalte ihre Jahreskarte immer erst einige Monate vor Ablauf erhalten. Schließlich sollte die Zielgruppe der Krankenversicherungkarte mit 30 Baht betrachtet werden; es sind hauptsächlich die Armen

12.2.2 Armutsreduzierungspolitik

Die Verkleinerung der Armut im landwirtschaftlichen Sektor Thailands ist schon seit längerem erklärtes Politikziel. Jedoch konzentriert sich das Wirtschaftswachstum in Thailand nach wie vor in einigen wenigen Regionen,

während die Entwicklung in den ländlichen Gebieten teilweise vernachlässigt worden ist. Diese Einkommensschere birgt gesellschaftliche Probleme und Härten.

Diese Arbeit zeigte, dass die armen Haushalte im ländlichen Thailand nur wenige Güter von Wert haben und sich vielfältigen Risiken ausgesetzt sehen. So sollte die Richtung der landwirtschaftlichen Entwicklung in Thailand stärker auf Investitionen setzen. Beispielsweise in den ländlichen Gebieten, in denen Haushalte Probleme mit Wassermangel haben, sollte die Regierung eine Politik fördern, die ihnen hilft, genügend Wasser für landwirtschaftliche Tätigkeiten zu haben. Grundsätzliche harte Infrastrukturmaßnahmen, wie z.B. Straßen, Elektrizität und Nachrichtentechnik erleichtert es den Armen, Märkte zu erschließen und ihre landwirtschaftliche Produktion über das Jahr verteilt zu vermarkten.

Ein anderer Vorschlag für das Verringern von Armut ist die Investition in eine bessere landwirtschaftliche Ausbildung. Ausbildung spielt eine bedeutende Rolle in der landwirtschaftlichen Entwicklung. In der Tat fand die Studie, dass es den armen Haushalten vielfach an wichtigen Informationen und Hintergrundwissen fehlt. Das öffnet beispielsweise die Tür für Betrug im Handel im Zwischenhändlern. Weiter setzen viele Haushalte nur ihre eigenen landwirtschaftlichen Fähigkeiten ein, wenn sie ihren Bauernhof bewirtschaften. Beratung und landwirtschaftliche Fortbildungsmaßnahmen könnten hier verstärkt ansetzten.

Landwirtschaftliche Risiken und nicht adequates Risikomanagement führen dazu, dass insbesondere die ärmsten Haushalte, noch verletzbarer in ihrer Lebensgrundlage werden. Folglich sind angepasste und effektive Mikrofinanzansätze im Versicherungsbereich wichtig für die Armen. Die Regierung sollte Mikrofinanzierung durch Entwicklungsprojekte wie OTOP (OTOP: *One Tambon One Product Project*) bereit stellen. Eine andere Gefahr, der sich Haushalte gegenüber sehen, sind wirtschaftliche Risiken im Bereich der Reiserzeugung und -lagerung. Aber auch der Absatzmarkt für Litchi und Blumen ist problematisch. Bauernhaushalte sollten folglich Unterstützung im Bereich Vermarktung bekommen. Dies würde Haushalten helfen, einen nachhaltigen Lebensunterhalt und ein geringeres Niveau an Verwundbarkeit gegenüber Lebensrisiken zu haben.

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APENDIX

Appendix to Chapter 4

There are two types of rights to private land. The first is the right of possession (Possessor right), i.e. people who possess and use the benefit of land will have the right to possess such land under the Civil and Commercial Code. The second is ownership by a person who has a title deed and documents concerning the land.

Certificate of Possession (Sor. Kor 1) is a notification form of possessed land. There is a certificate to show the right to the land. This maintains existing rights. Notification of Sor. Kor 1; on December 1954, the government advised all land proprietors to notify such possession to the government as per form Sor. Kor 1. After it was proven that such a proprietor had possessed the land legally and used the benefit of the land, then the government would issue Nor. Sor. 3 or Nor. Sor. 3 Gor as evidence. Nor. Sor. 3 and Nor. Sor. 3 Gor are legal certificates provided that any name shown on the title is a person who has the right to the land (according to the principle law). This right will be recognized by the law and can be used as evidence in any dispute with an ordinary person or the government. This certificate only recognizes possession and does not imply ownership rights with such possession. The certificate is non-transferable. However, a person in possession may transfer physical possession. This certificate is required for issuance of a Certificate of Use, and is most common in the rural areas.

Por. Bor. Tor 6 is evidence by the issuance of a tax number for the purpose of paying tax for using the benefit of the land. Such land has not yet been assessed as to the person's right to possess such land. In the event that there is not title for the land, then it may be land in a conserved forest, public land or land which existed under Sor. Kor 1, Nor. Sor 3, Nor. Sor. 3 Gor or a title deed. Any of these titles must have a Por. Bor. Tor 6 as tax must be paid, the same as any land without a title. Purchase of such land is possible by handing over the possession of the land to the buyer along with the tax nuber. The right to the land under Por. Bor. Tor 6 can not be used as evidence in any dispute with authorities.

Sor. Por. Gor 4-01 is an allotment of land from the land reformative committee, and under no circumstances may this land be bought or sold. It may be transferred to heirs only.

Certificate of Use (Nor. Sor. 3) is an instrument certifying the use of land issued by the government to the proprietor of land not a possessor title, i.e. it is confirmed by law that a person holding Nor. Sor. 3 has the legal right to possess the land. This land title can be used as a legal document or to use the benefit of the land as an owner. Nor. Sor. 3 is a floating map with no parcel points. It is issued for a specific plot of land and it is not connected to other land plots. This causes problems in verifying the land area. Any legal acts must be publicized for 30 days.

Confirmed Certificate of Use (Nor. Sor. 3 Gor) is a legal land title with the same legal basis as Nor. Sor. 3. This document certifies the right to use land and is often issued pending title deed. The difference being that Nor. Sor. 3 Gor has parcel points on the map, and is set by using an aerial survey to set the points and the land area. It is possible to verify a nearby land area. It always uses the same scale of 1:5000. There is no need to publicize any legal acts, and it is possible to partition (divide) the land into smaller plots.

Land Title Deed (Chanot) is a certificate for ownership of land. A person having their name shown on the deed has the legal right to the land, and can use it as evidence to confirm the right to government authorities. The title deed has been issued by using GPS to set the area and boundaries of the land, which is a very accurate method. Any legal acts may be done immediately, as per the right of ownership. Land partition of more than 9 plots must be carried out according to the Land Allotment Law, Section 286.

Appendix to Chapter 9

Thailand's Poverty Line

Thailand's poverty statistics are calculated using a poverty line developed by Nanak Kakwani and Medhi Krongkaew in collaboration with NESDB in 1996. This poverty line is compared to total household income per capita to obtain the poverty incidence. The calculation of poverty numbers is conducted by the National Economic and Social Development Board (NESDB) using the Socio-Economic Survey, the national household survey collected by the National Statistical Office (NSO). The poverty line is both "absolute" and "objective". It fixes a given standard of living over time and space, anchored in the attainment of basic nutritional and non-nutritional requirements. The consumption bundle is fixed to be adequate for basic consumption needs. A person is considered to be poor if it cannot meet the cost of the consumption bundle.

The poverty line is composed of two elements, the food and the non-food components. First, the food component is based on the required caloric intake of individuals separated by age and sex groups, as specified by the Thai Ministry of Public Health. The weights of the items in the food bundle were calculated with reference to one common food basket, defined as the average consumer basket in sanitary districts in 1992. Second, in order to allow for basic-needs non-food expenditures, the food component of the poverty line is divided by some estimate of the budget share devoted to food. The food share is fixed at 60 %, giving a non-food share of 40 %. The poverty line is updated using spatial food and non-food price indices, which are available by region on a monthly basis (urban and rural North, Northeast, Central, and South; and Bangkok).

The methodology has been subject to two criticisms. First of all, the use of 1992 as a base year may be outdated as the consumption pattern of Thai population has changed over time. Second, fixing the ratio of food to non-food expenditure across all regions at 60 to 40 % appears arbitrary and does not reflect differences in non food expenditure incurred by households residing in different areas. For example, those living in urban areas may have higher rental cost that those living in rural areas.

To address these issues, the NESDB has decided to revise the poverty line. The new poverty line incorporates the following changes:

- Consumption pattern and spatial price indices in the food expenditure component have been updated from using 1992 as based year to 2002;
- Calorie requirement has been changed from using international standard in the year of 1992 to calorie requirement for Thai people in the year 2003;

- Non food expenditure has been adjusted to reflect real expenditure and vary by different consumption pattern in different regions; and
- Economy of scale for different sizes of household has been incorporated into new poverty line.

With this new methodology, poverty line in 2002 will be 1,190 Baht (US$ 31) per head per month, instead of 922 Baht (US$ 24) from the earlier methodology and the headcount ratio in 2002 will be 15.5 % rather than 9.8 %.