An Economic Analysis of Community-based Tourism in Thailand

Dissertation

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Abstract

This study constructs a panel data 2003 and 2007, a social accounting matrix (SAM) and a computable general equilibrium model (CGE) in 2007 to investigate the effect of tourism on household income, poverty reduction and income distribution at the village level in Thailand. It conducted a census of 116 households in a particular village. There are three focuses. First, it examines the determinants of participation in tourism sector. Second, it investigates the effect of participation in tourism activities on household income change and poverty exit. Third, it simulates the direct and indirect effects of tourism price increase on income generation and income distribution in the village.

In the first focus, the determinants of participation in terms of working hours vary among economic sectors. Villagers operating homestay, accommodations for tourists, stay within 1 km from village center, got tourism income in 2003 and got an increase in household members during 2003 – 2007. Households attending core tourism, e.g. trekking guide and cultural show, also stay closer to the village center and got tourism income in 2003. Moreover, their heads of households get better education. The pools of human capital in households are also larger. For the participation in tourism-induced sector, e.g. souvenir production and coffee shop, education plays significant role in terms of education of the heads of households, average schooling years of household members and size of human capital in households. Households with an increasing number of members and older people are advantage in joining this sector. For other non-tourism sectors, education is also important for the participation in commercial sector. However, education is less important for households joining agricultural sector, agricultural labor service and non-agricultural labor service.

Community-based tourism can reduce absolute poverty. However, it depends on types of tourism activities. Households participating intensely in tourism-induced sector can raise their income. The increasing income is enough to help them get out of poverty. The reasons are that the sector empowers elderly people to earn additional income. Its labor productivity is competitive to those of other sectors. The size of the sector is large enough. Households also spend enough time to work in the sector. Finally, before 2007, the income in this sector distributed quite equally to poor households.

In the simulation under an assumption of fixed labor endowment, the income multipliers are around 5.34 to 6.63 in the tourism expansion phase. The multipliers range between 5.78 and 6.86 in a simulation under expandable labor endowment. The value-added multipliers are around 1.28 to 2.16 in both simulations. Community-based tourism is not pro-poor. The richest quintile gains the real income growth much higher than other quintiles. The poorest quintiles can gain positive real income growth only when tourism price is driven 40 percent higher than the level in 2007. The second poorest quintile gains the least and even faces the drop of the real consumption.

Overall, community-based tourism plays a minor role in poverty reduction. Only tourism-induced sector which is led by souvenir production is effective in reducing poverty. Therefore, the government should promote tourism-induced activities in tourism villages and encourage poor households to participate in tourism-induced sector.

Keywords: Community-based Tourism, Poverty reduction, Household analysis, Tourism income distribution, Village Computable General Equilibrium Model

JEL classification: O12, I32, R20, C68

Zusammenfassung

Die vorliegende Studie analysiert den Effekt von Tourismus auf Haushaltseinkommen, potentielle Armutsreduzierung und Einkommensverteilung in Thailand. Dafür wurde ein Panel Datensatz für die Jahre 2003 und 2007, eine Social Accounting Matrix (SAM) und ein Computerbasiertes Allgemeines Gleichgewichtsmodell für das Jahr 2007 erstellt. Für ein ausgewähltes Dorf wurde ein Zensus von 116 Haushalten erhoben. Der Schwerpunkt der Studie liegt auf drei Punkten. Erstens wurden die Determinanten für die Beteiligung am Tourismussektor bestimmt. Zweitens wurde analysiert ob ein Effekt zwischen der Beteiligung am Tourismussektor und dem Haushaltseinkommen sowie Armut existiert. In einem dritten Schritt wurden die direkten und indirekten Effekte eines Preisanstieges im Tourismussektor auf die Haushaltseinkommen und die Einkommensverteilung innerhalb des Dorfes unter verschiedenen Niveaus von Unterbeschäftigung analysiert.

Als Ergebnis wurde festgestellt, dass die Teilnahme am Tourismusgeschäft im Sinne von Arbeitsstunden über verschiedene Bereiche variiert. Die Dorfbewohner, welche ein Gästezimmer für Touristen anbieten, befinden sich 1km vom Dorfzentrum entfernt. Die ersten Gewinne vom Tourismus wurden in diesen Haushalten 2003 erzielt und diese Haushalte sind von 2003 bis 2007 gewachsen. Haushalte in denen der Kopf der Familie als Trekking Guide oder im Bereich kultureller Unterhaltung tätig ist, befinden sich ebenfalls in der Nähe des Dorfzentrums. Seit vier Jahren beziehen diese Haushalte Einnahmen aus Tourismus und die Bildung der Erwachsenen sowie das Humankapital haben sich verbessert. Die Bildung und das Humankapital der Haushalte spielen eine wichtige Rolle um am Tourismussektor mit zum Beispiel der Produktion von Souveniren oder dem Betreiben eines Kaffees teilzunehmen. Außerdem haben kinderreiche und Haushalte mit älteren Personen einen Vorteil um im Tourismussektor tätig zu sein. Für andere Nicht-Tourismussektoren spielt Bildung ebenfalls eine wichtige Rolle um am kommerziellen Leben teilzunehmen. Für Haushalte die im Agrarsektor arbeiten oder reine Arbeitsleistungen erbringen ist Bildung von geringerer Bedeutung.

Ländlicher Tourismus kann, abhängig von der Tätigkeit des Haushalts, Armut reduzieren. Haushalte, die intensiv im Tourismussektor beschäftigt sind, konnten ihr Einkommen steigern. Diese Einkommenssteigerung ist teilweise groß genug um nicht mehr als arm

klassifiziert zu sein. Der Grund dafür kann sein, dass ältere Personen durch den Tourismus ein zusätzliches Einkommen erwirtschaften können. Die Produktivität der Arbeit im Tourismussektor ist vergleichbar mit anderen Sektoren und die Größe des Tourismussektors ist ausreichend. Bis 2007 haben alle armen Haushalte zu gleichen Teilen vom Tourismussektor profitiert, danach wurde der Zugang zu spezifischen Bereichen begrenzt.

Aus den Simulationen des Allgemeinen Gleichgewichts Models, welches auf den Daten von 2007 basiert, geht hervor, dass der Einkommensmultiplikator in der Tourismus Expansionsphase und bei konstantem Arbeitseinsatz 5.34 bis 6.63 betrug. Der Multiplikator betrug zwischen 5.78 und 6.86 in einer Simulation mit flexiblem Arbeitseinsatz. Die Wertschöpfungsmultiplikatoren betrugen 1.28 bis 2.16 in beiden Simulationen. Die Einkommensverteilung betreffend hat der arme Anteil der Bevölkerung nicht überproportional vom Tourismus profitiert. Die reicheren Quantilen haben deutlich stärker als andere Quantilen vom Einkommenswachstum profitiert. Die Haushalte aus der ärmsten Quantile haben nur dann einen realen Einkommenszuwachs erfahren, wenn die Preise im Tourismussektor 40% über dem Niveau von 2007 lagen. Die Haushalte aus der zweitärmsten Quantile haben am wenigsten gewonnen und verzeichnen sogar einen Rückgang im realen Konsum.

Generell spielt Tourismus eine kleine Rolle für die Armutsreduktion. Nur Bereiche, die auf die Produktion von Souveniren aufbauen, haben zur Armutsreduktion beigetragen. Die vorliegende Studie appelliert politische Entscheidungsträger dazu ärmeren Haushalten die Möglichkeit zu geben im Tourismussektor tätig zu werden. Dadurch würden die Gewinne aus dem Tourismusgeschäft auch ärmeren Haushalten zugänglich werden.

Schlüsselwörter: Ländlicher Tourismus, Armutsreduzierung, Einkommensverteilung, Computerbasiertes Allgemeines Gleichgewichtsmodell, Haushaltseinkommen

JEL: O12, I32, R20, C68

Content

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Chapter 1
Introduction

The first chapter will begin with an introduction to community-based tourism (CBT) then go through the main research questions, the objectives of the study and the brief of the methodologies.

1.1 Introduction to community-based tourism

This section will highlight the definition of CBT, comparison between CBT and other types of tourism, importance of CBT and a broad picture of the development of CBT in countries around the world and Thailand.

1.1.1 Definition of community-based tourism

Community-based tourism (CBT) arose after the Earth Summit in 1992 at Rio de Janeiro[1] in accordance with the Agenda 21 (Phayakvichien, 2005). There are several definitions of CBT. The accordance among definitions given by World Bank (2000), UN-ESCAP (2001), REST (2003), and Ashley, Roe and Goodwin (2001) can be compiled as follows:

Community-based Tourism is tourism that emphasizes the ownership, management and involvement of communities' members in tourism activities. CBT is not just an ecotourism. While ecotourism focuses on ecological friendliness, community-based tourism focuses on the participations of villagers and the sharing of tourism benefits among them. The tourism product is not only the appreciation of natural environment but also the learning of local culture and way of life.

[1] The United Nations Conference on Environment and Development (UNCED), Rio de Janeiro, 3 – 14 June 1992. The informal name was the Earth Summit. Number of participants at level of heads of state of government was 172,108. Number of representatives of NGOs was 2,400. The conference gave a result of Agenda 21, the Rio declaration on environment and development, the statement of forest principles, the United Nations framework convention on climate change and the United Nations convention on biological diversity. (UN, 1992)

The heart of CBT is at the sharing of tourism benefits to villagers as wide as possible. Its philosophy is that when all villagers share burdens from tourism equally, e.g. noise pollution, road erosion, garbage, water shortage, and water pollution, they should share benefits from tourism equally.

1.1.2 Comparison between community-based tourism and other types of tourism

a. Eco-tourism

Eco-tourism aims at the appreciation of natural surroundings. Nature is at the central interest of this kind of tourism. Tourists touch the nature and learn the nature. It is different from CBT such that tourists need not to learn about way of life of local people. Tourists may go trekking or cycling along isolated roads without touching local people. Moreover, business entrepreneurs may be travel companies outside the area.

b. Mass tourism

Mass tourism aims at sight seeing. Tourists are accompanied in a big group to places to look at buildings, monuments, historic places. They are subjected to a certain schedule set by the program. It is extremely different from CBT such that tourists are not interested in touching people. They just come to see and go back. Besides, business entrepreneurs are always big companies from outside the area. Local people can get involved into this kind of tourism only to be objects to be seen. Some extreme cases such as an excursion to a village with long-necked Karen in Northern Thailand are compared to a human zoo (Trupp, 2010).

1.2 Main research questions

Questions on CBT emphasize four issues. They are participation in tourism, poverty reduction, income generation, and income distribution.

The first question on participation in tourism is the searching for determinants for villagers to participate in tourism. It is clear that unless the poor do not participate in tourism, they cannot gain the benefit. In fact, not all households participate. This study will find whether tourism is

not attractive enough or there are high barriers to entry. What should be enhanced to make the poor participate more in tourism sector?

The second question on poverty reduction is a further step from the first question. When it is a hope that tourism is a tool for anti-poverty campaign, is it really helpful in reducing poverty? If it can raise household income, is it enough to raise the income above the poverty line?

The third question on income generation is whether household income would increase when villagers participate in tourism. It is not obvious that tourism can raise household income. Villagers may switch from other jobs to welcome tourists instead of using free working hours to do the service.

The fourth question on income distribution is whether tourism income distributes equally when taking both direct and indirect effect into account. Direct effect is income from direct spending of tourists to the village. Indirect effect is income from expenditures of tourism sector to other related sectors, e.g. agriculture, plus consumption made by households gaining the direct tourism income.

1.3 Objectives of the study

There are four objectives to the study. First it aims to investigate the determinants of households' participation in tourism sector. It will find out what factors drive households to spend their working hours in tourism, agriculture, commerce and other major economic sectors.

Second, it will figure out the effect of tourism on absolute poverty exit. It will answer whether poor households which participate intensely in tourism activities can get out of poverty. When there are many kinds of tourism activities, it will also find what kind of them that can reduce poverty. If tourism is good enough for the poverty alleviation, this study will explain why tourism can do so.

Third, it will examine the effect of tourism on household income change. It will ensure that the poverty reduction is caused by the increase of household income and not the drop of poverty line. Moreover, apart of tourism activities, it will find the drivers of household income.

Last, it will simulate the impacts of community-based tourism on income generation and income distribution within a general equilibrium framework. It will calculate the income multiplier and the value-added multiplier both in the condition of tourism expansion and recession. It will compare the real income growth among household quintiles. It will also answer whether community-based tourism is pro-poor.

1.4 Brief of methodologies

Econometric methods and computable general equilibrium model at the village level (VCGE) will be used in this study. The motivation of using each model is as follows:

First, seemingly unrelated regression (SURE) will investigate the determinants of participation of households in major economic sectors. A household may earn money from more than one economic activity. They need to spend time to work in those activities simultaneously in a year. The decision to spend working hours in an economic sector is therefore not independent from the decision to do so in the other sectors. When it is likely that these decisions are correlated to one another, they should be modelled in a system of equations. SURE can solve this kind of system where the error terms of equations may be correlated.

Second, the binary logit model will examine factors that drive a poor household to get out of poverty. Poor households in 2003 can find there poverty status change in two ways. On the one hand, a poor household may turn to be non-poor in 2007. On the other hand, a poor household may be still poor in 2007. The binary logit model will find drivers for the poverty status change. The independent variables include the working hours in tourism sector as well as in other economic sectors.

Third, the regression with instrumental variable or IV regression will find the factors that empower households to boost up their income. It will ensure that the increasing income

changes the poverty status. The use of instrumental variable is necessary when an independent variable may cause the endogeneity problem in an economic model. A recursive model may happen when income change may be driven by the working hours in tourism sector, and it is also likely that the participation in tourism activities is also influenced by income change in the last period. IV regression will replace the possible endogenous variable with its predicted value which is generated by one or more instrumental variables. Then the regression can avoid the biased estimator.

Last, the computable general equilibrium at the village level (VCGE) will investigate the impacts of tourism expansion and recession in a village economy. The main motivation is to find out the distribution of tourism benefit among the poor and the rich in the village. The debate whether community-based tourism is pro-poor or pro-rich remains unsolved. This study will fill this gap of knowledge.

Table 1.1 summarizes all the methodologies in this study.

Table 1.1: Methodologies for the study

No.	Objectives	Methodologies
1	Determinants of participation in CBT	Seemingly Unrelated Regression (SURE)
2	Effects of CBT on poverty reduction	Logit
3	Effects of CBT on household income	Regression with instrumental variable
4	Impacts of CBT within the general equilibrium framework	Computable General Equilibrium model at the village level (VCGE)

Chapter 2
Recent development of community-based tourism

This chapter will review the recent development of community-based tourism both in development projects and academic literatures. Fist, it will highlight the development of CBT projects around the world. Then, it will discuss the academic literatures on CBT.

2.1 Recent development of CBT projects around the world

CBT is a hope to fight poverty in rural area. International organizations realize CBT as a mean for development. United Nations declared the year 2002 as the International Year of Ecotourism (UNEP, 2002). World Bank arranged a work shop on CBT (World Bank, 2000). United Nations carried out a study of the effect of CBT to poverty reduction (UNDESA, 1999). CBT was also included in national development strategies of several countries such as South Africa (Brennan and Allen, 2001) and Namibia (Ministry of Environment and Tourism of Namibia, 1995).

The origin of tourism is the pilgrim. Pilgrim drives people out of their home and journey to certain places. Group of visitors need shelters. They ask churches or temples for places to stay overnight and food supply. Some villagers offer their houses to be accommodations for travelers. Pilgrim is not just the religious activity. The communication between strangers from many places and local people is a way to learn different cultures from each other. Considering the definition that CBT is a kind of tourism that is owned and managed by local people and its tourism product includes cultural learning, the local hospitality for the pilgrim can be classified as an informal CBT.

International student exchange enhances CBT. Students like to travel to remote area in other countries to help poor people and construct small buildings to commemorate their visits. They have to stay overnight in villages. They also spend time with villagers and learn about their ways of live. CBT in Mae Kam Pong village in Thailand which is the target village in this study was originated by this way when a group of Japanese students visited the village.

The presence of researchers and officers in rural villages encourages villagers to welcome strangers to stay in their places. In many rural development projects, officers need to visit people to find out what kind of supports that local people need the government to help. Collecting data and information may take long time. Then researchers or officers have time to get together with villagers and learn more about their cultures, attitudes and values.

After World War II, the world has become more peaceful. Modes of transportation are upgraded both locally and internationally. Developing countries compete to attract tourists from all over the world to boost up their economies. Tourism promotion and advertisement can be seen everywhere. The number of tourism agencies is expandable. Tourism has been flourished for more than half of the century.

Apart of mass tourism, travelers turn to other options of tourism activities. Among the options, ecotourism is one of the leading activities. Visitors like to touch nature and spend time to appreciate the beautifulness of natural sceneries. They also learn from nature. However, this kind of tourism does not emphasize the getting closer to villagers.

CBT offers ecotourism plus cultural learning. Travelers do not only appreciate the nature but also touch local people. Although the concept is good, it is not easy to attract tourists to spend much time to get closer to local people. Only a few villages have been successful. Mainly, the successful villages are rich in natural resources. Most of them have strategies to force people to stay overnight. For example, tourists who come to a village to see fire-flies in the late evening cannot return back to downtown due to the inconvenient transportation; they must stay overnight in the village.

Some incentives awarded by the government spread CBT to villages. Cash is a good incentive for remote villages where cash income is hard to find. Villages tend to accept tourism development projects guided by central government. As long as the government offers a lot of awards each year, more and more villagers compete for the awards. However, it is still questionable whether a village operating the CBT really earns from tourists. This study may find the answer.

2.1.1 Development of CBT in Asia and Oceania

Apart of Thailand, there are several community-based tourism villages throughout Asia and Oceania. At least five countries in Asia have developed CBT; Cambodia, Lao PDR, Malaysia, Indonesia and Nepal. In Oceania, Papua New Guinea has also developed CBT in isolated communities. For Australia, it is mentioned that the state of Queensland has more than one hundred local tourism destinations. However, the structure of these destinations is not clarified so that it is uncertain that they are community-based tourism or just local private businesses.

CBT projects in these countries are funded by international organizations (Table 2.1). Some of donors are UNESCO, Netherlands Development Organization (SNV), World Wildlife Fund Norway, and Discovery Channel Television. Local NGOs also support CBT projects, e.g. Mlub Baitong in Cambodia and World Wildlife Fund of Malaysia. In some countries, government agencies take part in the CBT development such as National Tourism Authority of Lao PDR. However, projects in Australia and Papua New Guinea do not have funder.

Table 2.1 CBT projects in Asia and Oceania

No.	Country	CBT projects and funders	Author
1	Australia	125 local tourism destinations in the state of Queensland. No funder was mentioned.	Ruhanen (2004)
2	Cambodia	Chambok village supported by Mlub Baitong, a local environment NGO	Prachvuthy (2006)
3	Lao PDR	Ban Nalan village funded by Nam Ha Ecotourism Project, National Tourism Authority of Lao PDR and UNESCO	Tuffin (2005)
4	Lao PDR	Nammat Kao and Nammat Mai village funded by Nam Ha Ecotourism Project, National Tourism Authority of Lao PDR and UNESCO	Oula (2006)
5	Lao PDR	Netherlands Development Organization (SNV)	Ashley and Mitchell (2007)

No.	Country	CBT projects and funders	Author
6	Malaysia	Four villages in Lower Kinabatangan funded by World Wildlife Fund of Malaysia and Norway and Discovery Channel Television	UN-ESCAP (2001)
7	Indonesia	Togean Islands supported by Conservation International Indonesia and three villages around Gunung Halimun National Park supported by an unspecified donor country.	UN-ESCAP (2001)
8	Nepal	Villages in Humla district supported by Netherlands Development Organization (SNV)	Saville (2001)
9	Papua New Guinea	Hustein Range communities without funder	Wearing and McDonald (2002)

Source: Various authors as referred in the table.

2.1.2 Development of CBT in Africa

In Africa, at least seven countries have developed CBT projects. They are Botswana, Ethiopia, Kenya, Lesotho, Namibia, South Africa and Uganda. Namibia is famous of its CBT association called NACOBTA (Namibian Community-based Tourism Association) which is an example for the establishment of the same association in Uganda. South Africa operates CBT with joint efforts of communities, public and private sectors. They are not driven by foreign donors.

Supporters of CBT in Africa are quite different from those in Asia. The Netherlands Development Organization (SNV) has CBT development projects both in Asia and Africa. Some of other donors are Sustainable Tourism for Eliminating Poverty (ST-EP) project of UN-WTO, Swedish Development Agency (SIDA), Living in a Finite Environment (LIFE) programme, UK Department of International Development (DFID), European Union and United States Agency for International Development (USAID).

Local NGOs are also important supporters in Africa. Integrated Rural Development and Nature Conservation (IRDNC) supports CBT in Namibia. Mgahinga and Bwindi Impenetrable Forest Conservation Trust (MBIFCT) funds CBT in Uganda.

Moreover, state agencies in some countries also support CBT development projects. In Lesotho, CBT projects are supported by Ministry of Tourism, Environment and Culture of Lesotho. Kwazulu Department of Nature Conservation in South Africa supports CBT indirectly by its non-profit company called Isivuno which offers a joint-investment in CBT projects. Local Economic Development (LED) is another source of fund that supports CBT in South Africa. Uganda Tourist Board supports communities to form a CBT association in the same style of the organization in Namibia. The association is called UCOTA (Uganda Community-based Tourism Association).

Table 2.2 CBT projects in Africa

No.	Country	CBT projects and funders	Author
1	Botswana	Ukhwi, Bcaang and Ngwatle village supported by Netherlands Development Organization (SNV)	Rozemeijer (2001)
2	Ethiopia	12 projects were supported by Sustainable Tourism for Eliminating Poverty (ST-EP) project of UN-WTO	World Tourism Organization (2004)
3	Kenya	Communities in the North of Kenya were supported by Netherlands Development Organization (SNV)	World Tourism Organization (2004)
4	Lesotho	Menkhoaneng village was supported by Ministry of Tourism, Environment and Culture of Lesotho	World Tourism Organization (2004)
5	Namibia	45 communities formed an association called NACOBTA (Namibian Community-based Tourism Association). It was funded by Swedish Development Agency (SIDA), Living in a Finite Environment (LIFE) programme, UK Department of International Development (DFID) and European Union	Nicanor (2001)

No.	Country	CBT projects and funders	Author
6	Namibia	Five communities supported by local NGOs such as Integrated Rural Development and Nature Conservation (IRDNC).	Halstead (2003)
7	South Africa	Rocktail Bay and Ndumu Lodge were owned partly by communities, Isivuno which is a non-profit company of the Kwazulu Department of Nature Conservation and Ithala Bank.	Poultney and Spenceley (2001)
8	South Africa	Makulele and Manyaleti funded by Community-Public-Private-Partnership (CPPP) programme	Mahony and Van Zyl (2001)
9	South Africa	Villages in the municipality of Ultrecht funded by South African Local Economic Development (LED).	Hill, Nel and Trotter (n.t.)
10	Uganda	60 communities formed an organization called UCOTA (Uganda Community-based Tourism Association) supported by Uganda Tourist Board and USAID.	Williams et al (2001)
11	Uganda	Buhoma village supported by Uganda Wildlife Authority and a local NGO called Mgahinga and Bwindi Impenetrable Forest Conservation Trust (MBIFCT)	Mujuni (2003)
12	Egypt	Tourism in Sharm El Sheikh, South Sinai, supported by Egyptian government as a part of the center of development and population in dessert areas	Goodwin (2006b)
13	Gambia	Tourism projects in Senegambia and Kotu beach supported by the PPT partnership, funded by the Economic and Social Research Unit (ESCOR) of the UK Department for International Development (DFID).	Bah and Goodwin (2003), Goodwin (2006b)

Source: Various authors as referred in the table.

2.1.3 Development of CBT in South America and the Caribbean

In South America and the Caribbean, CBT development projects are found in at least six countries; Bolivia, Costa Rica, Ecuador, Guatemala, Peru and Saint Lucia. The Nature Coservancy, USAID and Alex C. Walker Foundation are major donors to these CBT projects. The Netherlans Development Organization (SNV) also extends its help to Bolivia. European Commission gives its support to Saint Lucia. Government support is found only in Saint Lucia. Some projects can survive without funders, e.g. Cofan community in Ecuador which is organized by a son of American missionaries.

Table 2.3 CBT projects in South America and the Caribbean

No.	Country	CBT projects and funders	Author
1	Bolivia	More than 80 CBT projects were mentioned. 12 projects around Amboro National Park were supported by Netherlans Development Organization (SNV)	Alcoba Meriles (n.t.)
2	Costa Rica	Amistad-Bocas del Toro funded by The Nature Coservancy, USAID and Alex C. Walker Foundation	Jones (2007)
3	Ecuador	Cofan community of Zabolo initiated by a son of American missionaries. No funder was mentioned.	Braman and Amazonia (2001)
4	Ecuador	Kichwa community funded by The Nature Coservancy, USAID and Alex C. Walker Foundation	Campana and Flores (2007)
5	Guatemala	Villages around Atilan Lake Watershed and Villages around Atitlan Volcanoes funded by The Nature Coservancy, USAID and Alex C. Walker Foundation	Calderon Barrios (2007) and Jones (2007)
6	Peru	Villages around Pacaya-Samiria National Reserve and Villages in Yanayacu Pucate Watershed funded by The Nature Coservancy, USAID and Alex C. Walker Foundation	Jones (2007) and Lau and Isora (2007)

No.	Country	CBT projects and funders	Author
7	Saint Lucia	Laborie village and Anse la Raye village funded by the European Commission and government of St. Lucia.	Renard (2001)

Source: Various authors as referred in the table.

2.1.4 Development of CBT in Europe

In Europe, there are 15 development projects supported by the European Commission in 13 countries including Germany. The support aims at the development of rural tourism. They may not be community-based tourism in the sense that the project covers huge area with large population (Table 2.4). It does not focus on a particular community or a group of communities. Moreover, in the management aspect, it is unclear whether tourism businesses are collective efforts of villagers or private enterprises. However in another view, this kind of rural tourism brings income to local people in remote area of developed countries who have less opportunity than people in big cities. Thus, this kind of tourism is also good for local communities even though it is not typical community-based tourism.

Table 2.4 Rural tourism in Europe

No.	Country	Region	Population	Description of tourism
1	Austria	Bregenzerwald	30,000	Traditional agricultural area in foothills of the Alps
2	Austria	Lungau	21,000	Isolated mountainous area
3	France	Pays Cathare	58,000	Area with strong historic and cultural heritage
4	France	Vosges du Nord	83,000	Regional natural park with many short visits
5	Finland	Pohjois Karjala	187,000	Region with traditional tourism based on lakes and forests
6	Germany	Saechsische Schweiz	147,000	Attractive sandstone uplands popular for short visits
7	Greece	Sitia	10,000	Attractive coastal tourism area
8	Iceland	Skaftarhreppur	500	Small remote district in unique environment

No.	Country	Region	Population	Description of tourism
9	Ireland	Ballyhoura	55,000	Typical Irish agricultural landscape with modest levels of tourism in small communities
10	Italy	Basilicata	600,000	Relatively isolated and little known rural region
11	Netherlands	Schouwen West	34,000	Island with considerable development of caravan and camping sites on farms
12	Portugal	Vale do Lima	167,000	Upland area with traditional villages and architecture
13	Spain	Montana de Navarra	77,000	Upland area with well established rural tourism
14	Sweden	Vallonbruk i Uppland	25,000	Former industrial area across a number of small rural communities
15	United Kingdom	Trossachs	6,000	Mountain and lake area with day visits

Source: European commission, 2000

2.1.5 Development of CBT in Thailand

The origin of CBT in Thailand can be dated back to 50 years ago when a village in Southern Thailand called Kiriwong claims that they have operated a homestay since then. At that time, they offered villagers' houses to be accommodations for trekkers, social activists and rural developers to stay overnight (Homestay Thailand, 2007).

Many remote villages offered tourism service at the beginning of 1980s, e.g. a Hmong[2] village called Ban Suay in Chiang Mai province (Michaud, 1997). However, the village is not a community-based tourism because everything is organized by travel agencies in downtown. Villagers have nothing to do with the management. Therefore, this kind of tourism is not counted into the history of community-based tourism.

[2] Hmong is a group of hill tribers in Northern Thailand.

I made a list of 164 tourism villages in Thailand and asked some villages by phone calls about their originalities. I found that the oldest village that conducts community-based tourism is Aka Hill House Homestay in Pong Nam Ron village in Chiang Rai province in Northern Thailand. The village established its tourism service in 1989. The second oldest is Ban Mae Lana in Mae Hong Sorn province in Northern Thailand which settled its tourism service in 1993. The third oldest is Koa Yao Noi village in Pang-Nga province in Southern Thailand which began the tourism service in 1995.

Community-based tourism in Thailand was expanding during the Amazing Thailand years, 1998 -1999 (Homestay Thailand, 2007). At least seven community-based tourism villages were established. The most famous one is Plai Pong Pang village which launched the service in 1999 (Kantamaturapoj, 2005). Extending from accommodation service, the village offered ecotourism and soft adventures for visitors.

Plai Pong Pang village is famous of its modern management of community-based tourism. According to the interview with the head of the project, Mr. Tawat Boonpad, the idea to establish CBT was emerged when he traveled to New Zealand and visited a cave with glow worms which shone in the darkness of the cave. He thought that there were plenty of fire fliers in his village as well. They should be also impressive to visitors. However to see the fire fliers, tourists needed to stay until late evening in the village when darkness covered the scene. It was not convenient for them to travel back to Bangkok or other provinces at night. Therefore, they needed to stay overnight in the village. This was the beginning of homestay service in the village where 25 households joined the project. The village was awarded the outstanding CBT village in 2000.

In 2000, Mae Kam Pong village established its community-based tourism project. The originality was that this village wanted to join OTOP (One Tambon[3] One Product) project in that year. However, OTOP project emphasized the production of local products. The village had nothing to do with production then it proposed tourism service instead. The proposal was accepted by the government. Four years later in 2004, it won the first prize and got one million Baht (around USD 33,000) as a reward. It was a surprise that a tourism village topped

[3] Tambon is a Thai word. It means sub-district. It combines around 4 – 10 villages with population approximately 2,000 – 5,000 persons.

other production sites for the award. After that, other villages wanted to follow the suit in the establishment of community-based tourism projects with the hope that they might get tourists as well as the prize.

The expectation for CBT to the development of rural economy encourages government agencies to get involved in the activity. Tourism Authority of Thailand (TAT) started in 2007 to give the so called "The Most Outstanding Community-Based Tourism Award" to 62 villages. In that year, there were at least 183 villages operating community based tourism in Thailand (TAT, 2007).

However by my survey among 164 villages, there are two types of tourism villages. The first type is the typical community-based tourism where villagers cooperate to organize tourism service and share tourism benefit. The second type is the private guesthouse located in villages. Only 36 villages are classified as community-based tourism. The remaining 128 sites are marked as private business of some persons in the village or even outsiders which do not deal with mutual benefit of the village. The private guesthouse is not counted as the community-based tourism because villagers do not get involved in the management and share the benefit.

2.2 Recent development of academic literatures on CBT

This section will review academic literatures in 4 issues. It will begin with participation in CBT. Then it will go through literatures regarding effects of CBT on income generation, income distribution and poverty reduction.

2.2.1 Participation in CBT

It is a long effort to enhance the poor to participate in tourism. Literatures such as Ashley, Roe and Goodwin (2001) suggested that tourism business should hire more local people. However, it may not always work out. One thing is that the poor cannot respond to the call for jobs or even are not willing to join the sector. Goodwin (2006) found that after almost ten years of the promotion of tourism to the poor, not many poor households participate in tourism activities.

There are several hypotheses why villagers did not participate in tourism activities. First, the relative return in non-tourism sectors is higher than in tourism sector. Prachvuthy (2006) reported that 56 percent of villagers in Chambok village in Cambodia did not participate in tourism activities. More than half of them revealed that they would like to grow vegetables and fruits instead. The return from industrial and commercial activities (US$203 per household per year) and agricultural activities (US$158) were apparently higher than tourism activities (US$26).

Untong et al (2006) also reported that only 30 percent of villagers in Mae Kam Pong village in Thailand participated in tourism in 2003. Households gained average income from non-tourism and tourism activities around US$750 and US$175 per year respectively. At that time, the CBT in the village was in an introductory stage of tourism product life cycle. It was just 3 years after the establishment of the project.

In contrast, when the return in tourism sector is above the returns in other sectors, more people will join it. In Nammat Mai village in Lao PDR, Oula (2006) reported that almost every villager participated in tourism. The average tourism income was around US$38 per household per year whereas non-tourism income yielded around US$28.

Secondly, the poor cannot enter the sector even though they are interested in it. They may lack of necessary capitals and skills necessary for tourism activities according to Untong, et al (2006), Prachvuthy (2006) and Oula (2006). Villagers who cannot provide standard service to tourists are not selected by village's leaders to participate in tourism. In contrast, in a village where tourism is heavily related to primary life style of villagers, advanced physical capitals and advanced skills are not necessary.

2.2.2 CBT and income generation

Scholars believe differently upon the effect of tourism on household income generation. On the one hand, they believe that tourism can generate much income. Goodwin (2006b) compared income of workers in tourism in Gambia between 2001 and 2002 which was a case of before and after access to tourism income. The study found that the income increased drastically. Vendors of craft got around 95 – 198percent of income growth. Juice sellers experienced a 121percent growth of income. Tourism guides got slightly 18-33percent more of their income.

Untong (2006) used structural equation modeling to investigate the satisfaction of local people in Northern Thailand upon tourism. The study found that they are satisfied for their increasing tourism income. Kim (2002) did the study in the same fashion in Virginia. The study found the same results of satisfaction in economic dimension and material well-being. People felt that tourism created employment opportunity, provided desirable jobs and created variety of jobs.

On the other hand, many literatures warned that the income generation may be low. Lynn (2003) mentioned that CBT took time to deliver benefits to villagers. In the beginning period, income generation was low. It is also added by Strasdas (2005) that communities needed at least 5 years to generate substantial income from tourism. He emphasized that the income was not much. Rozemeijer (2001) added that, although most of villages wanted to operate the CBT for additional income, they confronted with the opportunity cost foregone in agricultural production. Prachvuthy (2006) found that average income per household from CBT in Cambodia did not exceed the average income from agricultural production.

Although Goodwin supported the argument of increasing income from tourism, another study of him in 2006 mentioned that CBT did not always deliver much income to villagers. It depended heavily on location of village, participation of local people in commercial activities, facilities to secure revenue and the maintainance cost.

The issue of income multiplier was hypothesized by Mitchell and Ashley (2007). They convinced that the indirect effect of tourism is extremely important to a village economy. They predicted that around 50 – 90 percent of the impact of tourism came from the indirect effect. It means that the income multiplier can range from 2 to 10. The indirect expenditures include spending of tourism staffs on food and non-food consumption, purchasing of intermediate goods for tourism activities, and money transfer from tourism sector to other public institutions such as temples and schools.

Slee, Farr and Snowdon (1997) provided the approximation of the income multiplier but not from CGE model. They investigated the economic impact of rural tourism. They classified rural tourism into two categories, hard and soft tourism. Hard tourism is characterized by externally owned large-scale developments. Soft tourism is tourism activities which embedded within a local economy and engage local people into it. They quantified the

impacts into three dimensions, direct, indirect and induced impacts. Direct impact is the impact of tourist spending on incomes and jobs at businesses where tourists spend their money. Indirect impact is the impact resulting from successive rounds of local business transactions that result from tourist spending. Induced impact is defined as the impact on incomes and jobs of the spending of income earned as a result of spending by tourist. They used the decomposition method in calculating the impacts. The data was from 120 tourism-related businesses and 1,800 tourists in Scotland. They found that hard tourism made more money from tourists than soft tourism. However, soft tourism yielded greater income multiplier than hard tourism. The income multipliers were small. They were around 1.10 for hard tourism and 1.15 for soft tourism.

2.2.3 CBT and income distribution

The issue of income distribution are clearly revealed by the quantitative studies of Kaosa-ard, (2006), Untong et al, (2006), Oula, (2006) and Prachvuthy, (2006). Their literatures pointed that tourism income distributed unevenly in several communities in Thailand, Lao PDR and Cambodia. However, these studies took only the direct effect into account.

A study of Wattanakuljarus and Coxhead (2008) took consideration of both direct and indirect effects and found that the income distribution was also uneven. The study was at a national level. They focused on the effect of inbound tourism on income distribution. They found that tourism growth benefited all household classes. However, high income and non-agricultural households benefited more from tourism. One of the reasons was that the expansion of foreign tourism demand brought about a real appreciation that undermined profitability and reduced employment in tradable sectors, especially agriculture, from which the poor derived a substantial fraction of their income. They emphasized that inbound tourism expansion was not pro-poor as long as owners of primary factors did not participate in tourism-related activities.

2.2.4 CBT and poverty reduction

Walter, Goodwin and Edmunds (2004) tried to figure out the contribution of tourism to poverty reduction from several expert meetings and seminars. They found some key factors that might need to be promoted to achieve pro-poor tourism. For example, it required the commitment and quality of the community leadership. The report also created some indicator

to quantify the impact. Some of indicators were the number of small and medium enterprises (SMEs) owned by the poor that had been created during the monitoring period, the number of previously poor employees who were formally employed within the tourism industry and the change of earnings per week. They suggested that it was useful to compare the well-being of the poor before and after tourism development.

Goodwin (2006b) estimated the effects of tourism on poverty reduction in many countries using some of the methods proposed by Walter, Goodwin and Edmunds (2004) mentioned earlier. He found that, in a community in Gambia, income of workers in core tourism and tourism-induced sector grew rapidly. Some participants earned double of their income or more. In Egypt, tourism workers could send around 63percent of their earnings back to their families. However, he did not mention about poverty reduction because he did not have the poverty lines for the analysis.

Suriya (2008) investigated the effects of tourism on poverty reduction at the provincial level in Thailand using seemingly unrelated regression. Secondary data in 2007 were drawn from poverty maps of National Statistical Office and tourism data of Tourism Authority of Thailand. The study found that tourism income could help reducing the absolute poverty. It also calculated that only tourism income would not be possible to get rid of poverty in the poorest province of Thailand. However, the study was at the provincial level and could not extend the estimation to the village level.

Chapter 3
The survey and data

This chapter will reveal the survey method and the data. First, it will give the overview of the target village. Second, it will introduce the survey methods. Third, it will explain about the Social Accounting Matrix (SAM). Fourth, it will describe the panel data of 2003 and 2007. Finally, it will clarify definitions and measurements of important issues.

3.1 The target village

Mae Kam Pong village in Chiang Mai is an outstanding CBT village in Thailand. It is the first CBT village in Northern Thailand. It has experienced the CBT since December 2000 without foreign funders. It received awards of outstanding CBT two times, in 2004 the prime minister OTOP award, and 2007 the award from Tourism Authority of Thailand. It is like a school for other villages to learn how to establish CBT.

The village is located to the east of Chiang Mai province, around 50 kilometers from the city of Chiang Mai and 58 kilometer from Chiang Mai international airport (Figure 3.1). It is a highland village at the elevation about 1,300 meters above the sea level. Its age can be dated back to 100 years ago. It consisted of 135 registered households in 2007. Eleven households were abandoned. Only 124 households were active. The number of villagers is around 500 people. The villagers are local Northern Thai. They speak official Thai and Northern Thai languages.

The village is divided into 4 clusters. The inner cluster is the biggest one. It includes 48 households. It is the location where most of the richest households in the city are settled. It is the village center because a temple is there. The upper middle cluster is the second largest cluster with 38 households. The middle cluster is the smallest one with 18 households. The outer cluster consists of 31 households. It locates at the entrance of the village, around 2 kilometers from the village center. Most of poor households are in the outer cluster.

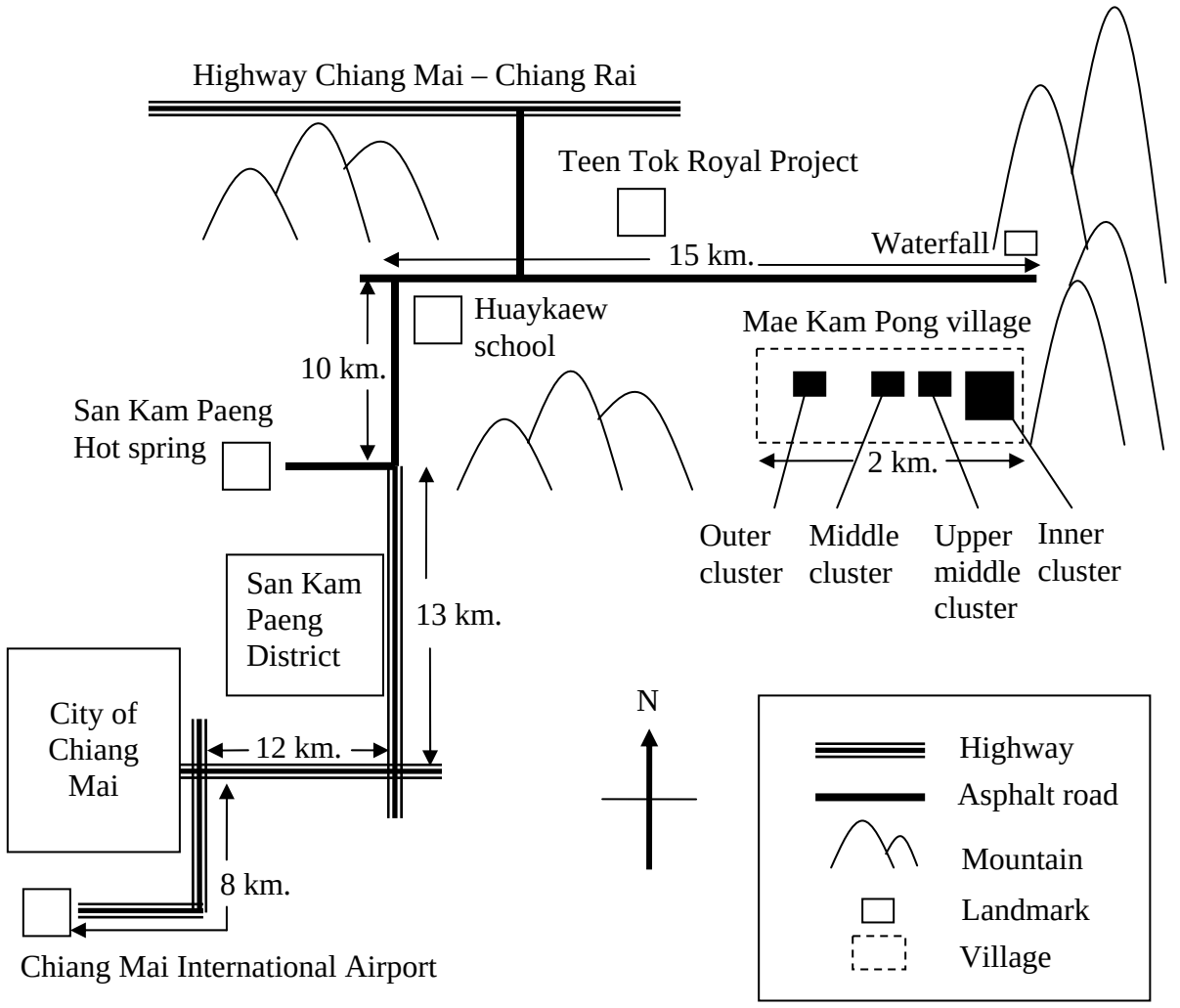


Figure 3.1: Map of Mae Kam Pong village

There are several advantages to conduct a research on community-based tourism at Mae Kam Pong village as follows:

❖ ***The community's power in tourism control***. According to the principle of CBT, the ownership and management of tourism activities should be controlled by the community. Villagers in this village occupy all tourism assets and control all tourism activities.

❖ ***The participation of villagers***. Not only adults participating in tourism sector, but also children show traditional dances to visitors. Farmers let visitors to visit their farms. Senses of hospitality to tourists spread around the village.

❖ ***The economic linkages***. Varieties of economic linkages can be found in the village. Agriculture, souvenir productions, commerce and services are linked to tourism sector. The village operates its own water work and runs a micro hydro-power plant; these activities represent the utility sector in the village.

❖ ***The growing stage of CBT life cycle***. Annual tourism income of the village grew up from around US$5,300 in 2003 (Untong, et al, 2006) to US$34,000 in 2006 (Suriya, Srichoochart and Pruekruedee, 2007). The average income growth was around 85 percent per year. Kotler (2000) classified this high growth as a growing stage in the product life cycle model. It indicates that this village has already passed the introductory stage of CBT while many other villages are still in the introductory stage.

❖ ***The size of the village***. Consisting of 124 households, the village is not too big and not too small. Data collection for the construction of Social Accounting Matrix (SAM) within one year can be possible.

❖ ***The language***. Villagers speak Northern Thai. There is no need for a translator because the researcher and staffs understand the language. It is good for asking deeper questions and getting the answers clearly. It is easier to make friends with villagers who speak the same language and share the same customs.

❖ ***The accessibility***. The village is linked by concrete and asphalt roads from the city of Chiang Mai. There will be no problem in getting access to the village in the rainy season.

❖ ***The interest of policy makers.*** Mae Kam Pong village won the outstanding CBT awards two times. The village is the case study of many scholars. Policy makers also learn from the village for the promotion of CBT around the country. Therefore, the research conducted in this village will be attractive to policy makers in Thailand.

3.2 Introduction to the survey methods

The survey in the village took place during August 2008 to March 2009. Starting from May 2008, the project recruited staffs and trained them about the aims of the projects, the questionnaire, interview skills and survival skills in a mountainous village. It also prepared materials for the survey and the long-stay in the village.

The data collection method was the census. During that time, 135 households were officially registered with 124 active households. The project approached every household whose residents were found. The study got 116 households in the census.

There were two rounds of the survey. The first round was an exercise for the field staffs. It used a short questionnaire, 2 pages, to conduct a census. The objective was to get to know villagers and introduce the staffs to the village. It also prepared villagers for a bigger survey that would come later. Moreover, it helped the survey team to learn how to overcome obstacles in the data collection. Data from the survey was not used in this study.

The second round of the survey used a 125-page questionnaire designed specifically for the construction of SAM. The details of the questionnaire can be seen in annex 1. In this round, it realized that it would need a half day or a whole day for a household to answer the questionnaire. The time depended on how complex of economic activities that a household engaged. Therefore, the project decided to compensate a household with 150 Baht, around €3.00, which was equal to a daily return from agriculture.

The compensation scheme worked well. All households, even some households that refused to participate in the first-round survey, made appointments with the staffs by the arrangement of the head of village. Villagers cooperated very well in answering the questionnaire although some mistakes could happen because of the lost memories.

Other researchers that were doing their research projects in the village blamed the compensation method such that they could not pay for villagers. To respond this, the author discussed with the head of village and came up with an agreement that it must be fair for villagers who spent time during their working hours to talk with researchers. Before this, hundred of researchers came, disturbed, and reap benefits from villagers without paying some

money. It was a reason why some households chased researchers away. The compensation set a new fair standard and made villagers welcome further researchers. By the way, researchers are not meant to pay the compensation when talking to villagers in their free time.

A tip in the data collection was that staffs should visit a household in pair. One asked questions and another one filled the questionnaire. The questionnaire was too long and too complex to let villagers fill it by themselves. The project had four staffs in the field forming two pairs. The pair was not stick to the same persons. It was a part of the quality control which guaranteed that all staffs must know everything in the questionnaire. They must be prompted to be either an interviewer or a note taker.

The process of data collection was delayed by rain. Primarily, the project aimed to finish four questionnaires a day. Practically, it could get only two. Staffs could not leave for another house because of the heavy rain. Overall, the census lasted three months in the second round.

Data in the questionnaire was mainly translated into digital format by the four staffs plus some more office staffs. This process took around 2 more months. During this period, when there were some curious data, staffs needed to arrange appointments with villagers to clarify them.

After a whole set of digital data was obtained, economic ratios were calculated, e.g. production cost ratio and household expenditure ratio, to ensure the consistency. The problem was that they were not consistent. Therefore, the researcher with staffs needed to visit the village again to clean the data.

It was not possible to make villagers who made a mis-recall to get a better memory. The staffs turned to observe their production process and consumption behavior instead. Asking neighbors was another way to get more reliable information. After that, the information was compared to other consistent households. The manipulation of data was unavoidable. The process of manipulation was transparently clarified in section 3.3.5.

3.3 Social accounting matrix (SAM)

In this section, it will introduce the SAM. After that, it will explain how to construct the SAM. Then it will show the reference period of the data. It will also clarify the data manipulation and the method to balance the SAM table. Finally, it will discuss the advantages and disadvantages of SAM.

3.3.1 Overview of SAM

Social Accounting Matrix (SAM) collects most of economic transactions in an economy or a geographical area in a period of time, actually a year. It displays income and expenditure of economic sectors as well as households.

SAM is a two-way table consisting of payers on the top of the table and receivers on the left-hand side of the table. In this study, payers include activities, commodities, factors, households, investment, and the rest of the world. Receivers include the same categories. The table is a 6×6 matrix. It can be a 7×6 matrix if it divides the last row into two rows, imports from the rest of the world and transfers to the rest of the world (Table 3.1).

SAM has numbers in only some cells. Cells that should not have numbers must not have numbers, otherwise they will be incorrect. There are some exemptions in some cells that can have or have no numbers. Details can be seen in annex 2.

It should be noted that the meaning of a cell can be read in two ways. First, it can be read as income when reading by row. Second, it can be read as expenditure when reading by column.

Table 3.1: The specification of Social Accounting Matrix (SAM) in this study

	Activities	Commodities	Factors	Households	Investment	Rest of the	Total
Activities		Commodities produced inside the village					Total value of production
Commodities	Intermediate inputs			Consumption expenditures	Intermediate goods for construction	Exports	Total sales of commodities produced inside the village
Factors	Factor payments for production inside the village				Factor payments for construction	Factor exports	Total factor returns
Households	Profits to households and returns to family labors		Factor payments paid to households	Inter-household transfers		Inward transfers, remiitance	Total household income
Investment				Savings		Capital inflow	Total investment
Imports	Imports of inputs		Factor import	Imports of consuming products	Imports of inputs for construction		Total imports
Outward transfer				Household transfers to rest of the world	Capital exports		Total outward transfers
Total	Total cost of production	Total value of commodities produced inside the village	Total factor payments	Total expenditure of households	Total cost of construction	Total revenue from rest of the world	

3.3.2 Construction of SAM

The construction of SAM at the village can be done in two ways. The first method is the estimation from secondary data. The second method is the census in a village.

For the first method, Taylor and Adelman (1996) presented series of SAM at the village level. It included five Village-SAM tables in five countries as listed below:

- Mexico by Irma Adelman, J. Edward Taylor and Stephen Vogel (1988) which was the first Village-SAM of the world
- India by Shankar Subramanian
- Kenya by Blane D. Lewis and Erik Thorbecke
- Senegal by Elise H. Golan
- Indonesia by Katherine Ralston

Other Village SAM tables which were done in the same period but not included in the book are also listed here:

- Subramanian, Shankar and Elisabeth Sadoulet (1990)
- Klasen (1990)
- Parikh, Alka and Erik Thorbecke (1996)
- Kuiper, Marijke (2005)

The SAM tables in these studies were estimated by using survey data conducted by other organizations which covered the target village. For example, the study of Shankar Subramanian in 1996 used data from ICRISAT (International Crops Research Institute for the Semi-Arid-Tropics) which covered household data in many villages including the village in his study.

For the second method, the study of Arjunan Subramanian (2007) in India was the first time that conducted the census. The census collected household data with a 120-page questionnaire. The questionnaire was a prototype for this study.

3.3.3 Advantage and disadvantage of SAM

There are several advantages and disadvantages of SAM. This section will begin with its advantages and then proceed to its disadvantages.

The advantages of SAM are listed below:

- It contains data of almost all economic transactions in a period of time.
- It shows the linkages among all economic sectors in the village.
- It reveals the distribution of income from economic sectors to households.
- It can be used as the database for computable general equilibrium (CGE) model.
- It is possible to be constructed at the village level.

The disadvantages of SAM are described as follows:

- It needs a census in a village to complete the data.
- It cannot avoid data manipulation because SAM table cannot be automatically balanced.
- The balancing method can be controversial because it may disturb the whole data dramatically.
- It is not necessary when the partial equilibrium analysis can completely answer the research questions.

3.3.4 Reference period (RP)

Reference period is a period that a questionnaire contains data. It is actually one year. However, it may not be a calendar year. The reference period in this study is during May 1st, 2007 to April 30th, 2008. The RP is set following the beginning of a major cash crop season, the tea.

3.3.5 Data manipulation

This study manipulated some data from the questionnaire because of the inconsistency of the data. The inconsistency might occur because of mistakes from the recalled memories. It might also occur when respondents wanted to hide some information.

To minimize the manipulation, the researcher tried to approach the respondents and asked the questions again. However, if the answers were still not consistent or even led to more confusion, the study had to manipulate the data with a certain procedure.

The first step in the manipulation began with a revisit to villagers. The researcher observed their activities closely and tried to understand the production process or villagers' behaviors.

The second step was the look at some reasonable and more consistent data from other households with similar production. The data were grouped and called a standard set. Then the researcher compared the production structure of the suspicious households to this standard set. If they were comparable, the research would apply the average ratio obtained from the standard set to the suspicious ones. If the questionable households were unique, the researcher would recalculate the income and costs of production especially for them. The results from the estimation were assumed to be as the same as what occurred in the reference period.

The first and the second steps were also used to estimate the missing information if necessary.

In the third step, it must balance the income and expenditure such that expenditures of all household spent to a firm must equal the domestic sales of that firm. It was impossible to get such the balance from raw data in questionnaires. To obtain the balance, another procedure was applied as follows:

1) Separate households with full information which the directions of trade were fully known and households with missing information which the directions of trade were unknown into two groups.

2) Use the group with full information to calculate the average consumption ratios which were spent to each firm.

3) Apply the ratios to the group of household with missing information.

4) Repeat step 1 to 3 for the spending of firms. This is the intra-industry trade. It needs to classify firms into categories. Then apply the procedure to them category by category, not just one shot for the whole firms.

5) Count household, institutional and industrial expenditures spent to a firm as the domestic sales of that firm.

The fourth step was to balance the income and expenditure of firms. The procedure included sub-steps as follows:

1) The principle is not to touch the balanced data which were done in the previous procedures. The industrial cost and household consumption were remained untouched.

2) Then only the retained value added in households (RVA) was affected by the manipulation. The increasing income of households would increase the savings later. The decreasing income would decrease the savings on the other hand. However, in case of negative savings, it was assumed that households would withdraw money from saving accounts to spend for consumption in that period.

It should be noted that this procedure absorbed all mistakes which might take place in the census into the RVA which was treated as the residual of the calculation.

3.3.6 Balancing the SAM

There are two methods to balance the SAM. First, the calculation technique, e.g. RAR, is widely used for data with unstable structures. Second, balancing with residuals is used for data with quite stable structures on which economic ratios obtained from them can be relied on.

RAR has an advantage of sharing residuals into all other cells without discrimination. However, it disturbs the whole data set. When researcher wants to keep most of data unchanged, this method does not work. Moreover, it yields doubtful results in some cases. For example, in a case of unbalanced export and import while the rest of data are already balanced, RAR will yield a perfect equality of export and import values which may be unreasonable.

The method of balancing by residuals has an advantage of handling the case with a few unbalanced points in the table, e.g. the unbalanced values of import and export. Its disadvantage is at the subjective selection of what should be a residual, i.e. import or export. In this case, actually the cost of production is more rigid than the revenue. Thus import should be kept constant and export should be treated as residual. However, the residual might blow up the export value to exceed a reasonable level. The researcher must compare the numbers before and after the adjustment. If the adjustment is not too large, it may be acceptable.

In this study, export is used as the residual. Its original value is 10,223,211 Baht. After adjustment in order to balance the SAM, the export is 9,204,867 Baht. It decreases 9.96percent.

3.3.7 Note on the government sector

Usually in a standard SAM table, there is the government sector. The sector collects taxes from the economy and spends subsidies or other kinds of transfers to the economy. However, in this study, there is no government sector. The reasons are as follows:

1.) The income of an individual in the village is less than the threshold to pay tax. According to the Thai Law, a person who has net income larger than 150,000 Baht (USD 4,340) per year must pay income tax. However, there is no villager whose income exceeds that threshold. Therefore, there is no payment of the income tax.

2.) The value-added tax (VAT) from tourism revenue is exempted. Tourism revenue is counted as the income of a cooperative of the village. There is an exemption that a cooperative whose income is smaller than 2,800,000 Baht (USD 81,018) per year may not pay the value-added tax. The cooperative is also exempted to pay the cooperate tax.

3.) The transfers from government are counted as the transfers from the rest of the world. This is because there is no government office in the village. This treatment is also applied to savings which is counted as the capital export since there is no bank in the village.

3.4 Panel data 2003 and 2007

This section will describe the construction of the panel data of 2003 and 2007. It will also discuss the advantages and disadvantages of the data.

3.4.1 Construction of the panel data

A panel data of 2003 and 2007 was constructed by two rounds of survey in Mae Kam Pong village. The survey in 2003 was conducted by Social Research Institute, Chiang Mai University under the directorship of Prof. Mingsarn Kaosa-ard. The researcher-in-chief was Mr. Akarapong Untong. The survey in 2007 was conducted by the author. Matched observations are 104 households which are around 89 percent of total households in the village.

3.4.2 Advantage and disadvantage of panel data analysis

The advantages of panel data 2003 and 2007 are listed below:

- It is possible to compare two points of time.
- The data shows the dynamic of economic transactions in the village.

The disadvantages of the data are discussed as follows:

- It does not contain information during 2004 to 2006. All the stories that happened between 2003 and 2007 are studied by interviews or side-evidences to fill the gap. Researchers cannot be sure what exactly happened during the period.
- The data in 2003 did not contain information on household expenditure, assets and cost of production. Therefore, the poverty status can be measured only on income side.
- It is useful when households in 2003 and 2007 are well-matched. Fortunately in this report, around 89 percent of households are matched.

- Researchers need to wait for many years to collect the data again. Funders cannot wait for such a long time. Therefore, each survey needs to be funded by different projects. Thus, the matching of information may not be perfect.

3.5 Definitions and measurements

This section will introduce definitions and measurements of important variables in this study. It will begin with household income. Then it will proceed to poverty and poverty line. Finally, it will present the participation in tourism activities and the details of each tourism activity.

3.5.1 Household income

Household income consists of three parts. First, the retained value added in households (RVA) includes returns to family labors and profit. Second, the factor payment includes returns to hired labors, land rent, material rent and financial returns. Third, the transfer from outside the village includes all kinds of transfer made to the village.

The income does not include inter-household transfer which is the transfer from a household to another household. Although the transfer existed, the total amount was so small. It was less than 10,000 Baht per year or around 0.11 percent of total household income. The transfer caused a technical problem in the CGE model because the directions of the transfer could not be clearly traced. It was known that a household got the transfer but unknown where the transfer was from. Therefore, inter-household transfer was ignored from all the models.

There are 9 categories of household income as follows:

1.) Agricultural income
Major sources of income are from tee, coffee, flowers, cow sold for meat, chicken, egg, and fish.

2.) Manufacturing income
Small household production yields income from bamboo basket, rattan furniture, and bag for fertilizer.

3.) Commercial income

Villagers are traders of tee, coffee, household products, alcoholic beverage, lottery and garbage. Restaurants and bars in the village are also counted in this category because they sell mainly to local people.

4.) Income from agricultural labor service

Two major works are harvesting crops, e.g. tee and coffee, and cutting grass.

5.) Income from non-agricultural labor service

Major sources of income in this category are construction and services. The income counts both labor factor payment and retained value added. Services cannot be decomposed into sub-categories because of the limitation in the 2003 data set.

6.) Financial income

Villagers gain mainly from remittance, interest payment and dividend paid by production groups in which they are members.

7.) Income from homestay

Villagers offer their houses to be accommodations for tourists to stay overnight in the village. The income also covers the cost of three meals for tourists.

8.) Income from core tourism

The income comes mainly from trekking guide, cultural show, transportation for tourists, tourism route development and tourism management.

9.) Income from tourism-induced sector

Major sources of income are souvenir production, coffee shop, and massage.

3.5.2 Poverty and poverty line

This study refers poverty to the absolute poverty measured on the income side. Poverty status is measured against the poverty line. A poverty line is constructed uniquely for each household according to its number of members and demographic structure, i.e. gender and age.

The study can construct only the poverty lines on income side because the survey in 2003 did not cover household expenditures. The procedure of construction of poverty lines is clarified in the annex 7.

3.5.3 Participation in tourism activities

A household is identified as a participant of tourism activities when it gains non-zero income from tourism activities. There are three tourism activities which are homestay, core tourism, and tourism-induced sector.

a. Homestay

Homestay is a provision of a house to be an accommodation for tourists to stay overnight. It provides mattress with clean bed sheet. It also prepares three meals. Tourists can access to clean western toilet and bath with warm water. The payment for homestay service is made separately from tourism package.

b. Core tourism

Core tourism is a set of main tourism products of the village. It generates the flow of tourists to the village. Tourists make the payment by buying tourism packages.

The activities consist of two parts. First, it counts activities with the direct contact to tourists. Second, it includes activities which are supporting units. The details of activities are listed below:

Group 1: Direct contact to tourists

- Trekking guide (paid on a lump sum basis)
- Local music (paid on a lump sum basis)
- Cultural dance (paid on a lump sum basis)
- Thai massage show (paid on a lump sum basis)
- Greetings ceremony in a local way (paid on a lump sum basis)
- Offering food to monks in the morning (paid on a specific basis)

- Food for tourists (paid on a specific basis)
- Transportation for tourists (paid on a lump sum basis)
- Lecture on how to organize community-based tourism (paid on a lump sum basis)

Group 2: Supporting units

- Tourism coordination (paid on ad valorem basis)
- Tourism route development (paid on a specific basis called tourism fee)

These activities are paid on different bases. Some are paid by a lump sum amount, e.g. trekking guide. One is paid by an ad valorem basis, i.e. tourism coordination. Others are paid to a specific amount of tourists, e.g. food and tourism route development. All the costs are summed up and charged to tourists in one bill.

c. Tourism-induced sectors

Tourism-induced sector is a set of activities outside the main tourism products. Without them, tourism can still operate. They are options for tourists.

This sector cannot generate the flow of tourists by themselves. Without homestay and core tourism, this sector cannot exist.

The categories of income in this sector are listed below:

- Souvenir shop, including returns to family labors and profit
- Souvenir production, including returns to family labors and profit from pillow sewing, wages of hired daily labors, management fee and financial returns to share holders
- Coffee shop, including wages of hired labors, management fee and financial returns to share holders
- Massage, including the returns to self-employment

Chapter 4
The economy of Mae Kam Pong village

This chapter will highlight the economy of Mae Kam Pong village. First, it will give the overview of the economy in 2007. Then it will present the tourism economy. Finally, it will show the dynamic of the economy during 2003 and 2007.

4.1 The village economy in 2007 read from SAM

This section will give the overview of the village economy in 2007. It will begin with the income side and then proceed to the payment side.

4.1.1 Income

Income can be read from the Social Accounting Matrix (SAM, table 4.1) by a row in the direction to the right-hand side. For convenience, it will read from an upper row to a lower row. The second row of the table shows channels of sales distribution. The third row presents sources of factor returns. The fourth row displays sources of household income.

In contrast, sources of cash from outside the village are read by column. The information can be found in the last column on the right-hand side.

1.) Product sales

Total sales of firms' production were 15.52 million Baht (table 4.1). More than half of them, 59.29 percent, were exported (table 4.2). The sales to other firms shared the second largest portion, 31.15 percent. The sales to households shared the smallest portion of 9.56 percent.

Many products were almost totally exported. The export of livestock was 99.88 percent of its whole production (not shown in tables). Services, not including tourism, were exported around 94.24 percent. Utilities were exported around 80.33percent, mainly the electricity sold to government.

Some products or services were all sold to outsiders. They were products from souvenir shop, coffee shop, homestay and core tourism.

It should be noted that construction was not counted as an export but an investment instead. Its sales were paid by money from outside the village in forms of the withdrawal of saving accounts.

2.) Factor returns (hired labor, land and capitals)

Total factor returns was 1.47 million Baht in 2007 (table 4.1). Construction was the largest sector that paid the returns, 49.61 percent (table 4.2). Production firms paid around 39.39 percent. Factor exports to outside the village accounted around 11percent of the factor returns.

3.) Household income

Households gained 8.7 million Baht in 2007 (table 4.1). They relied heavily, 71.07 percent, on earnings from family-labor payment and profit (table 4.2). Being hired labors made 17 percent of the income. Transfers from outside the village contributed 11.93 percent to households.

Table 4.1: The Social Accounting Matrix (SAM) of Mae Kam Pong village in 2007

	Activities	Commodities	Factors	Households	Investment	Rest of the world	Total
Activities		15,525,961					15,525,961
Commodities	4,836,514			1,484,580	-	9,204,867	15,525,961
Factors	582,694				733,887	162,778	1,479,359
Households	6,184,451		1,479,359	-		1,038,369	8,702,179
Investment				1,612,532		2,987,716	4,600,248
Imports from rest of the world	3,922,302		-	5,333,627	2,253,829		11,509,758
Transfer to rest of the world				271,440	1,612,532		1,883,972
Total	15,525,961	15,525,961	1,479,359	8,702,179	4,600,248	13,393,730	

Table 4.2: Ratios in the income side (summation by row)

	Activities	Commodities	Factors	Households	Investment	Rest of the world	Total
Activities		100.00					100.00
Commodities	31.15			9.56	-	59.29	100.00
Factors	39.39				49.61	11.00	100.00
Households	71.07		17.00	-		11.93	100.00
Investment				35.05		64.95	100.00
Imports from rest of the world	34.08		-	46.34	19.58		100.00
Transfer to rest of the world				14.41	85.59		100.00

Table 4.3: Ratios in the payment side (summation by column)

	Activities	Commodities	Factors	Households	Investment	Rest of the world
Activities		100.00				
Commodities	31.15			17.06	-	68.73
Factors	3.75				15.95	1.22
Households	39.83		100.00	-		7.75
Investment				18.53		22.31
Imports from rest of the world	25.26		-	61.29	48.99	
Transfer to rest of the world				3.12	35.05	
Total	100.00	100.00	100.00	100.00	100.00	100.00

4.1.2 Payments

Payments can be read down by a column. The following list is arranged according to the order of the columns. The first column is the production costs. The fourth column is the consumption expenditures.

In contrast, a kind of payment that must be read by row is the imports. The information is in the sixth row of the table.

1.) Production costs

Total cost of production in 2007 was around 15.52 million Baht (table 4.1). The largest share of the costs, 39.83 percent, went to family-labor payment which was the profit of households (table 4.3). The second largest part was the intra-industry trade, 31.15 percent. Import of raw materials shared the third largest portion with 25.56 percent. Hired labors and other factors were paid only 3.75 percent of the production costs.

2.) Consumption expenditures

Total household expenditure in 2007 was around 8.70 million Baht (table 4.1). Household consumed imported goods heavily, 61.29 percent of total expenditure (table 4.3). They purchased products which were produced in the village just 17.06 percent of their total spendings. They transferred some money to outside of the village, 3.12 percent. They could save around 18.53 percent of their income.

4.1.3 Openness of the village economy

1.) Sources of cash from outside the village

The village gained cash around 13.39 million Baht from outside the village in 2007 (table 4.1, the lower-right cell). The largest source of income was from product and service exports, 68.73 percent (table 4.3). They withdrew 22.31 percent of the cash from bank accounts outside the village. Only 7.75 percent of the cash was from transfers from outside of the village. Factor exports shared the smallest portion of 1.22 percent.

Breaking the 68.73 percent of the cash from exports into two parts, tourism contributed to 12.39 percent while other commodities or services contributed to 56.34 percent (not shown in tables).

It should be noted that the factor exports were made by villagers who stayed regularly in the village. For those villagers who went to work in cities and stayed outside the village, their income was not counted in SAM. If they sent money back to their families in the village, it was counted as the transfers.

2.) Imports

Total import value in 2007 was around 11.50 million Baht (table 4.1). The imports for consumption exceeded the imports for production, 46.34 percent and 34.08 percent (table 4.2). Another part of imports, 19.58 percent, went to construction.

4.1.4 Summary of the economic structure of the village

From the information in SAM table of Mae Kam Pong village, the village can be classified as a small-open village economy. It connects to the markets outside the village. It is not an isolated village. The distance between the village and the city of Chiang Mai is 50 kilometers and the condition of the road is good. Along the way, there are two major markets. The closest market is at San Kam Paeng hot spring. It is located around 25 kilometers from the village. Another market is at San Kam Paeng district which is around 38 kilometers from the village.

The village has several dimensions of uniqueness. First, it is a highland village growing tea and coffee. This is different from the lowland village which usually grows rice. In the SAM table, rice is not a part in the economic activities. Second, the village can produce electricity by the hydropower generator. It also has its own waterworks. Therefore, its utilities sector is presented in the SAM. Third, there is no school in the village. There was a school but the number of students was not enough to operate anymore. Then it was closed by the government's order. The closest school is around 15 kilometers from the village. Thus in the SAM table, there is an activity of school bus. Fourth, it is a village which lies along the distance of 2 kilometers of the road. This is because two small villages were combined in last

20 years to form this village. The new village is divided into 4 clusters of household. In each cluster, a commercial retailer is concerned as a center of the cluster. It is not convenient to walk to another glossary in other clusters. Not only selling commodities, but the glossaries also buy tea and coffee from villagers to sell to outsiders. Therefore, the role of commercial sector is huge.

The village shares many similarities with typical villages in Northern Thailand. First, it is a rural village where no financial institutions are settled inside the village. The savings are deposited in banks outside the village. Therefore, savings are treated as capital export in this SAM table. Second, the production inside the village is not complex. The trading of intermediate inputs among firms inside the village is small. Third, the retained value added in household (RVA) is high. This is because villagers usually use their own household labor for the production. Fourth, a large share of household consumption goes to commercial sector and markets outside the village. Villagers buy goods from some major glossaries inside the village. They also consume a lot of commodities bought directly from markets outside the village.

Comparing the village to another village which uses SAM for the analysis, some economic activities are different. In SAM table of Kanzara village in India (Subramanian, 1996), the production structure is more complex. They produce varieties of agricultural products such as dry agriculture, wet agriculture and sugar. They import milk. The production relies on hired labor more than family labor. They also have village government in the SAM table. The differences are partly because of the larger number of population, 1,251 persons in 242 households in 1985, and the difference of geographic location.

4.2 Tourism economy in 2007

This section will show details of tourism income, seasonal index, major tourism products, tourism-induced industries, tourism activities**,** classification of tourists and linkages between tourism and other sectors. The data are compiled from two sources. First, the official account of the village gives the details in tourism income and activities in the sector. Second, the census in 2008 provides pieces of information in other economic sectors.

4.2.1 Tourism income

In 2006, it was the first year that the village gained more than 1 million Baht from tourism (Figure 4.1). The income dropped slightly in 2007 due to the political unrest in Bangkok when protestors blocked a major airport in November. After the political situation was calm, the income went on the trend that it should be, increasing to 1.6 million Baht in 2008.

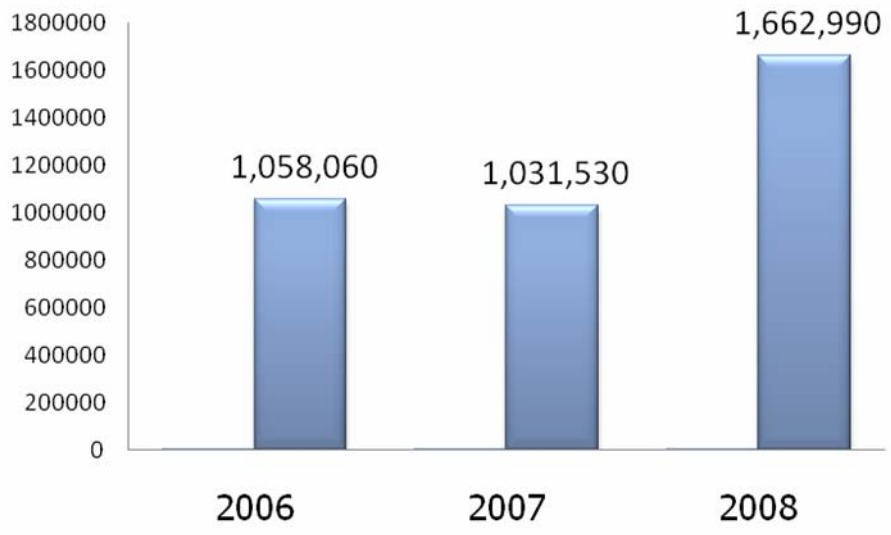


Figure 4.1: Tourism income of the village 2006 – 2008 (Unit: Million Baht)

4.2.2 Seasonal index

The village is famous on its cool temperature, fresh air and water. The high season of tourism is in winter starting from October and lasting until January (Figure 4.2). December is the peak. August is another month that the demand is high. It is because the end of the fiscal year is September 30th. Officials usually spend up their money in August for study visits and then work on financial reports in September.

The low season is actually months in the rainy season. It lasts from May to September, except August. Another period is in summer, March and April, when beach tourism dominates mountainous tourism. Although February is in winter, it is in the low season. People have to go back to work after long holidays in December and January.

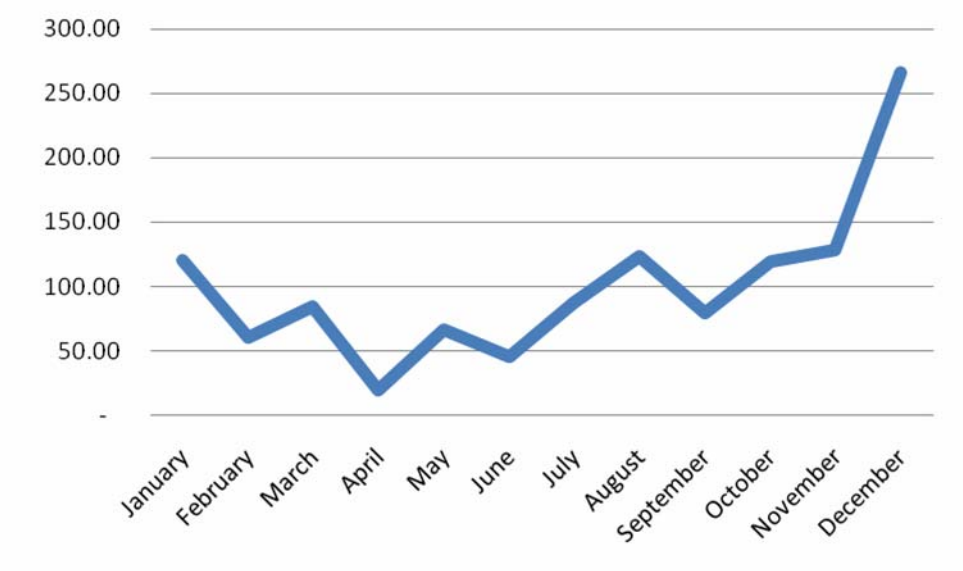


Figure 4.2: Seasonal index of Mae Kam Pong village calculated during 2006 -2008

4.2.3 Major tourism products

The village officially welcomes tourists at a small hall near a temple. Tourists will be provided the information about community-based tourism (CBT). Topics are the history of CBT development and CBT management. A three-hour trekking into herbal forest, including relaxing at a waterfall is offered after the lecture. At night, it provides cultural show which consists of local dances and music. Twenty-four houses offer the accommodations for tourists who would like to stay overnight. These houses are called homestay.

In 2007, measured by retained value added in households (RVA), tourism income shared 8 percent in total income of the village (Figure 4.3). RVA, like the profit for households, is the gross income less material costs and all factor payments. Among the tourism income, homestay income was the largest portion, 56.63 percent (Figure 4.4). Food and beverage was the second largest activity, 14.95 percent. Other activities were much smaller.

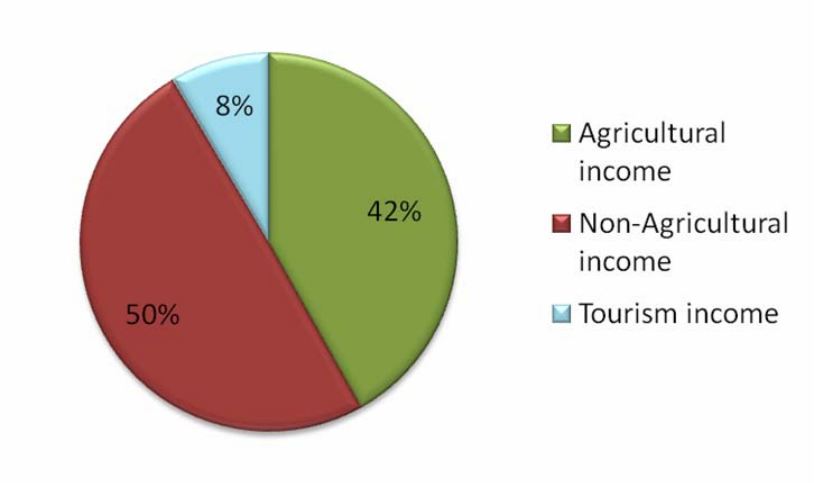


Figure 4.3: Portion of tourism income in total income of the village in 2007

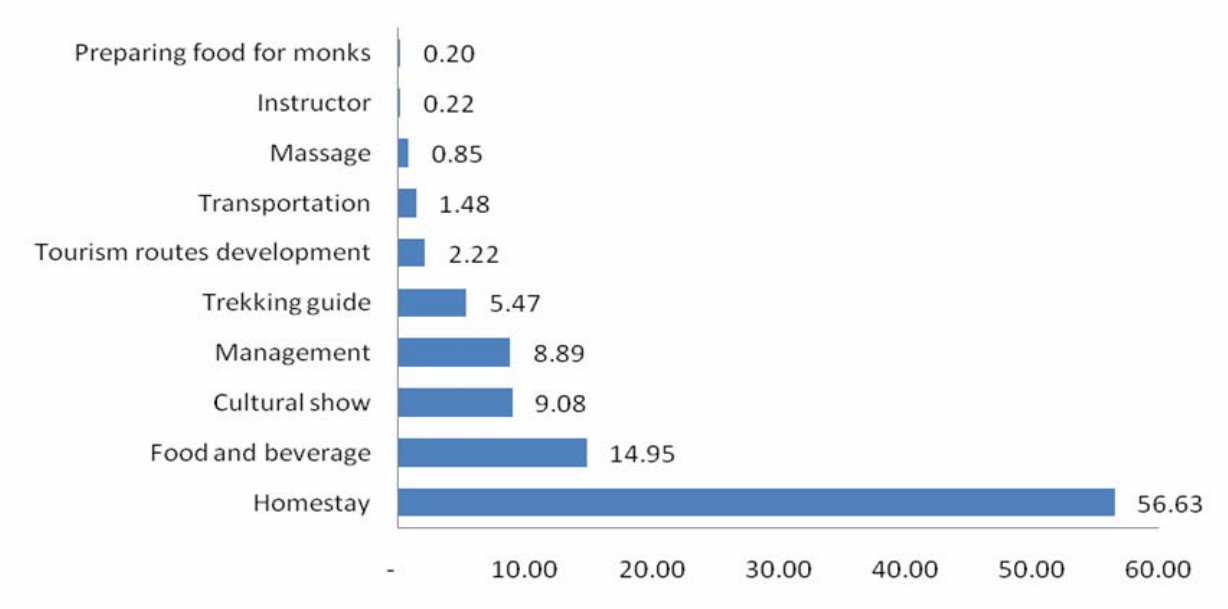


Figure 4.4: Portion of tourism activities in tourism income in 2007

4.2.4 Tourism-induced industries

Apart of tourism, the village has developed tourism-induced industries. Two major businesses are souvenir production and coffee shop. Villagers from 33 households produce and sell pillow as souvenir. The speciality of the pillow is at its dried tea leaves inside. The dried leaves are the by-product from tea. Its smell makes people relaxed. Income from souvenir production shared 4 percent in total village income (Figure 4.5).

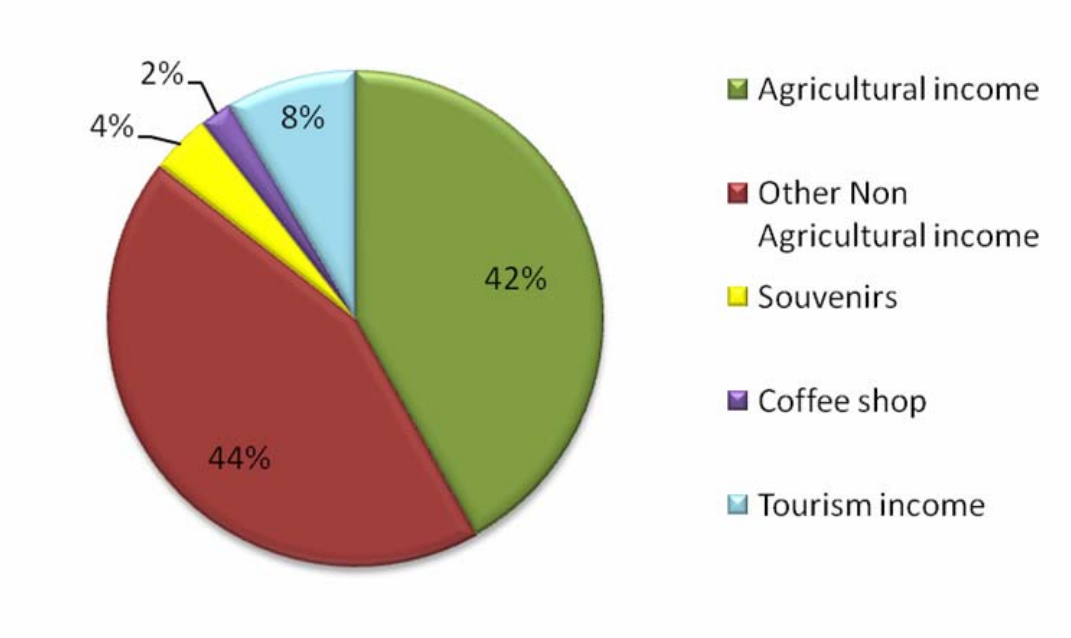


Figure 4.5: Shares of souvenir production and coffee shop in total village income in 2007

The originality of souvenir production was from an offer made by a tourist to purchase a pillow with an attractive price. A clever and intelligent housewife, Mrs. Rojjana Nongya, got an idea to produce more pillows to sell to tourists. She asked neighbors and friends to join. They collected some money from the members to invest in materials. More and more households joined the group. It was profitable in the first year of operation. However, dividing the profit to all members yielded little disappointment such that each household gained not much from the activity. From that time on, the group limited the number of its members.

For coffee shop, around 30 households formed the coffee shop business. Most of them are the same households in the souvenir group. It bought dried coffee from farmers, blended the coffee, packed and sold in a coffee shop. The business shared around 2 percent in total village income in 2007 (Figure 4.5).

4.2.5 The whole tourism activities

For the whole tourism activities in 2007, homestay still shared the largest portion, 33.30 percent, while souvenirs and coffee shop came as the second and third places with the share of 26.55 percent and 14.65 percent (Figure 4.6). However, tourism-induced sector combining souvenirs, coffee shop and massage shared 41.70 percent which was larger than the share of homestay.

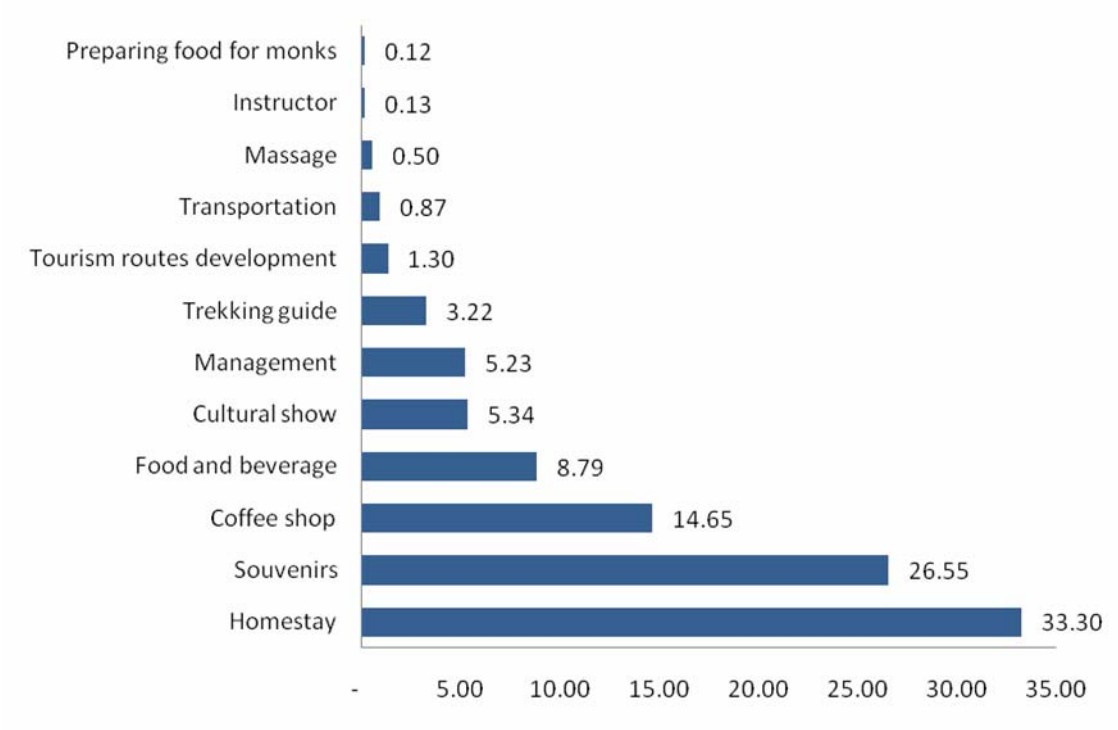


Figure 4.6: Shares of tourism activities and tourism-induced industries in 2007

4.2.6 Classification of tourist

The village is the first one in the Northern Thailand that won a national award in tourism development twice in 2004 and 2007. The winners of this award receive 1 million Baht. The reward attracts other villages to come and learn how to develop tourism and to win the award. Therefore, official visit from other villages was the largest group of tourists in 2007 with the share of 47 percent (Figure 4.7).

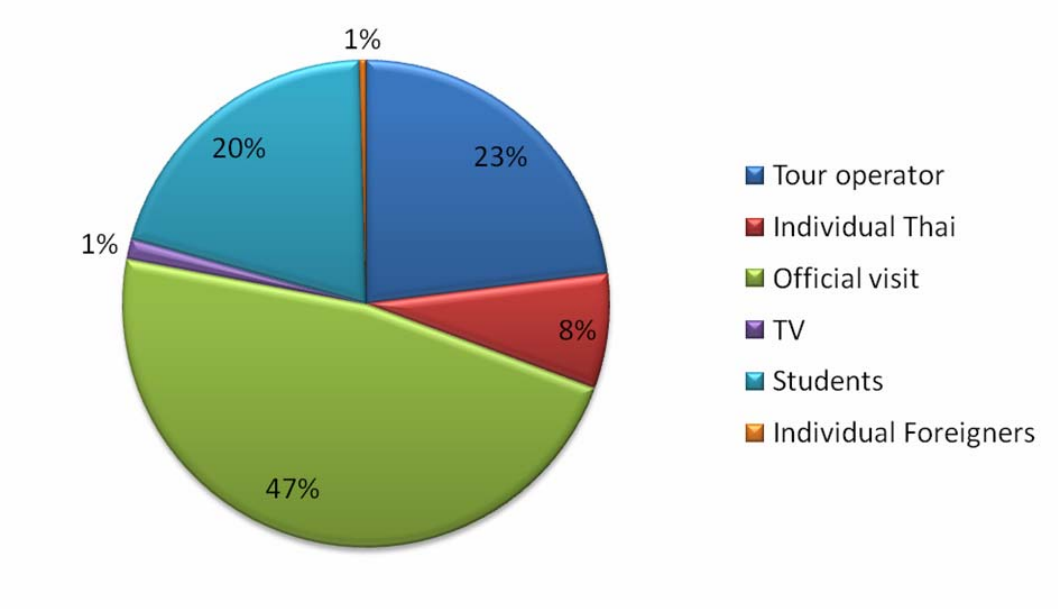


Figure 4.7: Decomposition of tourists in 2007

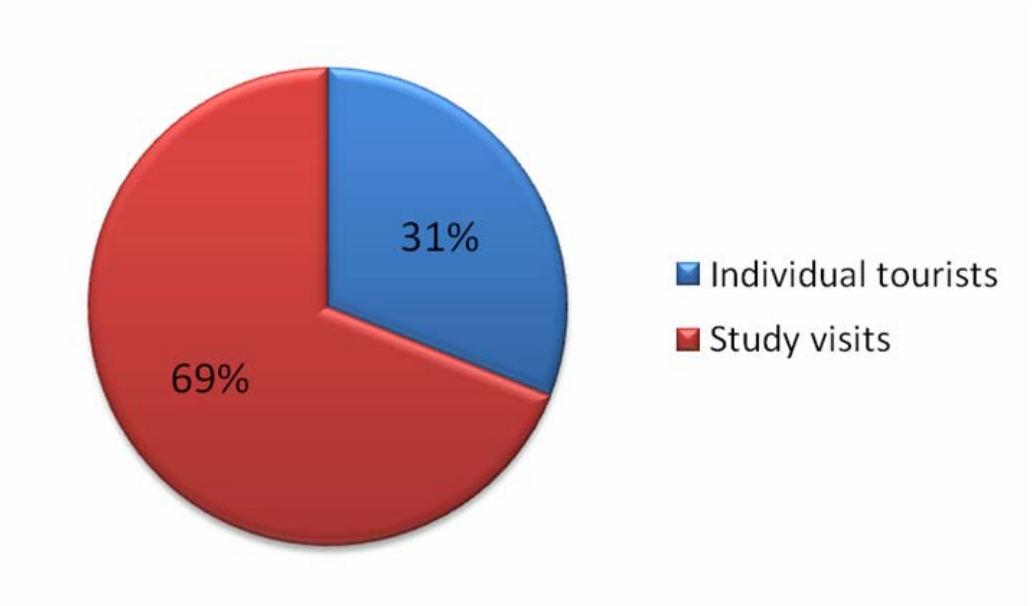


Figure 4.8: Study visits dominated individual tourists in 2007

Apart of the visits made by other villages, officials who have supported the village in infrastructural improvement come to follow up the programs or to present the programs to the higher level. This kind of visits is also counted into the official visit.

Student visit is another large sort of tourism income. Students come to learn about the nature and rural livelihood. The village is full of natural diversities. It locates not too far from city of

Chiang Mai. Therefore it attracts schools to take their students to visit the village. The student visit shared 20 percent of overall tourists in 2007 (Figure 4.7).

Most of independent tourists came with tour operators, 23 percent (Figure 4.7). Eight percent of domestic tourists arranged the visits by themselves. There were around 10 tour operators feeding tourists to the village. Initially before 2000, tour operators took tourists to the hot spring located 16 kilometers from the village. After tourists enjoyed the hot spring, there were no other places to take them to. Then a tour operator noticed that there was a big waterfall in the village. He came to talk with the village's leader whether he could bring tourists to the waterfall. After the first trip, tourists spread words of mouth that the village was good to travel because of its cool temperature, fresh air, fresh water, and peacefulness. Moreover, they announced this message in the internet. After that, the village emerged to be a landmark of tourism on the eastern side of Chiang Mai.

Foreign independent tourists shared only 1 percent among overall tourists in 2007 (Figure 4.7). Motivations of the visits were diversified. Once, a staff from a foreign consulate came to stay many days to learn Northern Thai language and local way of life. Many foreign tourists came for adventure, trekking and learning the herbal forests. Foreign motorcyclists often passed the village to fight the steep road and achieve the peak of the mountain.

Aggregating official visit, student visit and TV visit into the study visit, they dominated the market by 69 percent of total visits in 2007 (Figure 4.8). Therefore, the village is called a big school in the jungle. Thailand Research Fund (TRF), a major funder in national research, gave a status of a national learning site on community-based tourism development to the village.

This kind of tourist structure may warn the village of the sustainability of tourism. The major group of visitors is not independent tourist but the institutional market including villages, government agencies and schools. The issue of sustainability can be viewed in two dimensions. On the first perspective, it is unsustainable such that tourism is not driven from real tourists. When institutional market fades, tourism of the village will drop sharply. On the second perspective, it can be sustainable with the continuous stream of income from the institutional market. As long as the government gives awards with cash to outstanding villages that operate community-based tourism, Mae Kam Pong village will still be attractive

for other villages to come to learn its establishment, experience and success. Moreover, a lot of schools set the schedules to bring their students to visit this village. It is according to a new curriculum in primary and secondary schools that students should have opportunity to learn local intellectualities and touch local way of life. There are not many villages that can handle the massive flow of students, offer the accommodations and give lectures about the nature.

4.2.7. Duration of staying overnight

To understand the behavior of tourists clearly, the duration of staying overnight in the village is presented in table 4.4. The data are from official village accounts. They record the number of tourists and duration of their stays during 2005 to 2007.

The three-year average of the duration was 1.77 nights. A maximum length was in October 2005 with 2.64 nights. The duration was shorter in 2006 and 2007 compared to 2005.

Table 4.4: Duration of staying overnight in Mae Kam Pong village 2005 – 2007 (Unit: nights)

	2005	**2006**	**2007**
January	2.53	2.04	1.84
February	2.19	2.49	1.09
March	1.93	2.13	1.65
April	1.21	2.15	1.15
May	0.65	1.21	1.75
June	2.11	2.36	1.28
July	2.00	2.20	1.90
August	2.06	0.97	1.71
September	2.00	0.78	1.89
October	2.64	1.71	1.35
November	2.11	2.03	1.73
December	1.50	1.77	2.20
Annaul weighted average	1.93	1.68	1.76
Three-year weighted average	1.77		

Source: Calculation using data from the village's account of homestay income 2005 - 2007

These figures show that tourists came to stay overnight just for a short period. They might enjoy a trip of 2 days and 1 night. Another popular trip lasts 3 days and 2 nights. Many visitors are day-trippers. Visitors with long-stay in the village are hardly found. Most of the long-stay guests are researchers.

4.2.8. Linkages between tourism and other sectors

Tourism links to other economic sectors by its purchase of raw materials. Table 4.5 shows the cost structure of homestay, core tourism, souvenir production, coffee shop and commerce.

Table 4.5: Cost structure of tourism activities and commerce in 2007 (unit: percent)

	Homestay	Core tourism	Souvenir production	Coffee shop	Commerce
Tea	0.00	0.00	22.22	0.00	33.15
Coffee	0.00	0.00	0.00	0.00	6.84
Commerce	41.14	27.35	5.07	50.00	5.19
Pillow sewing	0.00	0.00	11.11	0.00	0.00
Utilities	2.29	0.18	0.34	1.63	0.33
Local Administration	0.00	0.00	5.71	0.00	0.44
Imported materials	4.57	2.81	24.44	0.00	40.06
Factors and RVA	52.00	69.59	31.10	48.37	13.99
Total	100.00	100.00	100.00	100.00	100.00

Source: Calculation based on data from SAM

Note: RVA is retained value added in household which is profit for households.

It can be seen that the tourism-agricultural linkage is weak. Homestay and core tourism does not buy anything from agricultural sectors. Food for tourists is prepared from materials which were bought from the commercial sector and external markets.

Commerce is a major buyer of agricultural products. However, only a small part of its purchase is related to tourism. It sells coffee to coffee shops. The shops do not buy coffee directly from farmers but the commercial sector instead.

The strongest linkage between tourism and agriculture is in the souvenir production. As dried tea leaves is a major raw material for pillow. Around 22 percent of the pillow's cost goes to the tea sector. Fortunately, suppliers of dried tea leaves are those in the poorest quintile of households. Therefore, this is a big hope for the indirect distribution of tourism benefit to the poorest quintile.

4.3 The dynamic of the village economy between 2003 and 2007

This section will show the dynamic of the village economy read from the panel data of 2003 and 2007. It will begin with the dynamic of household income. Then it will show the dynamic of participation in tourism sector as well as the dynamic of household income of the participants. Finally, it will highlight the income distribution of homestay, core tourism, and tourism-induced sector.

4.3.1 Dynamic of household income

In 2003, households gained mainly from agriculture. The average income was 31,247 Baht per household per year (table 4.6). Non-agricultural labor service was the second largest source of income. It yielded 19,864 Baht for a household on average. The third largest source of income was financial income which mainly included the remittance from outside the village. Average commercial income was 11,710 Baht. Agricultural service, homestay, core tourism and manufacture were minor sources of income which yield a household less than 10,000 Baht per year to a household. In that year, there was no tourism-induced sector. Souvenir production was established in 2006.

In 2007, agricultural income dropped slightly, 489 Baht. Its size turned to be the second largest source of income. The most important sector was taken over by commerce which yielded 32,939 Baht per household. Non-agricultural labor service was the third largest income generator with 23,850 Baht per household. Tourism-induced sector and homestay shined to the village when they generated more than 20,000 Baht on average to households. Financial income shrank to be less than 5,000 Baht per household. Agricultural labor service, core tourism and manufacture still yielded less than 10,000 Baht per household.

Table 4.6: Average household income in 2003 and 2007 sorted by the size of average income in 2003

Sources of income in 2007	Average Income 2003 (Baht per household)	Average Income 2007 (Baht per household)	The difference of average income (Baht per household)
Agriculture	31,247	30,758	-489
Non-agricultural labor service	19,864	23,850	3,986
Finance	16,514	4,923	-11,591
Commerce	11,710	32,939	21,229
Agricultural labor service	5,074	2,348	-2,726
Homestay	4,875	15,061	10,186
Core tourism	2,592	7,006	4,414
Manufacture	1,890	4,056	2,166
Tourism-induced sector	0	20,224	20,224
Total	49,039	68,166	19,127

Source: Calculation

Note: The summation of total income in 2007 was 7,089,264 Baht which was not equal to total household income in SAM table (table 4.1) and in CGE model which was 8,702,179 Baht. The difference is because SAM is calculated using 116 households in 2007 while the income in this table is calculated from the panel data 2003 and 2007 whose number of matched observations is 104 households.

In 2003 and 2007, incomes from agricultural sector were almost constant. The drop of only 489 Baht was just around 2 percent of the income in 2003. The reason why it did not grow was because of the allocation of labor from this traditional sector to tourism sector. Moreover, new generations of the village did not participate much in farm works. They got better education and could find jobs outside the village.

The increasing of commercial income was due to the boom of tourism in the village. It is the major supplier for tourism as well as household consumption. When villagers had gained more income from visitors, they spent more money to commercial sector.

Non-agricultural labor service was also growing during the period. The coming of outsiders to buy land and build houses in the village created the demand for construction, house caring and other related services. Villagers constructed their new houses too. They also expanded the size of their houses when they got more income. It was also popular to build the balcony to welcome visitors in many houses.

Tourism-induced sector created a new hope for the village to generate cash. Souvenir production was the major activity that households could join the profit. Coffee shops were established to offer hot drinks for visitors. The average size of income from this sector in 2007 was almost equal to that of the non-agricultural labor service.

Number of visitors who stayed overnight in homestay in 2007 was much larger than in 2003. Tourism in the village was established in 2000. In 2003, homestay was at the introductory phase of its product life cycle. In 2007, tourism was well-settled. Therefore, the average income from homestay rose around 3 times during the period.

The drop of financial income was because of the uncertain remittance from outside the village. This source of income was not reliable for its size. It was hopeful that sons or daughters of villagers who worked in the city would send money back to their parents. However, with the rising cost of living in cities, they might have to set the priority to themselves and their families.

The changes of average income in other sectors were small. Even though the average income from core tourism and manufacture rose around 2 to 3 folds during the years, their sizes were less than 10,000 Baht.

The average income in agricultural labor service dropped during 2003 and 2007. This was partly because the job in this sector was not expandable while more households entered the sector to share the benefit. In 2003, there were 21 households gaining the income from this sector. The number rose to 47 households in 2007. More details of the dynamic of income change can be seen in annex 5.

4.3.2 Dynamic of participation in tourism sector

Not all participants in tourism sector in 2003 continued the participation until 2007. Forty-percent of participants in core tourism in 2003 quit before 2007 (table 4.7). The quit ratio in homestay was 12.5 percent.

New comers after 2003 were the biggest groups in both homestay and core tourism. They shared 71 percent in homestay service and 62.5 percent in core tourism service. Most of them started to join the sectors in 2004 (table 4.8). All participants in tourism-induced sector firstly joined the sector in 2006. After that, the membership was limited.

Table 4.7: Dynamic of participation in tourism sector (Unit: Households)

No.	Actions	Homestay	Core tourism	Tourism-induced sector
1	Participants in 2003	8	25	0
2	Quit before 2007	1 (12.5% of participants in 2003)	10 (40% of participants in 2003)	0
3	Participants in 2003 remained in 2007	7 (29% of participants in 2007)	15 (37.5% of participants in 2007)	0
4	Joined after 2003 and continued to 2007	17 (71% of participants in 2007)	25 (62.5% of participants in 2007)	33
5	Total participants in 2007	24	40	33

Source: Survey in 2004 and 2008

Table 4.8: Originality of participation in tourism sector of participants in 2007 (Unit: Households)

Year	Homestay	Core tourism	Tourism-induced sector
2003 or before	7	15	0
2004	13	19	0
2005	0	2	0
2006	3	4	33
2007	1	0	0
Total participants in 2007	24	40	33

Source: Survey in 2008

4.3.3 Dynamic of household income of participants in tourism sector

The mean income of households participating in homestay in 2003 and continued the participation to 2007 was higher than other groups (table 4.9). The phenomenon was the same for the participants in core tourism. However, the F-statistics in both tests show no significance.

The only significance by the t-test was the difference of mean income between participants in tourism-induced sector in 2006 and other non-participants. Participants earned around 35 percent more than the non-participants.

Table 4.9: Net change of annual household income 2003 – 2007 classified by participation in tourism in 2003 (Unit: Baht)

Households in 2003	N	Max	Min	Mean	Standard deviation	Standard error of mean	t-stat or F-stat for test of equality of mean
Participated in homestay sector 2003	8	293,030	-6,334	51,543	99,569	35,203	t-stat 0.825
Not participated in homestay sector 2003	96	177,953	-135,138	22,188	49,714	5,074	
Participated in homestay sector 2003 and continue to 2007	7	293,030	-6,334	58,879	105,186	39,756	F-stat 2.134
Participated in homestay sector 2003 but quit before 2007	1	193	193	193	0	0	
Participated in homestay later after 2003 and remained until 2007	17	131,026	3,833	44,842	34,768	8,432	
Not participated in homestay sector both 2003 and 2007	79	177,953	-135,138	17,313	51,248	5,765	
Participated in core tourism sector 2003	25	293,030	-82,601	35,214	76,670	15,334	t-stat 0.876
Not participated in core tourism sector 2003	79	177,953	-135,138	21,038	46,085	5,185	
Participated in core tourism 2003 and continue to 2007	15	293,030	-44,130	50,475	82,370	21,267	F-stat 1.269

Households in 2003	N	Max	Min	Mean	Standard deviation	Standard error of mean	t-stat or F-stat for test of equality of mean
Participated in core tourism 2003 but quit before 2007	10	151,406	-82,601	12,323	64,428	20,374	
Participated in core tourism later after 2003 and remained until 2007	25	177,953	-31,500	42,035	48,725	9,745	
Not participated in core tourism both 2003 and 2007	54	113,788	-135,138	11,317	41,790	5,686	
Participated in tourism-induced sector 2006	33	293,030	-28,465	47,895	63,456	11,046	t-stat 3.090***
Not participated in tourism-induced sector 2006	71	151,406	-135,138	13,547	47,075	5,586	
Total	104	293,030	428,168	24,446	54,910	5,384	

Source: Author's calculation using SPSS
Note: t-stat is for the test of equality of mean income
F-stat is for ANOVA
*** significance at 99%, ** significance at 95%, *significance at 90% (2-tailed)

4.3.4 Income distribution of homestay and core tourism

Tourism income[4] in the village was more evenly distributed across households in 2007 than in 2003. Figure 4.9 shows that the highest quintile lost around 16 percent of the share. This portion flew to the middle and upper-middle quintiles. The share of the middle quintile increased around 10 percent while that of the upper-middle quintile increased around 6 percent. It should be noted that the calculation was based on the same households in each quintile both in 2003 and 2007.

4 Only income from homestay and core tourism

While the structure of income distribution was better, there was still a problem. The poorest and second poorest quintiles lost their shares in tourism income altogether around 1.35 percentage points. The flow of tourism income did not reach them. They gained only 11.13 percent of total tourism income in 2007.

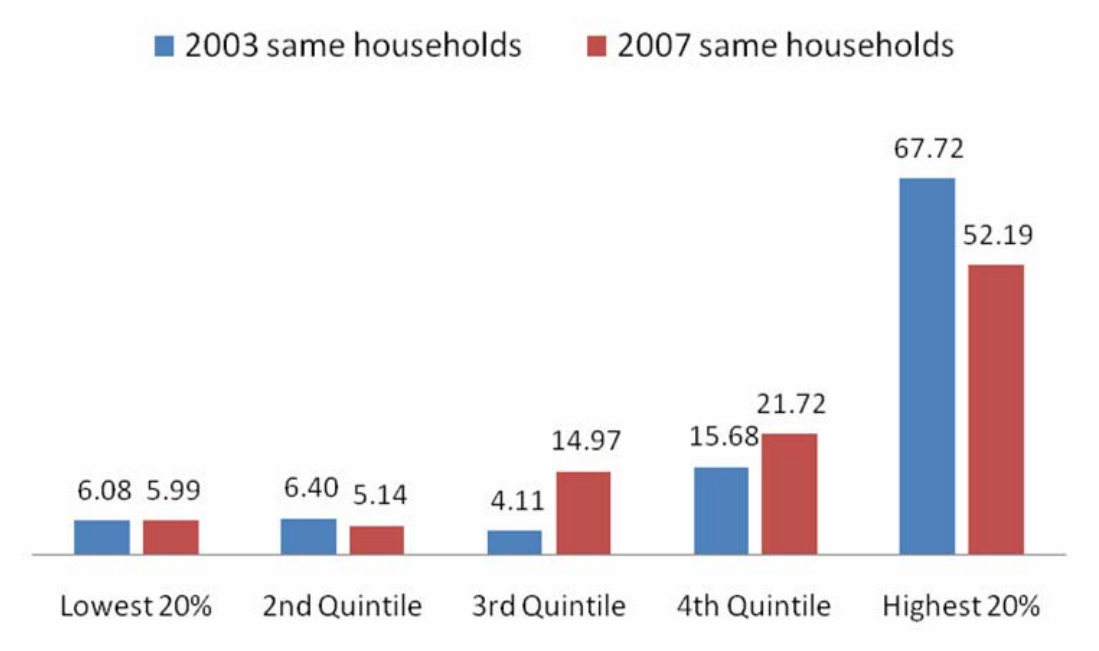


Figure 4.9: A better tourism income distributional structure in 2007 compared to 2003

4.3.5 Income distribution of tourism-induced sector

Before 2007, tourism-induced sector was a potential tool for development. The distribution of its income spread almost equally among households (Figure 4.10). There was no barrier to entry at that time. However, the poorest quintile did not earn much from the sector.

Figure 4.10: Distribution of tourism-induced income in 2007 to household quintiles sorted by income in 2003

Rearranging the households according to their income in 2007, the income of tourism-induced sector in 2007 concentrated in the richest quintile (Figure 4.11). A question was raised where were all the benefits that went to other poorer quintiles in 2003 (Figure 4.10). When the only difference between Figure 4.10 and 4.11 was how the quintiles were arranged, the poor in 2003 might move up to the richest quintile in 2007.

Table 4.10 illustrates the dynamic of the movement among quintiles. It shows that 6 out of 42 households in the poorest and second poorest quintiles in 2003 jumped to the richest quintile in 2007. Three of them gained enormously from tourism-induced sector.

Table 4.10: Movements of households among quintiles during 2003 and 2007

Quintile	Number of households in 2003	Number of households that moved to the richest quintile in 2007	Number of households that moved to second richest or middle quintile in 2007	Number of households that moved to poorest or second poorest quintiles in 2007
Poorest	21	2	6	13
Second poorest	21	4	10	7
Middle	21	2	6	13
Second richest	21	4	12	5
Richest	20	8	8	4
Total	104	20 (19%)	42 (40.5%)	42 (40.5%)

Source: Panel data 2003 and 2007.

To make it clearer, table 4.11 shows the distribution of 33 households in tourism-induced sector and their movements.

Table 4.11: Movements of participants in tourism-induced sector during 2003 and 2007

Quintile	Number of households in 2003	Number of households that moved to the richest quintile in 2007	Number of households that moved to second richest or middle quintile in 2007	Number of households that moved to poorest or second poorest quintiles in 2007
Poorest	3	0	3	0
Second poorest	6	3	3	0
Middle	9	1	3	5
Second richest	7	1	6	0
Richest	8	6	2	0
Total	33	11 (33%)	17 (52%)	5 (15%)

Source: Panel data 2003 and 2007.

Participants in tourism-induced sector were pushed to better quintiles rather than pooled to worse ones. All the nine participants who were in the poorest and second poorest quintiles in 2003 climbed to better quintiles. Three reached the top. Thirteen out of 15 participants in the richest and second richest quintile could sustain their positions in the same quintiles or even moved to a better one. Only 5 participants in the middle quintile dropped to worse positions. Overall, households which were better-off accounted 33 percent of participants in tourism-induced sector while those who were worse-off accounted 15 percent. By these figures, tourism-induced sector is a hopeful sector to push the poor out of poverty.

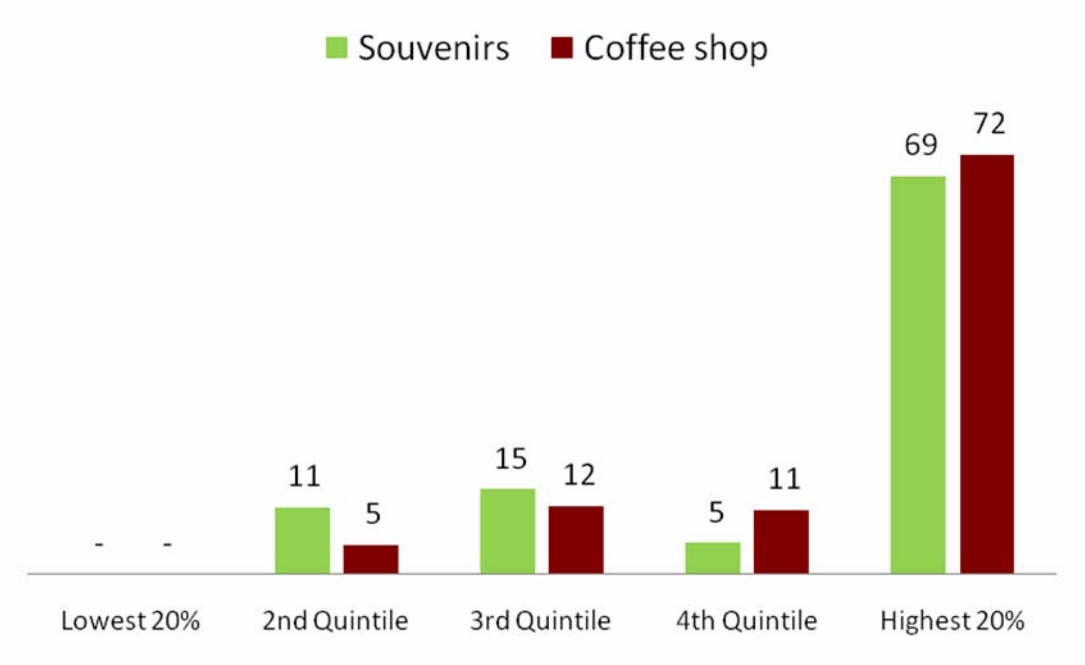


Figure 4.11: Tourism induced-income clearly concentrated in the richest quintile in 2007

However, the hope may be moderated by another interpretation of Figure 4.11. In 2007, the income of souvenir production and coffee shop were not evenly distributed any more. The poorest quintiles had no benefit at all from the sectors. The second poorest got around 11 percent from souvenir production and 5 percent from coffee shop. Even the middle and upper-middle quintiles who received sufficient shares of tourism income[5] did not share much from these emerging industries. This was because of a policy of membership limitation created by participants in both sectors to lock the benefits within their groups. In the future, there is no guarantee whether the groups will unlock the benefits.

5 Only income from homestay and core tourism

Chapter 5
Participation in community-based tourism

This chapter will examine the determinants of participation in tourism activities. Its contents will begin from the rationale, the research questions, methodologies, settings of the models, and the results. Finally, it will close the chapter with the discussion and conclusion.

5.1 Rationale

Tourism benefits reach the poor whenever they participate in tourism sector. The inclusion of poor people into tourism activities is a must according to policies set by international organizations dealing with community-based tourism. It is also one of the priorities in many action plans.

However, what are determinants of the participation in tourism sector are still unclear. So far, there has been no quantitative study to figure them out. This study will try to answer this question.

5.2 Specific research questions

> What are determinants of the intensity of participation of households, measured by working hours, in tourism sector and other economic activities?

5.3 Methodologies (SURE)

The investigation of the determinants of working hours in economic sectors applies Seemingly Unrelated Regression (SURE) because the decision to work in tourism sector may link to the decisions in other economic sectors. A household cannot think about working in tourism sector without thinking about other jobs especially agriculture. Therefore, a single regression just for the determinant of working hours in tourism sector is not appropriate. A system of equations of the determinants of working hours in all economic sectors is better because SURE can take care of correlations among the error terms.

Fractional logit is another option to study the determinants. The regression is for the decision to allocate things which all portions can be summed up to 100 percent. However, this study

does not use this method because a household does not make initial decision how much time should be allocated to each sector. They cannot think about the portions at the beginning of the year and then spend the time according to the portions. In practical, a household spend time day by day without thinking of any portion. At the end of the year, the portions reveal themselves. A household does not make decision of the portions first, but the portions are outputs of decisions in working in economic sectors throughout the year. Therefore, there is no need to figure out the determinants of the time portions because the portions do not exist. Thus, fractional logit is not suitable for this study.

5.4 Settings of the models

This section will introduce the dependent variables and the testing variables. It will explain the expectation of their signs. There are no controlled variable in this model since all of them are treated as testing variables.

5.4.1 Dependent variables

Dependent variables are working hours in seven economic sectors including homestay, core tourism, tourism-induced sector, agriculture, agricultural labor service, commerce and non-agricultural labor service.

The data of working hours are from the questionnaire which is used to construct the SAM (annex 1). Villagers need to specify their time that they allocate to economic activities as well as income from those activities. Sub-activities are combined into major activities. The details of the activities are listed in section 3.5.1. Financial income is not counted for the working hours since villager do not spend time in gaining the income. They will get the dividend when they are members of the cooperative. Manufacture and commerce are merged together because the size of manufacture is too small to be modelled separately. It may be reasonable for this merge such that the manufacture is unlikely to go along well with other kinds of works. It is not a labor service, tourism or agriculture. It shares some similarities with commerce such that it is an independent work. The operation relies heavily on the owner.

5.4.2 Testing variables

There are 11 testing variables. The explanations of the expected signs are described as follows:

1.) Education of head of household

This variable is the schooling year of the head of household. This variable represents the quality of the head of household. In the Thai context, household members should obey to the leader. Therefore, the educated leader may direct the household to participate in a profitable sector. In contrast, an uneducated leader may be reluctant to allow the members to join some sectors or even prevent them to join.

2.) Age in 2003

The variable is the average age of household members. Simple average method is used for the calculation.

It was not obvious whether households with lower average age would participate in tourism more than the aging households. Considering that tourism activities are lighter than working on farms, participants do not require strong physical conditions. Therefore, the sector may be favorable to elderly people. The study predicts the positive sign for this variable.

3.) Women in 2003

This variable is a dummy variable indicating whether a household have more women than men. The value of the variable is one when number of female members exceeds male. Otherwise, it is zero.

Tourism is a lighter work than agriculture or construction. Women are the key labor force in the sector. For example, operating a homestay needs cookers and cleaners. The tasks are assumed to be women's duties in the Thai society. Thus, households with more women may have advantage in participating in tourism sector.

4.) Distance 1 kilometer from village center

This variable is a dummy variable indicating that a household is located within 1 kilometer from village center. The village center is a meeting hall in the temple where villagers gather for official meetings. They also welcome tourists there.

The distance creates a geographical advantage. Tourists who come in group would like to stay closely to one another. They choose houses near the village center rather than ones that locate further. In core tourism, households near the center can respond to calls for jobs faster than outer households. In tourism-induced sector, villagers need to walk to the temple to produce souvenirs. Households in the outer cluster are around two kilometers from the center. The outer households may be reluctant to participate frequently. Therefore, the study predicts the positive sign for the variable.

5.) Members in 2003

The variable counts every member in household regardless of their ages and genders.

This is the hypothesis of the labor surplus. Assumed that the village is not at the full employment, household with larger number of members in 2003 should have more free time to allocate to tourism sector than households with smaller number of members.

6.) Dependency ratio in 2003

The dependency ratio is calculated as a ratio of the number of household members aged lower than 15 years old and older than 70 years old to the total number of household members.

Households with higher dependency ratio need to allocate working time to take care of children and elderly people. Their free working hours are less than households with lower dependency ratio. Thus, they tend to participate less in tourism sector.

7.) Change of dependency ratio

This variable is calculated as the dependency ratio in 2007 less the ratio in 2003.

The higher the dependency ratio, the more working hours are needed to be allocated to take care of the dependents. It reduces the probability to join tourism sector.

8.) Change of population in household

The variable is the simple difference between number of household members in a household in 2007 and 2003.

Additional labors in household should raise the opportunity to participate in tourism sector. However, it is not obvious such that the additional labors may choose between tourism and non-tourism jobs depending on the rates of return. According to the higher labor productivity in tourism sector (table 6.9 in chapter 6), it predicts that the labor would choose to participate in the sector. Therefore, the sign should be positive.

9.) Income 2003

Initial income in 2003 is calculated based on the survey in 2003. It follows the definition and measurement of income described earlier in section 3.5.1.

Households with higher initial income tend to participate in tourism sector more intensely than households with lower income. Untong, et al (2006) mentioned that tourism was brought into villagers in Thailand by rich households. They controlled the sector from the beginning and hardly left the sector. Goodwin (2009) also supported that the poor cannot participate much in the sector.

10.) Ratio of tourism income to total income in 2003

The variable is the ratio of household income from tourism to total household income. Among all sources of income, the variable indicates how important tourism sector is. It should be noted that in 2003 there was only two kinds of tourism activities, i.e. homestay and core tourism. Tourism-induced sector emerged in 2006.

Once a household get tourism income, they may like it. When they realized that tourism jobs can generate substantial income and the jobs are lighter than those on farms, they may want to keep participating in the sector.

11.) Human capital of household in 2003

This variable is an interaction between the average schooling year in 2003 and the number of household members in the same year. It represents a pool of knowledge in a household. While the average schooling year represents the quality of each member, this variable emphasizes the collaboration between educated persons in household. The higher number of educated members, the more rational discussions can be made. Then, the household is likely to have a collaborative agreement to participate in tourism sector which is more profitable than other sectors.

12.) Schooling in 2003

The variable is the average years of schooling in household. It is calculated by simple average method.

Households with higher average years of schooling are likely to be called by the head of village to contact tourists with several reasons. First, these people can speak English. Second, they have some knowledge about hospitalities. Third, they may be able to respond to tourists' demand more efficiently. Fourth, they tend to be more responsible.

Thus, households with higher years of schooling tend to participate in tourism more than those with lower years of schooling. Studies of Untong, et al (2006), Prachvuthy (2006) and Oula (2006) supported this argument.

It should be noted that the issue of the call from the head of village can be viewed both as a problem of selection bias and not the problem. For the first dimension, it can be the selection bias since the villagers make decision to respond to the call by themselves. This is the self-selection. For the second dimension, it may not be a self-selection in the sense that villagers are assigned by the head of village to do the duty. To treat the possible selection bias, it may apply the Heckman selection model to investigate the determinants of working hours in tourism sector. However, the decision of participating in tourism is not independent from the decisions to participate in other economic sectors. A more suitable model to take care the possible correlations among the decisions is seemingly unrelated regression (SURE). SURE is better than Heckman selection model such that it is a system of equations that can take care of every sector at the same time while Heckman selection model is a single equation which takes care of the participation in each sector separately.

5.4.3 Descriptive statistics of the variables.

The descriptive statistics of variables used in the SURE model are shown in table 5.1.

Table 5.1: Descriptive statistics of the variables

Variables	Number of observations	Mean	Standard deviation
Dependent variables:			
Working hours in homestay	104	57.08	128.40
Working hours in core tourism	104	92.28	241.47
Working hours in tourism-induced sector	104	241.23	701.33
Working hours in agriculture	104	2,320.69	1,789.30
Working hours in agricultural labor service	104	165.99	271.25
Working hours in commerce	104	364.76	1,192.03
Working hours in non-agricultural labor service	104	690.86	1,081.18
Independent variables:			
Education of head of household in 2003 (years)	104	4.27	1.84
Average age of household members in 2003 (years old)	104	39.37	12.03
More women than men in household in 2003 (yes=1)	104	0.35	0.48
Distance 1 km from village center (yes=1)	104	0.65	0.47
Members in 2003 (persons)	104	3.08	1.05
Dependency ratio in 2003	104	0.2374	0.2117
Change of dependency ratio	104	-0.0507	0.1889
Change of population in household (persons)	104	-0.0576	1.0128
Income 2003 (Baht)	104	43,592	28,455
Ratio of tourism income to total income in 2003 (%)	104	1.79	4.48
Human capital in household in 2003 (persons-years)	104	18.07	8.31
Average schooling of members in 2003 (years)	104	5.84	1.93

Source: Calculation

5.5 Results

This section describes the interpretation of the results in each sector and the reasons behind them as follows:

a.) Homestay

The determinants of working hours in homestay are the distance 1 kilometer from village center, the change of population in household and the ratio of tourism income to total income in 2003.

For the influence of the distance, it is because tourists like to choose to stay with households near the village center. The village consists of 4 clusters. There are two clusters, the inner cluster and the upper-middle cluster that are close to the village center. They are within 1 kilometer from the village center. Homestays are concentrated in these two clusters. For households in the outer cluster and lower-middle cluster locating further than 1 kilometer, tourists are reluctant to go there because of the long and dark way to walk. There is no shuttle bus to deliver tourists to the outer zone. Moreover, there are a lot of unfriendly dogs who are dangerous to tourists who walk along the way.

Table 5.2: Determinants of working hours in tourism activities

	(1)	(2)	(3)
Dependent variable:	Working hours in homestay	Working hours in core tourism	Working hours in tourism-induced sector
Method	SURE	SURE	SURE
Education of head of household in 2003	0.3127 (6.4676)	27.8833** (12.2005)	123.8813*** (36.1969)
Age in 2003	-0.6222 (1.1531)	1.5990 (2.1751)	12.8879** (6.4534)
Women in 2003	25.6330 (23.7575)	39.5794 (44.8156)	-99.8835 (132.9607)
Distance 1 km from village center	65.9847*** (22.5272)	75.5577* (42.4950)	54.4332 (126.0758)
Members in 2003	-12.9109 (33.6320)	-51.4395 (63.4428)	-228.5216 (188.2246)
Dependency ratio in 2003	1.8420 (68.7370)	-55.1158 (129.6642)	-161.3925 (384.6925)
Change of dependency ratio	-11.5647 (62.9474)	-37.5005 (118.7429)	-306.0491 (352.2905)
Change of population in household	34.5588*** (12.6855)	34.7904 (23.9297)	133.9621* (70.9956)
Income 2003	0.00065 (0.00040)	0.00019 (0.00076)	0.00007 (0.00226)
Ratio of tourism income to total income in 2003	7.2254*** (2.4496)	12.5740*** (4.6208)	22.1695 (13.7094)
Human capital of household in 2003	3.9672 (5.6603)	21.6751** (10.6775)	88.7678*** (31.6786)
Schooling in 2003	-4.0131 (17.0867)	-49.3894 (32.2320)	-218.2119** (95.6272)
Constant	-20.7592 (137.3004)	-115.6885 (259.0007)	-432.0334 (768.4125)
Observations	104	104	104

Source: Author's estimation using Stata. Note: Number in the bracket is standard error.
*** significance at 99%, ** significance at 95%, *significance at 90%

For the influence of the increasing population, an addition of members in households allows them to allocate labors to welcome tourists without losing income from farms. Usually, it is a regular duty for villagers to go to work on farm. Harvesting tea and cutting grass around the tea tree are major duties. When a family has a housewife or a daughter at home to take care of tourists, they are more willing to offer the homestay service. A housewife or a daughter has to cook three meals for tourists as well as prepare the bedroom for them. Moreover, tourists are always interested in exchanging idea and experience with the host while staying at home.

For the influence of experience in tourism sector, the earnings of tourism income in 2003 reflects that the households are pioneers in the sector. Their economic conditions in 2003 might be better than other households' so that they could afford necessary investment to operate the homestay service.

b.) Core tourism

The determinants of working hours in core tourism are education of head of household in 2003, distance 1 kilometer from village center, the ratio of tourism income to total income in 2003 and human capital of household in 2003. The reasons are as follows:

First, the education of a household's head is crucial to join the sector. A trekking guide for foreign tourists needs to speak English. For Thai tourist, they must communicate clearly in official Thai language. Moreover, they need to show that they are clever enough to guide tourists through the herbal forests.

Second the closer distance to the village center is an advantage. Tourists can come to the village without prior notices. They may demand a trekking trip immediately. It requires a staff that is prompted to response for such the call. Villagers who stay closer will be able to response faster.

Third, households with more experience in earning tourism income are more willing to join the sector. This is because they know that tourism income is an easy source of money relatively to works on farms. They may addict to tourism income. Other households that have not experienced tourism income may be afraid of losing income from farms if they join tourism sector.

Last, human capital in household represents a pool of knowledge within a household. It means that only one educated person may not be influential to the decision to join the sector. However, the collaborative effort of educated persons will be powerful. The rational discussion among them may find out what kind of service that should be delivered to tourists.

c.) Tourism-induced sector

The determinants of working hours in tourism-induced sector are education of head of household in 2003, age in 2003, the change of population in household, human capital of household in 2003 and schooling in 2003. The reasons are as follows:

First, an educated head of household will see how profitable the sector is. Then he or she will encourage household members to participate. Household without the educated leader may be afraid of losing income from farms.

Second, the sector welcomes elderly people to join. The positive significance means that participants are relatively old. This is because working in this sector does not require strong physical body. People just come to sit and work at the village center.

Third, additional members make the household advantage in joining the sector. While some members go to harvest tea, a free member can participate the job and find out whether it yields good income.

Fourth, human capital as a pool of knowledge shows the power of rational discussion in households. While there is nobody dominates the discussion, the atmosphere in the household is more democratic and rational. Finding that this sector is profitable, they may agree to participate in the sector.

Last, the average schooling year represents the quality of education of each household member. It insists that education is important in participation in this sector. Even though souvenir production looks like an easy job, it requires a good communication and coordination among participants. Villagers are like entrepreneurs rather than just labors. Conversations among them are about production management, product development, channels of distribution and benefit sharing. Villagers who are less educated may be afraid that they may have to sit quietly amid the conversation.

It should be noted that the variable of human capital is an interaction between average schooling year and number of household members in 2003. The effect of schooling depends on both human capital variables and itself. By calculation, the effect of schooling will be positive as long as there are more than 2.45 persons in a household. Only one educated person is not enough for the participation in tourism-induced sector because he or she needs to allocate his or her working hours to take care of farm.

Table 5.3: Determinants of working hours in agriculture and agricultural labor service

	(4)	(5)
Dependent variable:	Working hours in agriculture	Working hours in agricultural labor service
Method	SURE	SURE
Education of head of household in 2003	-140.88 (99.69)	3.4054 (15.3673)
Age in 2003	0.4287 (17.7746)	-5.6382** (2.7397)
Women in 2003	-94.6034 (366.21)	-5.1068 (56.4482)
Distance 1 km from village center	28.9569 (347.25)	-145.33*** (53.52)
Members in 2003	601.97 (518.42)	2.9325 (79.9104)
Dependency ratio in 2003	-2,114.65** (1,059.55)	46.5863 (163.32)
Change of dependency ratio	-2,188.39** (970.31)	-42.2862 (149.56)
Change of population in household	707.15*** (195.54)	-4.8117 (30.1410)
Income 2003	-0.00182 (0.00625)	0.00021 (0.00096)
Ratio of tourism income to total income in 2003	20.0489 (37.7599)	-7.9526 (5.8203)
Human capital of household in 2003	-3.4428 (87.2525)	-1.1091 (13.4491)
Schooling in 2003	1.7260 (263.38)	-20.7528 (40.5983)
Constant	1,590.75 (2,116.44)	593.86* (326.22)
Observations	104	104

Source: Author's estimation using Stata

Note: *** significance at 99%, ** significance at 95%, * significance at 90%
Number in the bracket is standard error.

Table 5.4: Determinants of working hours in commerce and non-agricultural labor service

	(6)	(7)
Dependent variable:	Working hours in commerce	Working hours in non-agricultural labor service
Method	SURE	SURE
Education of head of household in 2003	49.8292 (69.0307)	-41.1268 (62.3573)
Age in 2003	5.3397 (12.3072)	-18.9908* (11.1174)
Women in 2003	-257.07 (253.56)	-458.20** (229.05)
Distance 1 km from village center	17.7041 (240.43)	-326.73 (217.19)
Members in 2003	-270.44 (358.96)	57.0636 (324.25)
Dependency ratio in 2003	-549.27 (733.64)	-1,532.22** (662.71)
Change of dependency ratio	-324.39 (671.84)	-1,416.52** (606.89)
Change of population in household	154.44 (135.39)	73.7754 (122.30)
Income 2003	0.00208 (0.00432)	0.00208 (0.00391)
Ratio of tourism income to total income in 2003	-18.5072 (26.1451)	6.5115 (23.6176)
Human capital of household in 2003	110.07* (60.41)	16.0055 (54.5736)
Schooling in 2003	-207.41 (182.36)	-131.60 (164.73)
Constant	143.93 (1,465.)	2,488.86* (1,323.76)
Observations	104	104

Source: Author's estimation using Stata

Note: *** significance at 99%, ** significance at 95%, * significance at 90%
Number in the bracket is standard error.

d.) Agriculture

Unlike in tourism activities, the determinants of working hours in agriculture are not related to education. They are dependency ratio in 2003, change of dependency ratio and change of population in household.

Agriculture is a primary production in the village. Most of households gain their income from agriculture. Experiences that pass from generation to generation lessen the importance of education. Agriculture is labor intensive; it requires free labors in households for the participation. Therefore a low dependency ratio or a decrease of the ratio will allow villagers to participate more in the sector. Moreover, additional members will be primarily assigned to farm since it is a certain source of income.

e.) Agricultural service

The determinants of working hours in agriculture labor service are age in 2003 and the distance outside 1 kilometer from the village center. Jobs in this sector are labor intensive and need no high education such as cutting grass and harvesting tea. It is a last resource of income for a household. Participants need to be young because the job requires strong physical conditions. Moreover, only people stay further from the village center who have less opportunity in earning from tourism are likely to seek their earnings in this sector.

f.) Commerce

The only determinant of working hours in commerce is human capital in 2003. Commerce is regularly the family business. It needs a good collaboration among family members. They have to help one another in buying and selling. They deal with calculation. Only one educated person cannot handle all transactions without the help of other household members.

g.) Non-agricultural labor service

The determinants of working hours in non-agricultural labor service are age in 2003, the dominant of male members in households in 2003, dependency ratio in 2003 and the change of dependency ratio.

A major job in this sector is construction. Basically, it requires a young male labor. Besides, female labors can join the sector as long as they must not take care of their children or elderly people at home.

5.6 Discussion

This section will discuss barriers to entry for poor households to participate in tourism sector.

Poor people cannot participate in tourism sector for 4 major reasons. They are location, lack of capital investment, lack of education and lack of tourism experience. The details are described as follows:

1. Location

The poor cannot offer homestay service because most of them stay further than 1 kilometer from the village center. Households providing homestay service are clustered around the village center. There is no homestay in the outer cluster where 27 percent of the households are in the poorest quintile (Figure 5.2). Moreover, they cannot response quickly to the call in the core tourism activities. Therefore, they cannot catch tourism activities both from homestay and core tourism.

The poor in different clusters have different opportunities to earn tourism income. As shown in figure 5.1, the poor who stay in the inner cluster and upper-middle cluster earn more tourism income than those who live in the outer and middle cluster.

2. Lack of capital investment

Operating homestay needs substantial investment, e.g. westernized toilet, clean kitchen and mattress for tourists. The poor may not be able to afford these items.

3. Lack of education

By lacking of education, the poor are afraid of losing income from farms when switching to work in tourism activities. They feel safer to rely on the income from agriculture. Moreover, they find that there are jobs in agricultural labor service and construction that they are more

competitive because educated people do not join the sectors. They are confident that they have jobs to do; therefore they are not so interested in participation in tourism sector.

4. Lack of tourism experience

By lacking of experience in tourism, the poor may not know how well-paid the sector is. They are also unsure whether tourism income will surpass agricultural income. Moreover, they may not know how lighter the jobs are. In another point of view, the poor may not be confident to talk with tourists especially foreigners. They may not know how to behave to tourists or how to serve the tourists in an appropriate way. Moreover, when they are offered loans for the renovation of their houses to be homestay, they are afraid that the income may not be much enough to return the debt.

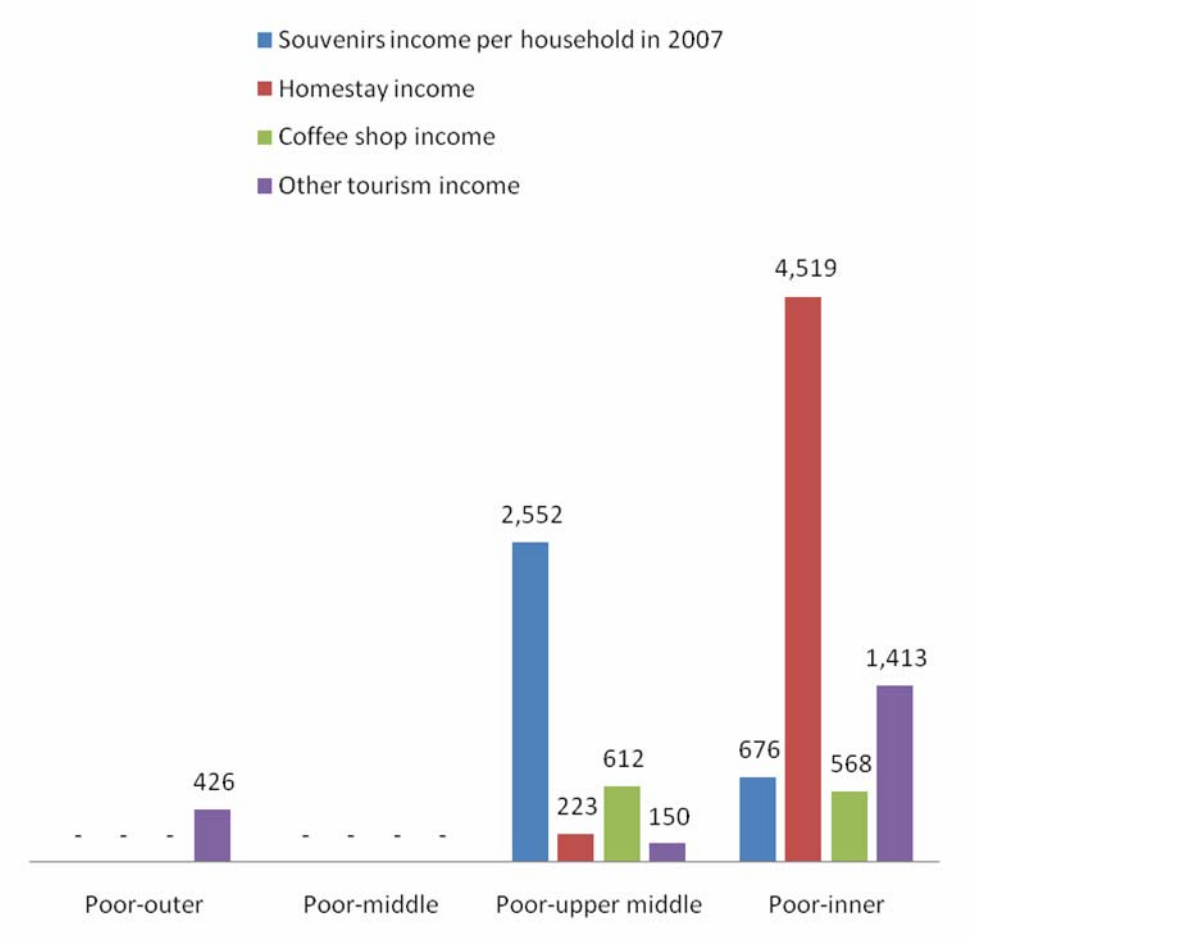


Figure 5.1 Comparison of tourism income among the poor in different locations

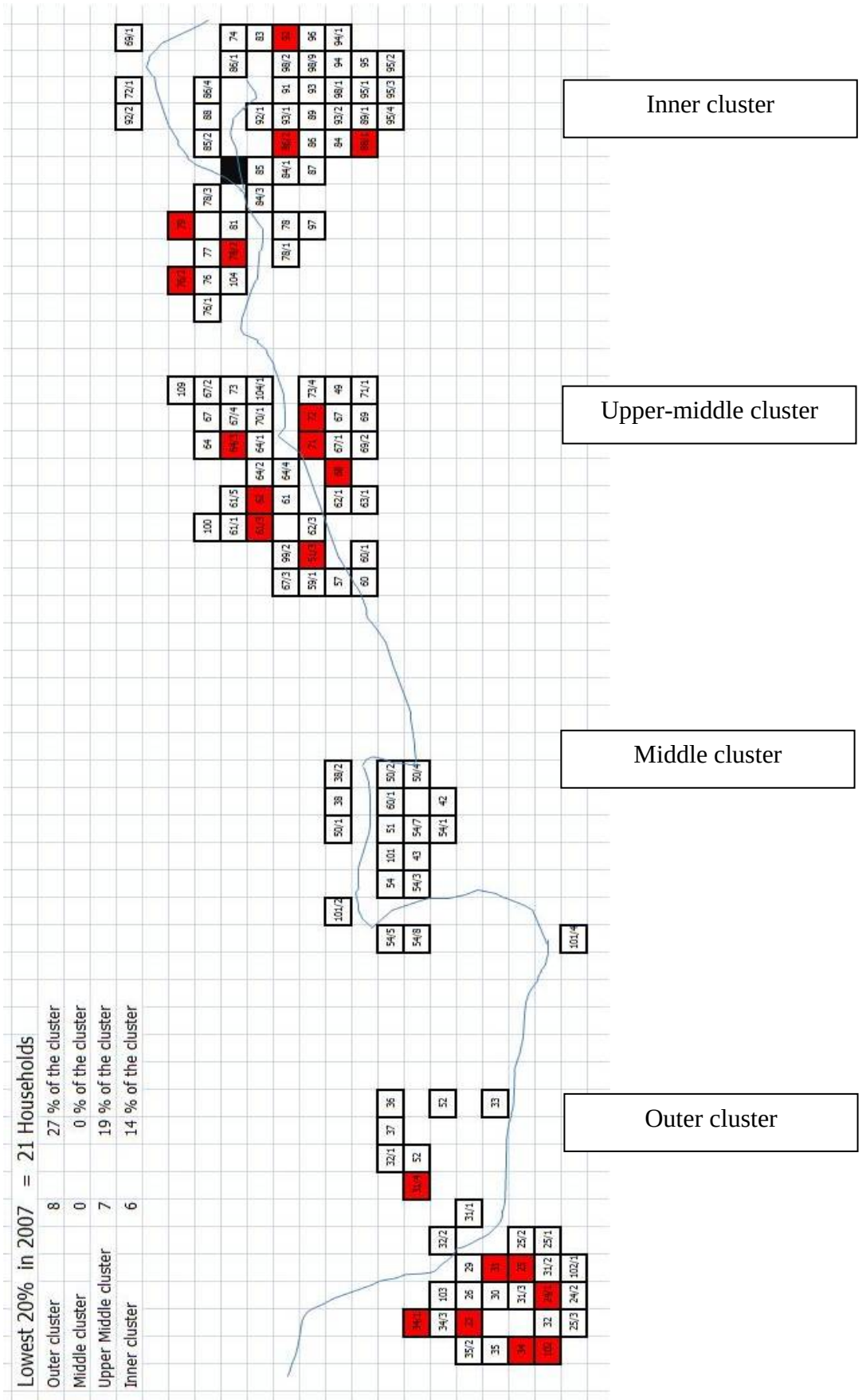


Figure 5.2 Location of households in the poorest quintile in 2007, marked by red dots.

5.7 Conclusion

Working hours in seven economic sectors are determined by different factors. The sectors can be grouped into two groups according to their determinants as follows:

Group 1: Sectors for well-educated households
This group includes core tourism, tourism-induced sector and commerce. Households with higher educational level of their leaders, higher average schooling years and larger pool of knowledge in households are more advantage to join these sectors.

Group 2: Sectors for labor excessive households
This group consists of homestay, agriculture, agricultural-labor service and non-agricultural labor service. They require free labor supply in households. Households with additional labor, low dependency ratio and decreasing of the dependency ratio are more advantage in participating in these sectors.

Another important determinant is location of households. Households which located within 1 kilometer from the village center are more advantage in participating in homestay and core tourism. Those who stay in the outskirt of the village tend to participate in lower-paid jobs such as agricultural labor service.

Not only location that is a barriers to prevent the poor for the participation in tourism sector, but also the lack of education and the lack of tourism experience. Education is a major driver for a household to join the tourism-induced sector and core tourism. Moreover, the experience in gaining tourism income also attracts a household to participate in core tourism and homestay. Households without good education and tourism experience may be unconfident to join tourism sector.

Chapter 6
Community-based tourism and poverty reduction

This chapter will examine the effects of tourism on poverty reduction. It will present the rationale, the research questions, methodologies, settings of the models, and the results. It will complete the chapter with the discussion and conclusion.

6.1 Rationale

International organizations hope that tourism could reduce poverty. They promote tourism as an anti-poverty tool. However, the effectiveness of the tool is still unobvious. So far, there has been no quantitative evidence to confirm that community-based tourism can reduce poverty at the village level.

This study will prove whether poor households who participate intensely in tourism sector can turn to be non-poor. The study will also find some evidences to ensure that tourism can raise household income. The evidence will confirm that the changing of poverty status is caused by the change of income and not the drop of poverty line.

6.2 Specific research questions

1.) Can poor households which participate intensely in tourism activities get out of poverty?
2.) Can all kinds of tourism activities reduce poverty?
3.) Can tourism raise household income?
4.) Why tourism can reduce poverty?

6.3 Methodologies

In the first step, a logit model will be used to estimate the effects of participation in seven economic sectors on poverty reduction. Later, the regression with instrumental variables will perform a double-checking of the effects. The details of each model are as follows.

6.3.1 Logit

Logit handles a regression that the dependent variable is dichotomous. It assumes the logistic distribution of the error term. The method is comparable to probit which assumes the normal distribution of the error term instead. However, both types of distribution are very similar such that the results from the estimations go actually in the same direction. Then this study chose only one model.

Another reason that logit was chosen over probit is that the model is easier to see the marginal effect. Its coefficients can also be read as the log of odd ratio.

In this study, only 49 poor households in 2003 are included in the logit model. Twenty-three households turned to be non-poor in 2007. They are classified as one. The rest of 26 households were still poor in 2007. They are classified as zero. The dichotomous variable is the dependent variable in the model.

Working hours in seven economic sectors in 2007 are independent variables. They represent the intensity of participation in each sector. The aim of the model is to figure out which sectors can raise the probability of getting out of poverty.

For the argument of endogeneity problem, it should be clarified that the causality between the working hours in economic sectors in 2007 and the change of poverty status in the same year is one way. It is clearly that the working hours determine the change of poverty status. This is because the change of poverty status is the last thing that a household will know at the end of the year 2007. Before that, a poor household has no idea whether it will get out poverty. Moreover, the thought of the poverty status change does not affect the decision to work during the year. Therefore, there is absence of the endogeneity problem in this regression.

It may also be argued that running a regression using only poor households may face a selection bias problem. This study believes that the poor households are not voluntarily poor. They are poor due to the fact that their incomes are under the poverty line. Selection bias will occur when an event is the self-selection. When being poor is not a self-selection, therefore running a regression with only poor households will not face the selection bias problem.

6.3.2 Regression with instrumental variables

1.) Reasons to use the model

An independent variable in this model, the working hours in tourism-induced sector, may be influenced by the dependent variable, the household income change, in the last period. If it is true, it will cause the recursive model as well as the endogeneity problem.

The problem can be shown as follows:

$$\Delta I_t = \alpha_0 + \alpha_1 W_t + \sum_{i=2}^{N} \alpha_i X_{i_t} + \varepsilon_1 \quad \text{.....(6.1)}$$

$$W_t = \beta_0 + \beta_1 \Delta I_{t-1} + \sum_{j=2}^{M} \beta_j Z_{jt} + \varepsilon_2 \quad \text{.....(6.2),}$$

where

ΔI_t = Household income change during 2003 and 2007

ΔI_{t-1} = Household income change during 2002 and 2006

W_t = Working hours in tourism-induced sector in 2007

X_t = Determinants of household income change

Z_t = Determinants of working hours in tourism-induced sector

ε = error term

Equation (6.1) is the main model that the study would like to estimate. The model is to test whether the participation in tourism-induced sector, representing by its working hours, can increase household income.

However, as seen in equation (6.2), the working hours in tourism-induced sector can be determined by the change of household income. Households who get richer during 2002 and 2006 may be interested in participating in this challenging and profitable activity. In contrast, households who get poorer may need to focus seriously on the major activities such as cash crops. Then, they may spend less time in tourism-induced sector.

In this case, applying the variable of working hours in tourism activities, W_t, in equation (6.1) may cause the endogeneity problem. The endogeneity problem is caused by the hidden autoregressive process in the error term of equation (6.1) as illustrated in equation (6.3).

$$\Delta I_t = \alpha_0 + \alpha_1 W_t + \sum_{i=2}^{N} \alpha_i X_{it} + \left(\alpha_{N+1} \Delta I_{t-1} + u\right) \quad \text{.....(6.3),}$$

where $\varepsilon_1 = \alpha_{N+1} \Delta I_{t-1} + u$.

It can be seen that if the autoregressive process exists and the lagged variable of income change is a determinant of the working hours, then the working hours is correlated with the error term in equation (6.1). This is the problem of endogeneity such that $Cov(W_t, \varepsilon_1) \neq 0$.

Therefore, to avoid the possible endogeneity problem it is safer to let the working hours be instrumented by one or more instrumental variables.

It should be noted that the working hours in tourism-induced sector is not affected by the change of income in this period, ΔI_t. This is because the change of income is known at the end of year 2007 but the decision to work in tourism sector is made at the beginning of the year or during the year. The decision can be affected by what was happened before the year which is the change of income of last period, ΔI_{t-1}. Therefore, the change of income and the working hours do not construct a system of simultaneous equations. Although the estimation strategy is indifferent with the one used in this chapter, the discussion how to handle the case is mentioned in annex 9.

2.) The selection of instrumental variables

A variable can be instrumented by one or more than one instrumental variables. The method yields unbiased but inefficient estimators. The standard errors of the coefficients will be unavoidably larger than those of OLS (Wooldridge, 2002).

There are two properties of an instrumental variable. First, it must have a high partial correlation with the instrumented one. Second, it must not be correlated with the error term of the model.

To select a good instrumental variable, there are many suggestions.

First, Greene(2003) and Pindyck and Rubinfeld (1998) suggest that an instrumental variable can be chosen from one variable or a combination of variables that has the highest correlation with the instrumented variable. However, it is to be careful that the high correlated variable may also be correlated with the error term.

Second, Patterson (2000) suggests that there may be a natural instrumental variable. One possibility is the lagged variable of the endogenous one. Usually, a variable and its lagged variable are correlated. However, it is possible only when their error terms are not correlated otherwise the lagged variable will be correlated with the error term in this period too. Another possibility is when the endogenous variable is structured by some determinants; those determinants are good candidates for the instrumental variables.

Third, Wooldridge (2002) suggests that the instrumented variable can be found by regressing the endogenous variable with all exogenous variables in the main equation plus some candidates for instrumental variables. The chosen instrumental variables are the one that the marginal effects are not zero. This is to guarantee that they are partially correlated with the endogenous variable. However, the textbook mentioned that there is no test available to prove that the candidates have no correlation with error terms. This is because the unbiased error terms cannot be observed. The only way is to give the good reasons that they should not be correlated with hidden variables in the error term.

Fourth, Gujarati (1995), Maddala (2001), Schmidt (2005) and Studenmund (1997) suggest that the predicted value of the endogenous variable generated by regressing it on all exogenous variables in the system will be a good instrumental variable.

To choose a set of instrumental variable, each strategy will be evaluated as follows. The first suggestions by Greene (2003) and Pindyck and Rubinfeld (1998) are too broad. They are rather the concept than the practical guide. The second suggestion on the lagged variable cannot be applied to this study. It is because there is no data of the lagged working hours before the year 2007.

The suggestion about the natural structure of determinants by Patterson (2000) is possible. The information of the determinants of the working hours in tourism-induced sector is found in chapter 5. They are ready to serve as candidates for instrumental variables. Combining with the suggestion of Wooldridge (2002), Gujarati (1995), Maddala (2001), Schmidt (2005) and Studenmund (1997) the determinants from chapter 5 can be regressed with other exogenous variables in the main equation. Variables that are partially correlated with the working hours will be chosen to be the instrumental variables.

A problem occurs when there is a join determinant in both equations. To make it clearer, the problem is illustrated in equation (6.4) and (6.5).

$$\Delta I_t = \alpha_0 + \alpha_1 W_t + \sum_{i=2}^{N} \alpha_i X_i + \sum_{h=N+1}^{R} \alpha_h H_h + \varepsilon_1 \quad \text{.....(6.4)}$$

$$W_t = \beta_0 + \beta_1 \Delta I_{t-1} + \sum_{j=2}^{M} \beta_j Z_j + \sum_{k=M+1}^{Q} \beta_k H_K + \varepsilon_2 \quad \text{.....(6.5),}$$

where

X = The pure determinants only of household income change

Z = The pure determinants only of working hours in tourism-induced sector

H = The joint determinants both of household income change and working hours in tourism-induced sector

In this case, Schmidt (2005) suggests that the variable H cannot be used as an instrumental variable. By his definition, an instrument variable is an exogenous variable in an econometric

model, and is excluded from at least one equation of a system of equations. The variable H appears in both equations. It is not excluded from at least one equation. Therefore, it is not an instrumental variable. There are two reasons behind this argument.

First, if H is used as an instrumental variable, it will predict the value of the working hours. The problem of multicollinearity will occur when inserting the predicted values, $\hat{W}$, into the original equation (equation 6.4) together with H.

Second, if H is taken out from equations (6.4) and (6.5) and assigned to be an instrumental variable instead, the problem of omitted variable will occur in the main model.

Therefore, the presence of H must be in only the original equations which are (6.4) and (6.5). It cannot be used as an instrumental variable to generate the predicted value of the endogenous variables.

3.) Steps in the estimation

In the first step, candidates for the instrumental variables are initiated by determinants of working hours in tourism-induced sector found in chapter 5. Both variables H and Z are the candidates.

In the second step, the selection of instrumental variables will be conducted by regressing the household income change with all exogenous variables and all candidates for instrumental variables using OLS as shown in equation (6.6). Those candidates which are significant in this test, H, will be excluded from the list of instrumental variables.

$$\Delta I_t = \lambda_0 + \sum_{i=2}^{N} \lambda_i X_i + \left(\sum_{h=N+1}^{R} \lambda_h H_h + \sum_{g=R+1}^{P} \lambda_g Z_g \right) + \varepsilon_1 \quad \text{.....(6.6)}$$

This process is used to satisfy the suggestion of Schmidt (2005) that the variable H should be excluded from the instrumental list. The estimation result from equation (6.6) may be biased because variable W_t is omitted from the model. However, it only aims to explore the significance of variable H and Z. As defined, H is the significant and Z is the insignificant

variables in this model. In practical, there is no prior information which variable is H or Z until the estimation result comes out from the model.

In the third step, use only variable X and Z as regressors to estimate the working hours in tourism activities. The equation is shown in equation (6.7). The predicted value of the working hours is calculated by equation (6.8).

$$W_t = \gamma_0 + \sum_{i=1}^{N-1} \gamma_i X_i + \sum_{j=N}^{M-1} \gamma_j Z_j + \varphi \quad \text{.....(6.7),}$$

$$\hat{W}_t = \gamma_0 + \sum_{i=1}^{N-1} \gamma_i X_i + \sum_{j=N}^{M-1} \gamma_j Z_j \quad \text{.....(6.8),}$$

In the last step, the household income change will be regressed with the instrumented variable, the predicted value of working hours in tourism-induced sector, plus all exogenous variables as summarized in equation (6.9).

$$\Delta I_t = \alpha_0 + \alpha_1 \hat{W}_t + \sum_{i=2}^{N} \alpha_i X_i + \sum_{h=N+1}^{R} \alpha_h H_h + \varepsilon_1 \quad \text{.....(6.9)}$$

4.) Adjustment for inflation

Household income change in this study is in a nominal term. Reasons of the unadjusted income change for the inflation during 2003 – 2007 are as follows:

1. The aim of the study is to investigate the effect of tourism on poverty reduction. To show clearly that the reduction of poverty incidence is due to tourism and not just because the drop of poverty line, it must prove that tourism adds income into households' pockets. Therefore, the income that the study focuses on is the nominal one.

2. In measurement of poverty, the study compares household income to poverty line. While the poverty line is in nominal term, the household income should be in nominal term as well.

3. The change of poverty status overtime is influenced by the change of poverty line and the change of income. When the change of poverty line is in nominal term, the change of income should be also in nominal term.

4. Adjustment for inflation measures real consumption which is not the aim of the study. The study focuses on the shift of poverty status regardless of how the real consumption changes.

6.4 Settings of the models

In this section, it will reveal the settings of logit model as well as the regression with instrumental variable.

6.4.1 Logit model

This section will describe the dependent variables, testing variables and controlled variables in the logit model. The details are as follows:

1.) Dependent variable

The dependent variable in the models is a binary choice indicating a changing poverty status from being poor in 2003 to non-poor in 2007 (Y=1) or still poor in 2007 (Y=0). There are 49 observations. Among them, 23 households turned from being poor to non-poor while 26 households remained poor in both years.

2.) Testing variables

Testing variables are working hours in seven economic sectors. They include homestay, core tourism, tourism-induced sector, agriculture, commerce, agricultural labor service and non-agricultural labor service. The reason of including all the sectors in the regression is that it is unnecessary that only tourism can help the poor to get out of poverty. Other sectors might be able to do so. Therefore, the regression should not ignore the effect of them on poverty reduction.

3.) Controlled variable

First of all, I would like to add household's characteristics into the regression as many as possible. However, they are correlated with the working hours. As seen from the regression results in chapter 5, most of the characteristics explained at least one dependent variable of working hours. Only one exogenous variable is left. It is the poverty gap in 2003.

It is reasonable to include the poverty gap in 2003 as a controlled variable. A poor household with narrower gap has a larger possibility to cross over the poverty line. In contrast, a household with a larger gap needs more income to get out of poverty. Therefore, the sign of this variable is expected to be negative.

4.) Descriptive statistics of the variables

Descriptive statistics for the logit model are presented in table 6.1 and 6.2. In the first table, the model uses working hours in major economic sectors as regressors. In the second model, it is for the regression using household characteristics as regressors. The motivation of using the second model will be discussed in section 6.5.1.

Table 6.1: Statistical summary for the logit model using working hours in major economic sectors as the regressors

Dependent variable (Y): The change of poverty status during 2003 and 2007
(Y=1 if turning to be non-poor in 2007, Y=0 if still poor in 2007)

Variables	Mean value in case Y=1	Standard deviation in case Y=1	Mean value in case Y=0	Standard deviation in case Y=0
Working hours in homestay	37.00	108.97	15.12	66.45
Working hours in core tourism	133.45	222.57	39.22	122.05
Working hours in tourism induced sector	305.73	572.61	77.84	233.56
Working hours in agriculture	2,237.95	1,118.73	2,209.18	2,247.62
Working hours in commerce	734.12	1,794.53	51.33	150.14
Working hours in agricultural labor service	100.34	175.91	241.83	352.03
Working hours in non-agricultural labor service	1,084.63	1,317.64	377.12	948.15
Poverty gap	-12,712.48	10,126.18	-14,961.90	11,497.09

Source: Calculation

Table 6.2: Statistical summary for the logit model using household characteristics as the regressors

Dependent variable (Y): The change of poverty status during 2003 and 2007 (Y=1 if turning to be non-poor in 2007, Y=0 if still poor in 2007)				
Variables	Mean value in case Y=1	Standard deviation in case Y=1	Mean value in case Y=0	Standard deviation in case Y=0
Education of head of household in 2003 (years)	4.56	1.70	3.50	1.70
Average age of household members in 2003 (years old)	36.21	7.83	38.57	14.57
More women than men in household in 2003 (yes=1)	0.3478	0.48	0.3077	0.47
Dependency ratio in 2003	0.2648	0.16	0.2658	0.20
Change of dependency ratio	-0.1057	0.16	-0.0469	0.17
Change of population in household (persons)	-0.1739	0.65	-0.2308	0.99
Human capital in household in 2003 (persons-years)	18.33	6.96	17.70	7.95
Schooling in 2003	5.79	1.39	5.42	1.54

Source: Calculation

6.4.2 IV regression model

This section will describe the dependent variables and testing variables for the regression with instrumental variable. The model will investigate whether the working hours in tourism sector can raise household income.

1.) Dependent variable

The dependent variable in the model is the change of household income in nominal term. The reason of the usage of nominal term is because poverty exit needs the nominal income to be larger than the nominal poverty line.

2.) Testing variables

The testing variables are working hours in tourism activities if they are significant in the logit model. The activities are homestay, core tourism and tourism-induced sector. Each sector will be modeled separately in a regression. This is to avoid the problem of having more than one instrumented variable in a model. In case that some of them are not significant in the logit model, the related regressions will be skipped. This is because the objective of the regression

is just to double-check that these activities can reduce poverty by increasing the household income.

3.) Controlled variables

Literatures suggest the expectation of signs for the controlled variables as follows:

1.) Schooling in 2003

Schooling is an investment in human capital. It is believed to yield positive effect to household income (Angrist and Krueger,1990). It expands the stock of knowledge (Schutz and Luckmann, 1973). It increases worker's productivity (Klasen, 2002). It provides know-how to do a more beneficial job or access to a higher-paid labor market (Baum and Payea, 2005).

2. Age in 2003

Households with lower average age are capable to gain more income because younger labors can work harder and longer than older people, given other factors equal. The variable was also used by Zucula, et al (1992).

3. Women in 2003

In this study it is expected that households with more women than men may gain more income than households with more men than women. This is because women tend to work harder than men in Thai society. Women also join hard job such as construction. They also control businesses in the village. The argument is challenging to the study done in the western context of Hundley (2001) which mentioned that self-employed women earned less than men mainly because of their burdens of housework and childbearing. Moreover, women might not access to relatively rewarding jobs such as construction but represent in relatively unrewarding sectors such as personal service. The study also pointed that even though women could run businesses, their businesses were relatively smaller than those of men because of smaller capital stocks and less experience in doing business.

4. Distance 1 kilometer from village center

Households in the range of 1 kilometer from the village center are closer to information than outer households. They can response faster to the calls for jobs. Tourists also prefer to choose homestays in this range because they don't have to walk further. The consideration upon the effect of location on village economies also appeared in Sachs and Warner (2001), Grimm and Klasen (2008) and Mapa, et al (2009).

5. Members in 2003

The number of household members in 2003 is concerned as an initial labor endowment of households. It is a potentiality of households to generate income in the future. More members may be able to generate more nominal income.

Concerning the possible multicollinearity problem between this variable and income in 2003, the correlation between both variables is low ($r = 0.19$) which is not harmful to the models.

6. Dependency ratio in 2003

Households with many children and elderly people will have to allocate working time to take care of the dependents. Then it loses opportunity to gain income. The variable was used in the studies of Zucula, et al (1992) and Mapa, et al (2009).

7. Change of dependency ratio

Reduction in dependency ratio will allow household resources to generate more income for households. Therefore, it is expected that the effect of this variable on the dynamic of income will be negative. It should be noted that although the variable is in a form of a difference between two periods of time, it does not create the endogeneity problem. This is because the variable is a change in demographic conditions which is not determined by income.

8. Change of population in household

In this study, it is expected that more endowments should translate into more household income. However, it may reduce the per capita income. A study in Uganda by Klasen and Lawson (2007) indicated that high population growth raised total income growth but reduced per capita income growth.

9. Income 2003

A household with higher initial income tends to generate less growth because of a bigger income base. In an absolute term, it is not obvious that households with higher initial income will generate larger income change. It depends on the rigidity of households' income structure and the situation of underemployment. Households that are flexible to switch to higher-paid sectors will be potential to generate more income. Households with free labors will also be possible to expand their income.

10. Ratio of tourism income to total income in 2003

This variable is a proxy of the experience in contacting tourists and other tourism activities. The contact to tourists can be viewed as another source of education. It is an indirect way to expand the stock of knowledge (Schutz and Luckmann, 1973). Households may use information or knowledge learned from outsiders to translate into more income.

4) Descriptive statistics of the variables

The descriptive statistics of the variables in the regression with instrumental variables are shown in table 6.3.

Table 6.3: The descriptive statistics of variables in IV regression model

Variables	Mean	Standard deviation
Dependent variable:		
Household income change during 2003 – 2007	24,446	54,910
Independent variables:		
Working hours in tourism-induced sector in 2007 (hours)	241.23	701.33
Education of head of household in 2003 (years)	4.27	1.84
Average age of household members in 2003 (years old)	39.37	12.03
More women than men in household in 2003 (yes=1)	0.3557	0.4810
Distance 1 km from village center (yes=1)	0.65	0.47
Members in 2003 (persons)	3.08	1.05
Dependency ratio in 2003	0.2374	0.2117
Change of dependency ratio	-0.0507	0.1889
Change of population in household (persons)	-0.0576	1.0128
Income 2003 (Baht)	43,592	28,455
Ratio of tourism income to total income in 2003 (%)	1.79	4.48
Human capital in household in 2003 (persons-years)	18.07	8.31
Average schooling of members in 2003 (years)	5.84	1.93

Source: Calculation

6.5 Results

This section will show the effects of tourism on poverty reduction. It will also present the effect of tourism on household income change.

6.5.1 Effect of poverty reduction

The result from the logit model shows that there are four sectors that can reduce poverty. They are tourism-induced sector, agriculture, commerce and non-agricultural labor service (table 6.4).

By their marginal effects, commerce is the most effective sector in reducing poverty. Tourism-induced sector is the second. Non-agricultural service is the third and agriculture is the fourth.

Table 6.4: Participations in economic activities and their effect on poverty reduction

Dependent variable: The poor in 2003 turning to be non-poor in 2007	(8)	(9)
Method	Logit (Coefficient)	Logit (Marginal effect)
Working hours in homestay	-0.00676 (0.00538)	-0.00142 (0.00111)
Working hours in core tourism	0.00443 (0.00294)	0.00093 (0.00061)
Working hours in tourism induced sector	0.00253* (0.00138)	0.00053* (0.00029)
Working hours in agriculture	0.00046** (0.00023)	0.00009* (0.00005)
Working hours in commerce	0.00428** (0.00168)	0.00090*** (0.00026)
Working hours in agricultural labor service	0.00007 (0.00134)	0.00001 (0.00028)
Working hours in non-agricultural labor service	0.00104** (0.00049)	0.00022* (0.00012)

Dependent variable: The poor in 2003 turning to be non-poor in 2007	(8)	(9)
Method	Logit (Coefficient)	Logit (Marginal effect)
Poverty gap	0.00005 (0.00005)	0.00001 (0.00001)
Constant	-2.44334** (1.07367)	
Observations	49	
R^2	0.3884	

Source: Author's estimation using Stata
Note: *** significance at 99%, ** significance at 95%, *significance at 90%
Number in the bracket in the column of coefficient is the robust standard error.
Number in the bracket in the column of marginal effect is standard error.

The result of the logit model links to the findings from SURE model in chapter 5. SURE model shows the determinants of working hours in these sectors such as the education of the head of household, average age of household members, and the distance between the household and the village center. Poor households whose characteristics are matched for the participation in the four sectors, i.e. tourism-induced sector, agriculture, commerce and non-agricultural labor service, will possibly be able to turn to be non-poor.

It is interesting to proceed further to see what will happen if household characteristics are regressors in the logit model. The estimation strategy is as follows:

1) As it appears that there are four sectors that can help the poor in 2003 turning to be non-poor in 2007 which are tourism-induced sector, agriculture, commerce and non-agricultural labor service, only the determinants of the working hours in these four sectors will be included as regressors in the logit model.

2) Because household characteristics are determinants of the working hours, the multicollinearity problem will occur if the characteristics and working hours are put together in the same model. Therefore, only household characteristics will be used as regressors.

3) The household characteristics in 2003 are used in the model to avoid the possible endogeneity problem.

The results of this model are shown in table 6.5.

Table 6.5: Results of logit model using household characteristics as regressors

Dependent variable: The poor in 2003 turning to be non-poor in 2007	(10)	(11)	(12)
Method	Logit		
Education of head of household in 2003	0.4044* (0.2179)	0.4134** (0.2101)	0.4170* (0.2145)
Average age of household members in 2003	0.0128 (0.0329)		
More women than men in household in 2003	0.0349 (0.7563)		
Dependency ratio in 2003	0.2215 (2.5322)		
Change of dependency ratio	-1.4362 (2.0519)		
Change of population in household	-0.0152 (0.3625)		
Human capital in household in 2003	0.0065 (0.0999)	-0.0031 (0.0708)	
Schooling in 2003	0.1847 (0.4433)	0.1851 (0.3178)	
Constant	-3.5878 (2.9400)	-2.786* (1.5205)	-1.816* (0.9666)
Observations	49	49	49
Pseudo-R^2	0.0924	0.0835	0.0729

Source: Author's estimation using Stata
Note: *** significance at 99%, ** significance at 95%, *significance at 90%
Number in the bracket is the robust standard error.

The results from table 6.5 show that only education of head of household in 2003 is the main factor for the poverty exit. There are several reasons behind this.

1) The decision of the head of household is very important in the Thai context. Although the society is democratic, household members always obey to the head of household. When the head is well-educated, he or she will lead the household to a good direction. The household

may allocate their working hours into more profitable sectors. The household may also realize what kind of skills that are needed for the participation in profitable sectors. Then, the head of household may encourages the members to practice or to acquire those skills.

2) Even though the characteristics of households that are used in this model are significant in SURE model, most of them are insignificant here. This is because the characteristics which are needed for the participation in a particular sector differ from other sectors. For example, agricultural sector needs households with less dependency ratio and larger size of household members while tourism-induced sector needs household with good education. Human capital and schooling are still insignificant in the second estimation where three characteristics of educational aspects are presented. This is because they are not necessary for the participation in agriculture which is also a big source of income for villagers. Therefore, it makes the model unclear whether a characteristic is important for poverty reduction.

3) The sample size in is small. The insignificance may be because of the insufficient number of observations.

6.5.2 Effects on household income change

According to the IV regression, instrumental variables are primarily chosen from variables that determine the intensity of participation measured by working hours in tourism sector. The determinants are according to the results from SURE model in chapter 5.

However, not all instrumental variables can be used. Some of them should be dropped from the instrumental list when they are correlated with the dependent variable. Table 6.6 examines the relationship.

Table 6.6: Testing of instrumental variables in order to exclude the variable which is significant to the dependent variable out of the instrumental list

Dependent variable: Household income change during 2003 – 2007	(13)
Method	OLS
Education of head of household in 2003	7,827.26* (4,306.96)
Average age of household members in 2003	265.15 (507.20)
More women than men in household in 2003	-19,745.28* (10,612.28)
Distance 1 km from village center	4,311.43 (9,743.68)
Members in 2003	-5,643.87 (16,297.64)
Dependency ratio in 2003	-37,356.93 (25,248.95)
Change of dependency ratio	-53,323.75** (24,306.51)
Change of population in household	17,398.41*** (6,242.66)
Income 2003	-0.6406*** (0.2273)
Ratio of tourism income to total income in 2003	1,667.32 (1,485.64)
Human capital in household in 2003	5,543.96 (3,405.26)
Schooling in 2003	-12,807.29 (8,791.65)
Constant	8,919.23 (55,134.10)
Observations	104
R^2	0.3289

Source: Author's estimation using Stata

Note: *** significance at 99%, ** significance at 95%, *significance at 90%
Number in the bracket is the robust standard error.

The summary of variables in the instrumental list is presented in table 6.7.

Table 6.7: Summary of instrumental variables for the study of effects of tourism on household income change

List of instrumental variables	Instrumented variable: Working hours in tourism-induced sector
Education of head of household in 2003	✗
Age in 2003	✓
Change of population in household	✗
Human capital of household in 2003	✓
Schooling in 2003	✓

Note: ✓ indicates that the variable was significant in the SURE model but not significant in the income change model. This variable can be used as an instrumental variable.

✗ indicates that the variable was significant in the SURE model and also significant in the income change model. This variable cannot be used as an instrumental variable.

Working hours in tourism-induced sector is significant in all models (table 6.8). The result ensures that tourism-induced sector can increase household income. Moreover, income in 2003, the change of dependency ratio and the change of population are significant in some models.

Table 6.8 Estimation results for the effects of intensity of participation in homestay on household income change using OLS and IV regression

Dependent variable: Household income change during 2003 - 2007	(14)	(15)	(16)	(17)
Method	IV	IV	IV	IV
Working hours in tourism-induced sector in 2007	48.0854*** (13.1477)	61.9766*** (17.3874)	86.7071*** (26.8380)	77.2170*** (24.0896)
Education of head of household in 2003	2,896.03 (2,799.71)			
More women than men in household in 2003	-12,681.21 (9,623.23)			

Dependent variable: Household income change during 2003 - 2007	(14)	(15)	(16)	(17)
Method	IV	IV	IV	IV
Distance 1 km from village center	1,478.74 (9,330.07)			
Members in 2003	14,620.81*** (4,998.84)	7,998.40 (5,872.85)		
Dependency ratio in 2003	-34,665.43 (21,580.91)			
Change of dependency ratio	-40,545.62* (22,780.26)	-19,610.84 (18,831.50)		
Change of population in household	11,092.16** (4,456.61)	9,968.16* (5,110.87)	5,404.25 (3,662.66)	
Income 2003	-0.6594*** (0.1865)	-0.6403*** (0.1782)	-0.7298*** (0.2035)	-0.6850*** (0.2090)
Ratio of tourism income to total income in 2003	746.67 (1,189.96)			
Constant	-6,907.01 (19,505.18)	12,301.20 (14,581.67)	35,657.80*** (8,978.32)	35,683.40*** (8,388.33)
Observations	104	104	104	104
R^2	0.4578	0.3758	0.1441	0.2360

Source: Author's estimation using Stata

Note: *** significance at 99%, ** significance at 95%, *significance at 90%
Number in the bracket is the robust standard error.

6.6 Discussion

There are five reasons why tourism-induced sector can help the poor to get out of poverty.

First, labor productivity in the sector was competitive to those of other sectors. As shown in table 6.9 the labor productivity in tourism-induced sector was in the third rank after homestay and core tourism. A participant could earn USD 0.82 per hour from the sector.

Table 6.9 Labor productivities in economic sectors in 2007

No.	Sectors	Baht / hour	USD/hour
1	Homestay	60.89	1.87
2	Core tourism	29.20	0.90
3	Tourism-induced sector	26.60	0.82
4	Manufacture and commerce	24.55	0.75
5	Non-agricultural labor services	20.25	0.62
6	Agriculture	12.11	0.37
7	Agricultural labor services	6.40	0.20

Source: calculation based on survey data

Second, the size of the sector was large enough. As shown in figure 6.1, souvenir production, coffee shop and massage accounted for 41.70 percent of the whole tourism income. It exceeded homestay income which was 33.30 percent of the tourism income.

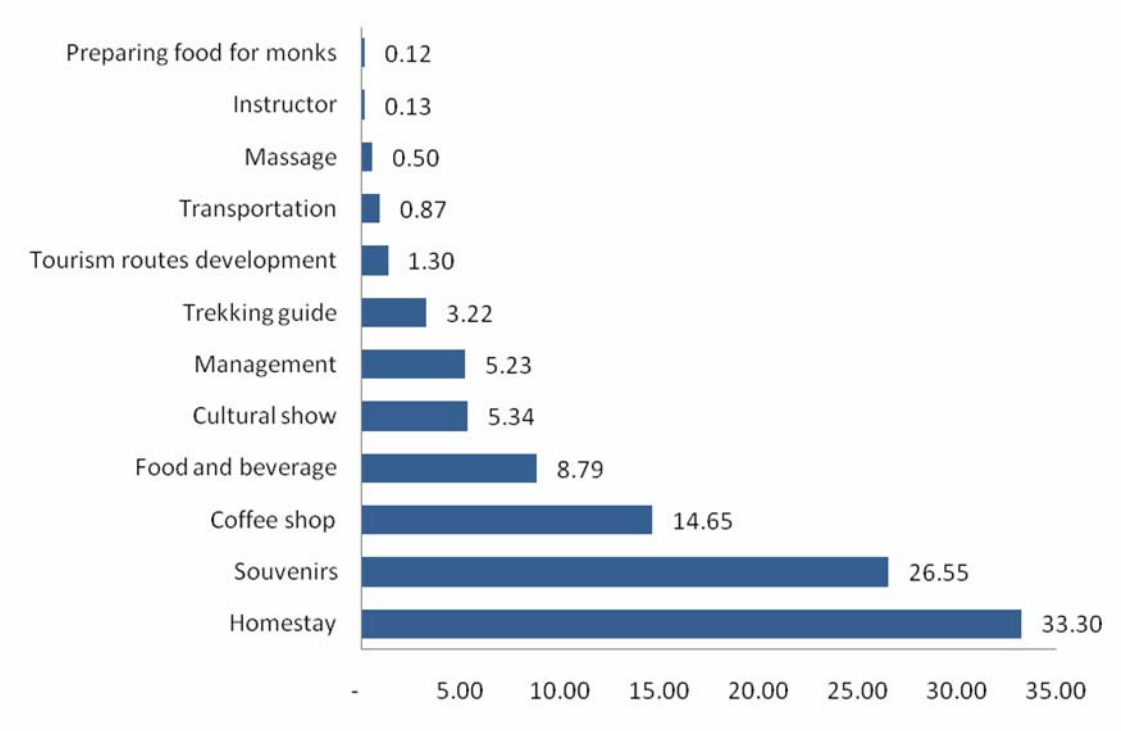


Figure 6.1: Sizes of economic sectors in 2007

Third, villagers allocated much working time enough into the sector. As shown in table 6.10 the poor households who turned to be non-poor in 2007 spent 305 hours per year per household into tourism induced-sector while the poor who were still poor spent only 77 hours per year per household into the sector.

Table 6.10 Comparisons of the allocation of working times between the poor in 2003 who was still poor in 2007 and who became non-poor in 2007

	Allocation of working hours (Average hours per year per household)	
	Poor households in 2003 and still poor in 2007	**Poor households in 2003 who turned to be non-poor in 2007**
Homestay	15	37
Core tourism	39	133
Tourism-induced sector	77	305
Manufacturing and commerce	51	734
Non-agricultural labor service	377	1,088
Agriculture	2,209	2,237
Agricultural labor service	241	100
All works	3,009	4,634
Average household members (persons)	3.19	3.21
Number of households	26	23
Dependency ratio	0.26	0.26
Maximum working hours per year of all households* (hours)	153,193	136,367
Utilization of working hours per year of all households (hours)	78,234	106,582
Underemployment rate** (%)	48.93	21.84

Source: calculation based on survey data

Note: * Only people aging between 15 – 70 years old (dependency ratio was around 0.26), with 6 working days in a week and 8 hours per day.

** The average unemployment rate for the whole village was 35.79% (based on 104 households).

The poor that turned to be non-poor worked more than those who were still poor, although the working hours in agriculture of both groups were almost the same. The underemployment rate in the group of being still poor was much higher than the number of the other group.

The fourth reason was that villagers who could no longer work on farm and construction could join the sector. Some of members of tourism-induced sector including its founder were elderly people. They were older than 50 years old. The founder was 62 years old in 2007. Some of them suffered from physical injuries. Some of them are disabled. Without the sector, they could not earn much money for living; their households' income should be dropped.

With the sector, they could come to sit and work. The jobs in the sector were light, for example putting dried tea leaves into pillows. Then they sold the pillows to tourists who came to the village center. Strong physical condition was not required for such activities.

Last, the income of the sector distributed quite evenly to households who used to be poor in 2003. As shown in figure 6.2, the income in tourism-induced sector (measured in 2007) flew to the poor quite evenly (households are arranged by the 2003 quintile). Even though the richest quintile gained the most, 33.79 percent, other quintiles gained substantial portions. The second poorest quintile gained 22.06 percent. The founder of the souvenir production group was in the second poorest quintile in 2003. Her household jumped to be the fourth richest rank in the village in 2007

The only problem was that the poorest quintile did not gain much. They received only 2.44 percent of the income of the sector. Barriers that prevented them to join the sector were discussed at the end of chapter 5 where the determinants of participation in tourism sectors were discovered.

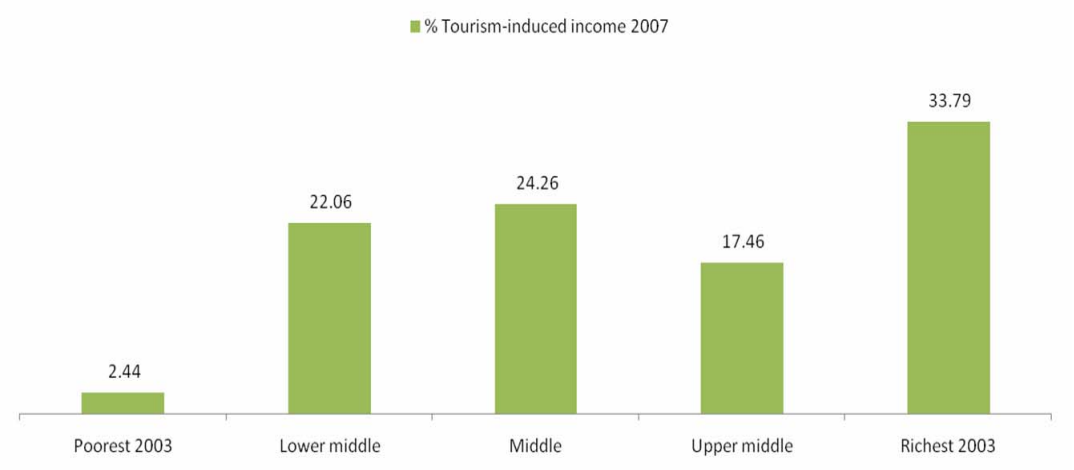


Figure 6.2: Distribution of tourism-induced income in 2007 to households arranged by income in 2003

Another important source of income which drove households to become non-poor was the non-agricultural labor service including construction, house caring and services. The boom of tourism led to some important changes in the village during last 5 years. First, villagers gained more cash income from tourism. They constructed new houses or extended the size of

houses. Second, to serve as a better homestay, many villagers built the balcony next to their houses. Third, outsider both from Chiang Mai and Bangkok came to buy land and built houses. Modern houses and resorts were constructed for the speculation of the price of the properties. Last, outsiders' houses needed the carings. Outsides hired local people to be gardeners, house keepers and securities for their houses.

It might be argued that poverty was voluntary since the working hours of the poor who were still poor were much lower than the poor who turned to be non-poor. This issue might be viewed in two dimensions. On the first perspective, it was possible that the poor were lazier than the non-poor. This was according to the story told by neighbors of the poor. They mentioned that some households did not work hard; thus these poor households were still poor. In contrast, they witnessed that the non-poor worked harder.

On the second perspective, the poor might not be able to work more. Many villagers suffered from diseases and physical disabilities. From my survey on this issue, poor villagers complained that they were sick. They mentioned that they could not afford the expensive medicine and the high transportation cost to go to see doctor in the city. Those expenditures prevented them to have regular healthcare services. Moreover, they thought that they had no skills that were necessary to join tourism activities. They said that they could not speak English. They did not know how to perform local music or dances. They could not do massage. Moreover, they believed that their houses were not good enough to be homestay.

6.7 Conclusion

Tourism is one of economic sectors that can reduce poverty. However, it depends on type of tourism activities. Only tourism-induced sector can do it while homestay and core tourism are not effective in poverty alleviation. Other economic sectors that can reduce poverty are commerce, non-agricultural labor service and agriculture.

Tourism-induced sector can reduce poverty because of five reasons. First its labor productivity is competitive to other sectors'. Second, the size of the sector is large enough. Third, participants spend enough time into the sector. Fourth, elderly people can work in the sector. Last, the benefit of the sector used to flow to the poor quite evenly before 2007 when the limitation of membership in this sector was not applied.

The reason why homestay cannot alleviate poverty is that it needs investment to renovate houses to be suitable for tourists. Most of the poor cannot afford the investment. Moreover, a reason why core tourism is not effective for poverty reduction is because of its small size. It cannot generate enough income for households to get out of poverty.

Chapter 7
An analysis with the computable general equilibrium model

This chapter will present the analysis with computable general equilibrium model at the village level (VCGE). It will answer several questions that cannot be answered by other econometric models. First, it will investigate what will happen when tourism demand is increased or decreased. Second, it will measure the size of income multiplier and value-added multiplier of tourism sector. Third, it will figure out whether the distribution of tourism benefit favors the poor when both direct and indirect effects are taken into account. Last, it will conclude whether tourism promotion is economically reasonable for a village.

7.1 Rationale

Tourism can be beneficial to a village in two ways. A direct effect is the benefits to villagers who participate directly in tourism sector. An indirect effect is the benefits to villagers who are outside tourism sector by the linkages between tourism and other sectors such as agriculture and commerce.

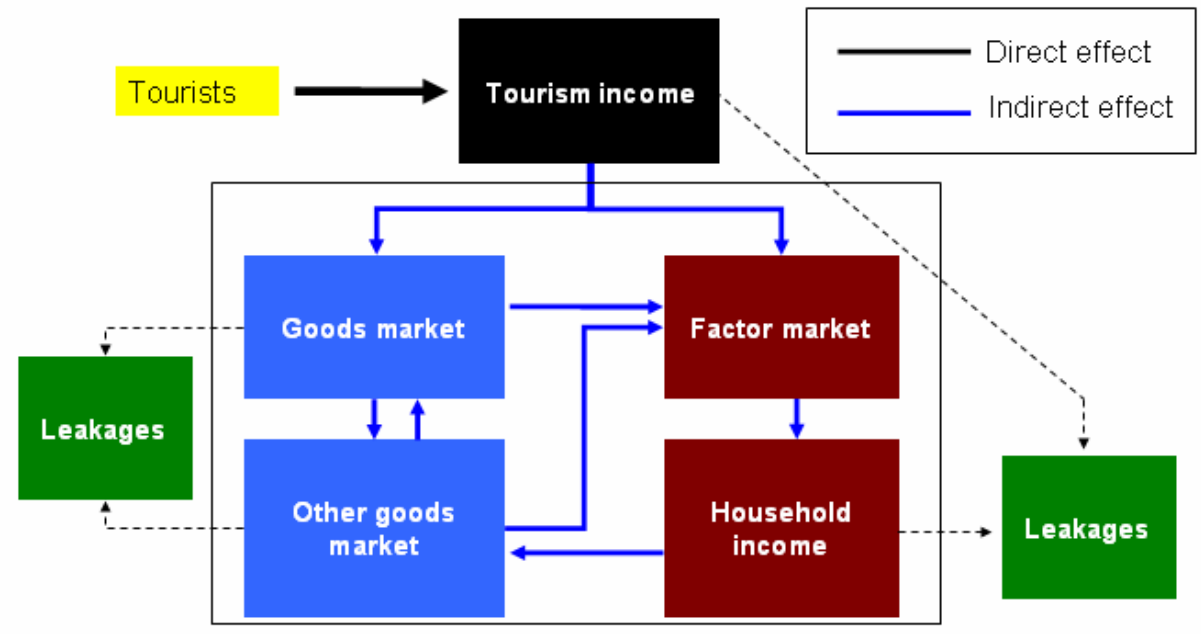


Figure 7.1 Direct and indirect effects of tourism benefit

Direct effect of tourism benefit is the expenditure spent from tourists to tourism activities. The activities are homestay, core tourism and tourism-induced sector.

The indirect effect is the expenditure spent from tourism activities to other sectors such as agriculture, commerce and non-agricultural labor service. Moreover, it includes the retained value added in tourism activities that becomes household income. Spending of other sectors and consumption of households are also counted as another part of the indirect effect.

The circulation of tourism benefit will last until the income totally leaks to outside the village. The leakages are in forms of good and service imports, savings in financial institutions outside the village and other kinds of outward transfers.

The analysis in this chapter takes both direct and indirect effects into account. It will close the gap of knowledge at least on two points. First, the size of income multiplier of community-based tourism which is still unanswered by other studies will be revealed. Second, the question upon the distribution of tourism benefit will be answered.

7.2 Specific research questions

1.) How much is the income multiplier?
2.) How much is the value added multiplier?
3.) Does real income of the poorest quintile rise at the faster rate than of other quintiles? In another word, is tourism pro-poor?

7.3 Methodologies

This section will introduce the Computable General Equilibrium model at the village level (VCGE). Then it will reveal the settings of the model and the simulation.

7.3.1 Village Computable General Equilibrium (VCGE)

In this section, firstly it will introduce the VCGE. Then it will compare VCGE to neoclassic household-farm model, Social Accounting Matrix model (SAM) and a normal CGE. Then, it will discuss the limitation of the model. Finally, it will reveal its programming method.

a) Introduction to VCGE

Computable General Equilibrium was firstly applied to village economies in Taylor and Adelman (1996). The model was based on the data from Social Accounting Matrix (SAM). Taylor and Adelman were also pioneers in using SAM for village economic analysis at the village level (Adelman, Taylor and Vogel, 1988).

The VCGE model is a combination between SAM and the neoclassical household-farm model (Barnum and Squire, 1979; Singh, Squire, and Strauss, 1986). SAM is a combination of an Input-output (I-O) analysis and an expenditure system (Davis et al, 2002).

b) Comparison between VCGE and neoclassical household-farm model

Davis et al (2002) mentioned about the advantage of VCGE over neoclassical household-farm (HF) model as listed below:

- VCGE captures the production and expenditure linkages among households while the HF model does not capture these issues.
- VCGE introduces the general equilibrium feedback effects while the HF model does not take the feedback effect into account.

c) Comparison between VCGE and SAM

Advantages of VCGE over SAM are mentioned below:

- VCGE captures the price effect while SAM is the fixed-price model.
- VCGE allows non-linearity in household-farm responses to policy changes while SAM assumes production with linear and fixed-proportion technologies.
- VCGE relaxes the assumption of perfectly elastic supply used in SAM by applying the family resources constraints on production.
- VCGE uses data from SAM; therefore the model captures the details of income and expenditure of household and institutions listed in SAM.

d) Comparisons of VCGE and CGE

Some of differences between VCGE and CGE are listed below:

- VCGE fixes the exchange rate equal to one. This is because the village economy is a part of a national economy. Then values of money inside and outside the village are the same. This is crucial to the explanation of the results such that normal CGE models explain their results based on the appreciation or depreciation of the exchange rate.
- Import prices are held constant because nothing in the model affects external prices.
- Savings are treated as capital export since there is no bank in the village. A normal CGE can hold savings inside the economy without the need of its export to the rest of the world.
- Tax may be ignored in the VCGE because households may have income less than a threshold to pay tax. It cannot be an exemption in a normal CGE.
- Households are a major institution in VCGE model while they are a part of many institutions in the normal CGE.
- VCGE can model both close and open economies according to the distance between a village and the nearest city. If the village is isolated, the model of close economy can be applied. Otherwise, if the village trades heavily with the city, it can be modeled as a small open economy. This is different from normal CGE such that the CGE is actually used for open economy because a nation usually trades with the world.

e) Limitations of VCGE

There are limitations of VCGE as follows:

- The most important criticism upon VCGE is related to data and parameter values. There are many problems related to consistency, reality and adequacy of data in a village economy.
- VCGE cannot model the long-run process of development because it cannot predict the inter-temporal change of economic structure.

f) Programming the VCGE

The study constructs a VCGE model by adopting a CGE model in Matlab written by Prof. Johannes Broecker, University of Kiel, Germany. The program was based on the Shoven-Whalley model of a small open economy.

The advantage of modeling VCGE in Matlab is that it is flexible for various kinds of shocks. It needs not to write a new program from the first line when a new shock is presented. It requires only a modification in the front layer. Moreover, it is transparent such that its process can be traced step by step.

The disadvantage is the complexity of layers in the program. It adopts many shortcut commands. Even the commands are transparent, they are clarified in other files. Researchers need to trace the files and learn each of them.

7.3.2 Settings of the models

To conduct the analysis with VGE model, the data in SAM are rearranged into five matrices to satisfy the settings of a small open economy model. The matrices are as follows:

Matrix 1: Payment matrix
Matrix 2: Income matrix
Matrix 3: Capital Export matrix
Matrix 4: Indicator of payment in domestic markets
Matrix 5: Indicator of income from domestic markets
Matrix 6: Transfers to household
Matrix 7: Factor exports

In the model, there are 14 activities. Each sector produces only one product. Apart of tourism, construction and plants, every sector sells their products both in markets inside and outside the village.

All three tourism activities which are homestay, core tourism and tourism-induced sector are combined into one sector. This is because these activities are bundled in the sense that their sizes should go on the same direction. I used to model these sectors as separated sectors. The

results were not good such that the size of tourism-induced sector went up sharply when the size of core tourism went down and almost faded from the economy. This is unreasonable because core tourism is pre-requisite of tourism-induced sector. Souvenir cannot be sold without tourists visiting the village. The village is not a marketplace of just the handicraft. Therefore, a better way to do the model is to include all tourism activities into only one sector.

Klasen (1990) added a transportation sector to differentiate local price of goods in the village and the price in the city. However, this study includes the transportation cost in a form of gasoline import. This is because villagers drive their own vehicles to buy goods in markets outside the village. Moreover, gasoline cannot be produced in the village. Therefore for a firm, the total cost of production is the sum of the price of goods plus the cost of gasoline. For a household, gasoline is considered as a part of its consumption.

Passenger transportation is assigned to be another set of activities. It is divided into two activities, school bus for only students and general passenger transportation which serves general needs for transportation, e.g. taking patients to hospitals. Transportation for tourists is included in core tourism.

Households are classified in to 5 groups according to their income quintile. Household income is decomposed into 4 sources. They are wage from being hired labor, rent, retained value added, and transfers.

The transfers to households are fixed. Factor exports are also fixed. Exchange rate is fixed to unity. However, capital export is flexible. The allocation of capital export to households is fixed to a ratio as appears before the shock.

CES production function is assumed in the model. This is to let the ratio of inputs of production flexible. There are two reasons for this flexibility. First, the production is not restricted by a certain formula. A big machine which requires fixed ratio of inputs is unlikely to take part in the production. Second, the decision to produce goods relies heavily on the owner of the firm. The response to the relative price change can be fast because of the short decision process.

Elasticity of substitution which affects the switching between inputs that a firm needs for its production is assumed to be one for all firms and households. Elasticity of transformation which affects the switching between markets that a firm sells its output is assumed to be 1.2 for all firms. The elasticity of substitution is set to be 1 because it will make the CES production function to be Cobb-Douglas production function which is easier for the calculation. Moreover, the elasticity of transformation is greater than the elasticity of substitution because the selling of outputs is more sensitive to output prices than the buying of inputs. However, this study performs the sensitivity analysis by varying the elasticities of substitution to be 0.8, 1.0 and 1.2 and the elasticities of transformation to be 0.8, 1.0 and 1.2. Nine combinations are modelled to investigate the differences that might be occurred by the different numbers of elasticities.

7.3.3 Simulations

The simulations are divided into two parts. The first part will conduct the simulation under fixed labor endowment. The second part will conduct the simulation under expandable labor endowment.

a. Simulation under fixed labor endowment

In the first simulation, it is assumed that households want to keep a certain portion between working hours and leisure. They are not willing to spend more time to work. Their labor utilization may not be at the full employment. Thus, it is the condition of fixed labor endowment. By this fixed underemployment rate, the model assumed that when tourism sector expands all new labors that enter tourism sector must switch from other sectors. Table 7.1 presents the underemployment rate of each quintile.

Table 7.1: Underemployment rate in each quintile in 2007.

Quintile	Underemployment rate
The poorest	57.69
The second poorest	42.92
The middle	33.67
The second richest	42.75
The richest	12.01
The whole village	37.81

Source: survey

The underemployment rate of the whole village was 37.81 percent in 2007. The richest quintile had the least underemployment rate, 12.01 percent. The poorest quintile had the largest underemployment rate, 57.69 percent, which was almost 5 times larger than the rate of the richest quintile.

The counterfactual of the simulation is the tourism price growth which is divided into two parts, the expansion and the recession of tourism sector. For the expansion phase, the price growth of 10, 20, 30, 40, 50, 60, 70, 80, 90 and 100 percent will be shocked. For the recession phase, the price growth of -10, -20, -30 and -35 percent will be simulated. The price growth beyond -35 percent will make the tourism sector faded from the economy as its output will approach zero. The price growth beyond 100 percent is quite impossible to occur in the near future. Therefore, the only meaningful range of tourism price growth is from -35 percent to 100 percent.

b. Simulation under expandable labor endowment

When tourism sector expands, it is possible that households use their free time to join the sector without switching from other sectors. The simulation, thus, mimics the situation that the expansion of labors in tourism sector is fully supplied by the unused labor endowment of the village.

The expansion of labor which is needed to supply to tourism sector is calculated by the tangent of Cobb-Douglas production function and the relative input price ratio. The formation of the Cobb-Douglas production function is stated below:

$$Q = K^{0.5083} L^{0.4917}$$

where

Q = output of tourism sector

K = commodities inputs

L = labor input in terms of household labor.

The numbers to the power of K and L represent the share of commodities input and labor input in terms of their values in the total output value. In the model, there is no capital input and hired labor input used in tourism sector. Therefore, all labors in the sector are household labors.

The relative input price ratio can be calculated by the ratio of weighted average labor return to the weighted average input price. The weighted average labor return is the average return across all household quintiles that participate in tourism sector. The weighted average input price is the average price of all inputs that are used by tourism sector. In the base case, both prices are normalized to be 1. Therefore the relative price is 1. In various simulations, the changes of the prices of commodities as well as the return of household labors, measured by retained value added in household (RVA), can be observed. Then the relative price ratio can be recalculated.

The expansion or reduction of labors in the whole village according to the expansion or reduction of tourism demand is shown in table 7.2. The model will add the labor endowment to the village economy just the number that is needed by tourism sector. The model does not add labor to all sectors but just sufficient to the expansion of only tourism sector. When all the additional labors join tourism sector, there will be no switching of labor from other sectors to tourism sector.

However, by the limitation of this VCGE model, it cannot add the endowment directly to tourism sector. It needs to shock the labor endowment of the whole village. Therefore, the additional number of labor in tourism sector must be recalculated to be the additional labor of the whole village before the shock. The expansion of labor in the whole village is calculated by these following steps.

Step 1: Calculate the retained value-added in households (RVA) of tourism sector in each case by the multiplication of the base value and the expansion rate of labor in tourism sector. The base value in 2007 was 815,992 Baht.

Step 2: Base on the RVA of the whole village in 2007 which was 6,184,451 Baht, use the incremental labor in tourism sector to calculate the expansion rate of labor endowment of the whole village.

In the second simulation, these particular expansions of labor endowment of the whole village will be shocked to the village economy.

Table 7.2: The expansions of labor in tourism sector according to various levels of tourism prices.

Growth of tourism price (%)	Growth of tourism output (%)	The expansions of labor in tourism sector (%)	The expansion of labor in the village (%)
-35	-99.99	-19.41	-2.56
-30	-98.37	-18.22	-2.40
-20	-55.23	-9.95	-1.31
-10	-19.75	-4.24	-0.56
0	0.00	0.00	0.00
10	12.33	3.22	0.42
20	22.89	6.10	0.80
30	31.17	7.94	1.05
40	38.63	9.14	1.21
50	45.71	9.91	1.31
60	52.88	10.34	1.36
70	60.23	10.54	1.39
80	67.86	10.58	1.40
90	75.97	10.50	1.39
100	84.60	10.33	1.36

Source: Calculation

For the concern of the limit of labor supplies, it should be noted that the highest rate of labor expansion is 1.40 percent. This number is smaller that the lowest underemployment rate which is 12.01 percent, i.e. the rate of the richest quintile (table 7.1). Therefore, it is possible that the labor expansion can be supplied by all household quintiles.

7.4 Specification of VCGE model

John Shoven and John Whalley (1972) firstly introduced a framework of CGE. Their model is called Shoven-Whalley model. Its major assumptions are the constant return to scale and perfect competition.

The model was originally designed for a closed-economy. It can be extended to a small open economy model by applying Armington assumption. Armington (1969) assumes that products traded internationally are differentiated on the basis of their country of origin. Therefore, goods produced domestically and imported from the rest of the world are not

perfectly substituted. This assumption allows the model to treat imported goods separately as another set of products.

The brief explanation of Shoven-Whalley model is shown step by step as follows:

Step 1: Optimization of production

The model works with F firms, H Households and M markets (commodities market, labor markets and capital markets). A firm seeks for an optimal quantity to find its maximized profit. A household seeks for the maximized utility under a budget constraint. A market seeks for a price to clear the market.

Given,

f is a firm

x_f is a production quantity of the firm

a_{if} is input from market i required for a production of 1 unit of output. Thus all inputs from market i for the production of x_f units equal to $a_{if} x_f$.

b_{jf} is output sold in market j which is transformed by one unit of x_f . Thus all the products sold in market j which are transformed by x_f units of outputs equal to $b_{jf} x_f$.

c_f is cost of production of 1 unit of output.

p is price of one unit of input and also one unit of output.

a is quantity of inputs.

$F_f(a)$ is a production function using inputs equal to a units.

The cost function is defined as follows:

$$c_f(p) = \min_a \left\{ p \cdot a \mid F_f(a) = 1 \right\}$$

Given that the production function, $F_f(a)$ is concave and homogeneous at degree one which yields only one unique solution, it is possible to apply Hotelling-Shepard-lemma to find an optimal quantity of inputs needed for the production of one unit of output.

$$\frac{\partial c_f(p)}{\partial p_i} = a^* = a_{if}$$

The application of Hotelling-Shepard-lemma helps the CGE modeling bypass the deal with production function $F_f(a)$ because the quantity of output is already optimal.

The revenue function is defined as follows:

$$r_f(p) = \max_b \left\{ p \cdot b \mid T_f(b) = 1 \right\}$$

$T_f(b)$ is the Transformation function of instant product b to be in a form of original output of x_f .

When the transformation function is convex and homogeneous at degree one, applying Hotelling-Shepard-lemma yields the following result.

$$\frac{\partial r_f(p)}{\partial p_i} = b^* = b_{jf}$$

This is again the optimal quantity of instant products.

Step 2: Optimization of consumption

The expenditure function is defined as follows:

$$e_h(p, u_h) = \min_d \left\{ p \cdot d \mid U_h(d) \geq u_h \right\}$$

When $U_h(d)$ is a utility function which is quasi-concave and has a unique solution, applying Hotelling-Shepard-lemma yields an optimal quantity of consumption of a commodity.

$$d_{ih} = \frac{\partial e_f(p, u_h)}{\partial p_i}$$

Step 3: General equilibrium

Assuming the perfect competition, a firm seeks for an optimal quantity of output, x_f , which yields the maximized profit which is zero profit in this case.

$$r_f(p) - c_f(p) = 0$$

A household needs to seek for the maximized utility, u_h , under a budget constraint.

$$e_h(p, u_h) - E_h \cdot p = 0$$

A market needs to find optimal prices, p , to make the market clear.

$$\sum_f x_f \left(b_{jf} - a_{if}\right) = \sum_h \left(d_{ih} - E_{ih}\right)$$

Step 4: Specification of functions

In this study, the cost function is defined as a CES function.

$$c_f^{1-\sigma_f} = \sum_i \alpha_{if} p_i^{1-\sigma_f}$$

Under an assumption that the elasticity of substitution is equal or greater than zero, $\sigma_f \geq 0$, it yields the following result.

$$a_{if} = \alpha_{if} \left(\frac{p_i}{c_f}\right)^{-\sigma_f}$$

α_{if} is called a shift parameter.

It also specifies the revenue function as a CES function.

$$r_f^{1+\eta_f} = \sum_j \beta_{jf} p_j^{1+\eta_f}$$

When the elasticity of transformation is equal or greater than zero, $\eta_f \geq 0$, it yields the following result.

$$b_{jf} = \beta_{jf}\left(\frac{p_i}{r_f}\right)^{\eta_f}$$

An expenditure function is specified as follows:

$$e_h = u_h \pi_h$$

π_h is called the price index. It is an expenditure that yields a certain level of utility.

u_h is the level of utility.

The price index is also specified as a CES function. It is named the price index because it contains p inside.

$$\pi_h^{1-\mu_h} = \sum_i \gamma_{ih} p_i^{1-\mu_h}$$

Given the elasticity of substitution is equal or greater than zero, $\mu_h \geq 0$, it yields the following equation.

$$d_{ih} = u_h \gamma_{ih}\left(\frac{p_i}{\pi_h}\right)^{-\mu_h}$$

It is interesting to see that γ_{ih} is another shift parameter which can be written as follows:

$$\gamma_{ih} = \frac{d_{ih}^0}{\left(e_h^0\right)^{\mu_h}}$$

In this equation, if the elasticity of substitution equals to one, then the shift parameter, γ_{ih} , means the ratio of consumption of commodity i to total consumption of the household.

$$\gamma_{ih} = \frac{d_{ih}^0}{e_h^0} \qquad ; \mu_h = 1$$

γ_{ih} is an adjustment mechanism in the expenditure function. The benefits of γ_{ih} can be seen in an equation of price index,

$$\pi_h^{1-\mu_h} = \sum_i \gamma_{ih} p_i^{1-\mu_h}$$

Assume $\mu_h = 0$, it yields $\gamma_{ih} = d_{ih}^0$. Then the price index will be simplified as follows:

$$\pi_h = \sum_i d_{ih}^0 p_i$$

Therefore, the price index simply refers to the total value of initial consumption.

Step 5: Calculation of utility

Initial utility is normalized to one. It is the summation of total consumption of households. Utility is produced by consumption like a commodity. In this step, it begins to show that the first equation can be rewritten as the second equation.

$$d_{ih} = u_h \gamma_{ih} \left(\frac{p_i}{\pi_h} \right)^{-\mu_h}$$

$$\frac{d_{ih}}{u_h} \left(\frac{p_i}{\pi_h} \right)^{\mu_h} = \gamma_{ih}$$

Assume $\mu_h = 0$, it also yields $\gamma_{ih} = d_{ih}^0$. It will simplify the equation as follows:

$$\frac{d_{ih}}{u_h} = d_{ih}^0$$

Given the initial utility level as one, $u_h^0 = 1$, it can be shown that the ratio of utility in two situations can be calculated by the ratio of total consumptions as follows. It needs no utility function at all in the calculation of utility. This is possible when assuming the homothetic preference and constant budget share.

$$\frac{d_{ih}}{d_{ih}^{0}} = \frac{u_h}{u_h^{0}}$$

In the study, the utility represents the real income. This is because the relative utility between the simulation and the base case is the comparison of quantity of commodities consumed by households between the simulation and the base case as well.

7.5 The measurements

This section will reveal the measurements of some important numbers.

7.5.1 The growth of tourism price

The growth of tourism price is determined by the shift of the tourism demand which is assumed to be perfectly elastic (Figure 7.2). When the demand goes up, the price goes up at the same rate. This is possible because it is assumed that the village economy is a small open economy. It is a price taker because of the competition among villages that offer community-based tourism all over the country.

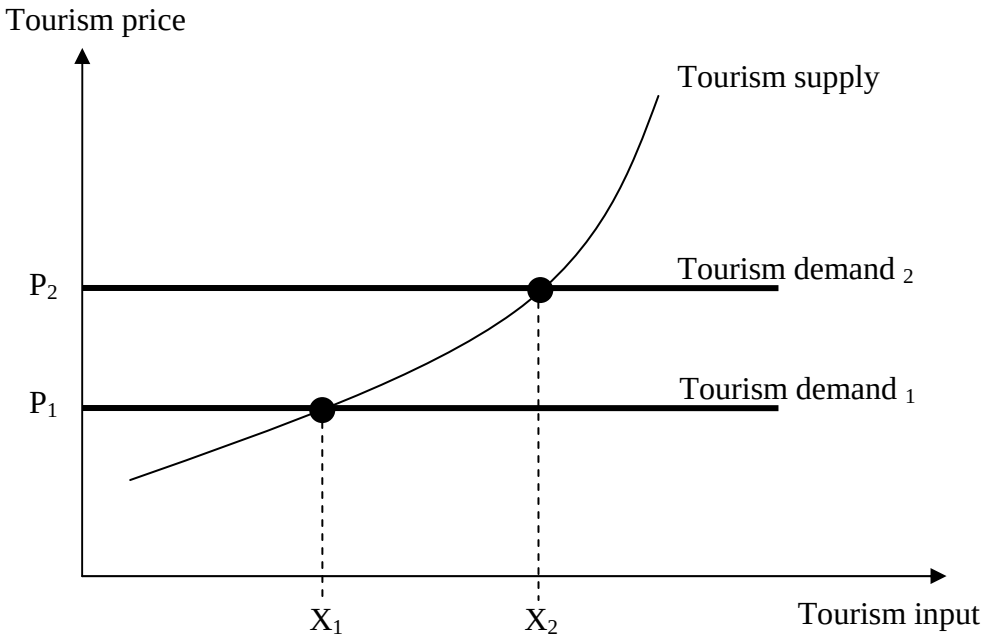


Figure 7.2: The shock on tourism demand and its price

7.5.2 The growth of tourism output

Assuming the CES production function, the supply of tourism is a non-linear function. Tourism output is determined by the demand and supply of the sector. It cannot be guaranteed that tourism output and tourism price will change at the same rate.

7.5.3 The growth of tourism value

Tourism value is calculated by the product of tourism price and tourism output. Its growth is measured compared to the base case where both tourism price and tourism output are normalized to one.

7.5.4 Income multiplier

Income multiplier is defined as follows:

$$M = \frac{\sum_{i=1}^{14} \Delta(P_i Q_i) + \sum_{j=1}^{5} \Delta V_j}{S}$$

where

M	=	Income multiplier
$\Delta(PQ)$	=	Change of production value
ΔV	=	Change of value added
S	=	Value of shock in tourism revenue
i	=	Production sectors
j	=	Household quintiles

7.5.5 Value-added multiplier

Value-added multiplier is defined as follows:

$$A = \frac{\sum_{j=1}^{5} \Delta V_j}{S}$$

where

A	=	Value-added multiplier
ΔV	=	Change of value added
S	=	Value of shock in tourism revenue
j	=	Household quintiles

7.5.6 Direct effect, indirect effect and total effect

Direct effect is the value of the shock of tourism revenue that is added to or deducted from the economy. Indirect effect is the change of production value plus the change of value-added. To avoid double counting in tourism sector, indirect effect is counted only as the change of tourism value which exceeds the shocking value. Total effect is direct effect plus indirect effect.

7.5.7 Real income

Real income is the quantity of commodities consumed by households. It is measured by the so called utility index which is presented in step 5 of section 7.4. The comparison of the utilities between the simulation and the base case will be translated into the comparison between the levels of real income between both situations.

7.6 Results

The results are divided into three parts. First it will highlight the impact of tourism expansion and recession under the assumption of a fixed labor endowment. Second, it will show the impacts under an expandable labor endowment. Last, it will present the sensitivity analysis of elasticities of substitution and elasticities of transformation.

7.6.1 Impact of tourism expansion and recession under the assumption of fixed labor endowment

In this section, it will begin with the result of the simulation on tourism output and value. Then it will show the multipliers. After that it will reveal the effects on prices and values of other sectors. Finally, it will highlight the distribution of tourism benefit to each household quintile.

a. The effects on tourism output and value

Tourism sector will vanish from the village economy when its price falls around 35 percent (Table 7.3). The decline of output is faster than the price drop. When the price drops 10percent, tourism output will decline 19.75percent. The output will drop more than half after the price goes down only 20 percent.

Table 7.3: The effects on tourism output and value in the simulation of various tourism prices under a fixed labor endowment.

Growth of tourism price (%)	Growth of tourism output (%)	Growth of tourism value (%)
-35	-99.99	-99.99
-30	-97.67	-98.37
-20	-55.23	-64.18
-10	-19.75	-27.78
0	0.00	0.00
10	12.33	23.56
20	22.89	47.47
30	31.17	70.52
40	38.63	94.08
50	45.71	118.57
60	52.88	144.61
70	60.23	172.39
80	67.86	202.15
90	75.97	234.34
100	84.60	269.20

Source: Simulation

Within the range of 10 to 30 percent of the price growth, tourism output rises faster than the price. After that, it still blows up continuously but at a slower pace.

The value of tourism sector will grow more than 100 percent when the price rises 50 percent. It will reach 200 percent when the price shoots to 80 percent.

b. Income multiplier and value added multiplier

The income multipliers range from 5.34 to 6.88 (Table 7.4). For the expansion phase, they range from 5.34 to 6.63 when the model varies the price growth from 10 to 100 percent. For the recession phase, the multipliers range from 5.93 to 6.88 when the price growth drops from 10 to 35 percent.

The value-added multipliers range from 0.03 to 2.16. For the expansion phase, they range from 1.28 to 2.16. They grow continuously along with the price growth. For the recession phase, the multipliers range from 0.03 to 1.02.

Table 7.4: Income multiplier and value added multiplier in the simulation of various tourism prices under a fixed labor endowment.

Growth of tourism price (%)	Income multiplier (times)	Value added multiplier (times)
-35	6.13	0.03
-30	6.88	0.11
-20	6.57	0.82
-10	5.93	1.02
10	5.41	1.28
20	5.40	1.40
30	5.34	1.52
40	5.35	1.64
50	5.45	1.74
60	5.62	1.84
70	5.84	1.93
80	6.08	2.01
90	6.35	2.09
100	6.63	2.16

Source: Simulation

c. Effects on other sectors

The expansion of tourism sector leads to the shrinkage in agricultural sectors such as tea and coffee. Service sector is negatively affected by the expansion of tourism too. Sectors that positively benefit from tourism are livestock, commerce pillow and construction.

The recession of tourism sector does not yield positive benefit to agricultural sectors. Tea and coffee will face the recession too. Sectors that supply inputs to tourism are badly affected. Commerce and pillow are shrunk. Construction also faces the recession. In contrast, livestock and service sectors enjoy positive benefits from the fall of tourism.

Table 7.5: The effects on commodities and services' values from the simulation of various tourism prices under a fixed labor endowment.

Growth of tourism price (%)	Growth of tea value (%)	Growth of coffee value (%)	Growth of livestock value (%)	Growth of commercial value (%)	Growth of service value (%)	Growth of pillow value (%)	Growth of construction value (%)
-35	-15.01	-14.94	48.56	-17.72	75.94	-90.47	0.02
-30	-13.05	-13.20	44.51	-16.73	77.35	-83.29	-2.51
-20	-1.86	-2.50	12.99	-7.87	38.14	-34.97	-6.89
-10	0.07	-0.40	2.48	-2.92	11.21	-10.64	-3.83
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	-0.77	-0.51	1.60	1.89	-3.88	7.33	3.13
20	-1.64	-1.36	7.06	3.51	-7.96	14.95	5.85
30	-2.83	-2.72	14.02	4.76	-12.74	23.30	7.88
40	-3.95	-4.10	21.08	6.05	-18.68	32.51	9.39
50	-4.76	-5.23	28.14	7.57	-22.61	42.45	10.52
60	-5.14	-5.98	34.53	9.46	-25.30	53.52	11.22
70	-5.10	-6.32	40.41	11.74	-27.50	65.68	11.59
80	-4.65	-6.26	45.85	14.40	-29.52	78.97	11.67
90	-3.77	-5.79	50.50	17.50	-31.65	93.69	11.45
100	-2.45	-4.90	54.01	21.02	-33.88	109.90	10.93

Source: Simulation

d. Real income and distribution of tourism benefit

The richest quintile is the top gainer of real income. When tourism price is doubled, they are better-off by 74.86 percent. They lose slightly when tourism price drops by 10 to 20 percent. After that, they become net gainers again when tourism fades from the economy.

The second richest quintile is the second top gainer of tourism benefit. Their real income increases 26.15 percent when tourism price is doubled. Their benefit is only one-third of the benefit that goes to the richest quintile. When tourism faces the recession, they lose slightly.

The middle quintile is the fourth top gainer of tourism benefit. Although they do not experience negative effect when tourism is boosted, the growth of real income is less than the poorest quintile's. Their real income increases 7.41 percent when tourism price is doubled. It is just around one-tenth of the benefit that goes to the richest. When tourism faces the recession, they are worse-off.

Table 7.6: The effects on real income from the simulation of various tourism prices under a fixed labor endowment.

Growth of tourism price (%)	Growth of real income of the poorest quintile (%)	Growth of real income of the second poorest quintile (%)	Growth of real income of the middle quintile (%)	Growth of real income of the second richest quintile (%)	Growth of real income of the richest quintile (%)
-35	-0.94	-6.31	-4.33	0.41	7.38
-30	-0.09	-5.15	-3.53	0.05	5.55
-20	1.55	0.46	-0.09	-1.79	-4.78
-10	0.54	0.42	-0.04	-1.26	-3.52
0	0.00	0.00	0.00	0.00	0.00
10	-0.29	-0.53	0.10	1.59	4.79
20	-0.47	-0.88	0.27	3.51	10.42
30	-0.35	-1.38	0.44	5.70	17.20
40	0.20	-1.86	0.74	8.15	24.65
50	1.20	-2.23	1.21	10.80	32.53
60	2.72	-2.42	1.93	13.61	40.64
70	4.73	-2.40	2.91	16.57	48.98
80	7.18	-2.14	4.14	19.66	57.51
90	9.93	-1.63	5.64	22.85	66.14
100	12.81	-0.86	7.41	26.15	74.86

Source: Simulation

The second poorest quintile is the loser when tourism is expanded. Their real income drops around 1 percent when tourism price is doubled. They are slightly better-off when tourism price drops around 10 to 20 percent. When tourism is fading from the economy, they become worse-off again.

The poorest quintile is the third top gainer of the tourism benefit. Their real income rises 12.81 percent when tourism price is doubled. They seem to be worse-off when tourism is starts to expand. Their real income drops around 0.30 – 0.50 percent when tourism price increases around 10 to 30 percent. After tourism price growth reaches 40 percent, the poorest quintile starts to be better-off. They are also better-off when tourism faces the beginning of recession. However, when tourism fades from the economy, they become worse-off again.

7.6.2 Impact of tourism expansion and recession under the assumption of expandable labor endowment

a. The effects on tourism output and value

The results in the second simulation are almost similar to the results in the first simulation. Tourism output almost vanishes when its price falls around 35 percent (Table 7.7). The output growth is larger than the price growth when the price rises between 10 to 40 percent. After that, the output growth is smaller than the price growth.

Table 7.7: The effects on tourism output and value in the simulation of various tourism prices under an expandable labor endowment.

Growth of tourism price (%)	Growth of tourism output (%)	Growth of tourism value (%)
-35	-99.96	-99.97
-30	-97.77	-98.44
-20	-56.59	-65.27
-10	-20.35	-28.32
0	0	0
10	12.89	24.18
20	23.76	48.51
30	32.87	72.73
40	40.86	97.20
50	48.39	122.59
60	55.67	149.07
70	63.17	177.39
80	70.84	207.51
90	79.15	240.39
100	87.59	275.18

Source: Simulation

The value of tourism grows a little bit faster than in the first simulation. It is 97.20 percent as tourism price goes up 40percent compared to 94.08 percent in the first simulation (Table 7.3). It reaches 200 percent when the price climbs up 80 percent.

b. Income multiplier and value added multiplier

The income multipliers under expandable labor endowment are larger than those in the simulation under fixed labor endowment. They range from 5.78 to 7.62 (Table 7.8). For the expansion phase, the multipliers range from 5.78 to 6.86. The comparison between these numbers and income multipliers in the first simulation which range between 5.34 and 6.63 in

the expansion phase indicates that the additional labor endowment does not affect the economy much.

The value-added multipliers range from 0.03 to 2.16. In the expansion phase, they are between 1.28 and 2.16. According to the first simulation where the multipliers also range from 1.28 to 2.16 with some differences at the third digits, the expansion of labor endowment does not affect the value-added multiplier much.

Table 7.8: Income multiplier and value added multiplier in the simulation of various tourism prices under an expandable labor endowment.

Growth of tourism price (%)	Income multiplier (times)	Value added multiplier (times)
-35	6.78	0.03
-30	7.62	0.10
-20	7.30	0.80
-10	6.57	1.02
10	5.92	1.28
20	5.91	1.40
30	5.82	1.52
40	5.78	1.63
50	5.85	1.74
60	5.97	1.84
70	6.15	1.93
80	6.36	2.01
90	6.61	2.09
100	6.86	2.16

Source: Simulation

c. Effects on other sectors

In the tourism expansion phase, agriculture such as tea and coffee are shrunk. The service sector is another one that faces recession. However, those sectors which enjoy positive impacts in the first simulation still gain the positive impacts in the second simulation. The value of livestock, commerce, pillow and construction rise along with the growth of tourism sector.

In the recession phase, the results are still similar to those in the first simulation. Tea, coffee, commerce, pillow and construction are shrunk. Livestock and service gain the positive impacts from the fall of tourism.

Table 7.9: The effects on commodities and services' values from the simulation of various tourism prices under an expandable labor endowment.

Growth of tourism price (%)	Growth of tea value (%)	Growth of coffee value (%)	Growth of livestock value (%)	Growth of commercial value (%)	Growth of service value (%)	Growth of pillow value (%)	Growth of construction value (%)
-35	-17.01	-16.96	45.58	-19.69	72.93	-90.61	-3.05
-30	-15.22	-15.39	42.18	-18.73	74.03	-83.78	-5.04
-20	-3.31	-3.93	12.51	-9.20	37.07	-36.36	-8.29
-10	-0.51	-0.99	2.20	-3.49	10.59	-11.20	-4.44
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	-0.35	-0.09	1.82	2.33	-3.41	7.82	3.59
20	-0.87	-0.60	6.71	4.32	-6.55	16.08	6.53
30	-1.75	-1.63	13.73	5.92	-11.36	25.00	8.85
40	-2.67	-2.84	20.91	7.44	-17.29	34.64	10.56
50	-3.35	-3.85	27.77	9.13	-21.32	45.08	11.77
60	-3.71	-4.56	34.52	11.07	-23.73	56.26	12.60
70	-3.64	-4.88	40.45	13.41	-25.83	68.62	13.02
80	-3.19	-4.83	46.08	16.11	-27.75	82.05	13.16
90	-2.30	-4.34	50.14	19.27	-29.96	97.08	12.87
100	-1.04	-3.51	54.24	22.76	-32.11	113.19	12.40

Source: Simulation

d. Real income and distribution of tourism benefit

The results repeat those in the first simulation. The richest quintile is still the top gainer of tourism benefit. The second richest quintile is the second top gainer. The poorest is the third top gainer. The middle is the fourth top gainer while the second poorest is the loser in most cases of the simulation.

Table 7.10: The effects on real income from the simulation of various tourism prices under an expandable labor endowment.

Growth of tourism price (%)	Growth of real income of the poorest quintile (%)	Growth of real income of the second poorest quintile (%)	Growth of real income of the middle quintile (%)	Growth of real income of the second richest quintile (%)	Growth of real income of the richest quintile (%)
-35	-1.83	-7.64	-6.66	-2.31	3.19
-30	-1.13	-6.61	-5.85	-2.45	1.95
-20	0.95	-0.44	-1.41	-3.09	-6.50
-10	0.29	0.05	-0.59	-1.84	-4.30
0	0.00	0.00	0.00	0.00	0.00
10	-0.11	-0.26	0.53	2.04	5.42
20	-0.09	-0.44	1.09	4.36	11.69
30	0.12	-0.73	1.55	6.85	18.83
40	0.71	-1.07	2.04	9.52	26.58
50	1.72	-1.36	2.65	12.32	34.67
60	3.23	-1.51	3.43	15.25	42.99
70	5.25	-1.46	4.46	18.30	51.48
80	7.73	-1.19	5.72	21.46	60.15
90	10.41	-0.67	7.25	24.70	68.83
100	13.42	0.09	8.99	28.01	77.64

Source: Simulation

7.6.3 Sensitivity analysis of elasticity of substitution and elasticity of transformation

The sensitivity analysis conducts simulations under 9 assumptions according to different elasticities of substitution (EOS) and elasticities of transformation (EOT). The nine cases are as follows:

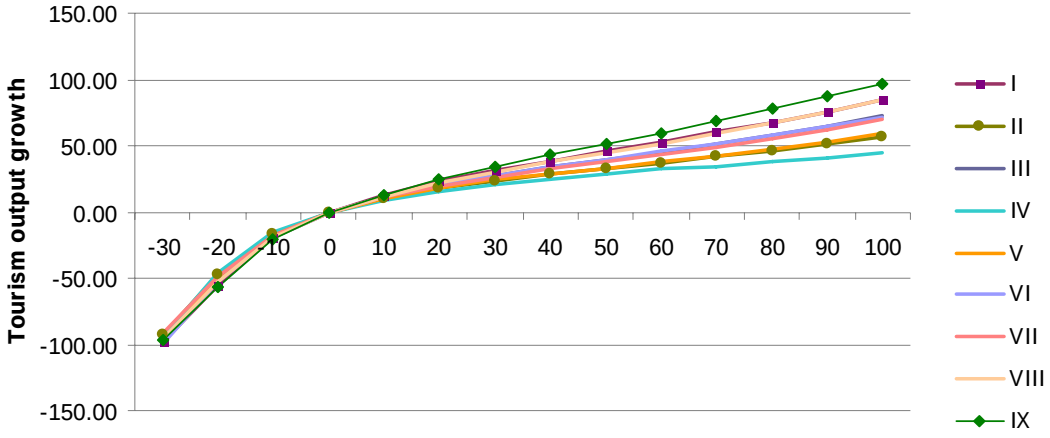
Case I (base case):	EOS = 1	EOT = 1.2
Case II:	EOS = 1	EOT = 0.8
Case III:	EOS = 1	EOT = 1.0
Case IV:	EOS = 0.8	EOT = 0.8
Case V:	EOS = 0.8	EOT = 1.0
Case VI:	EOS = 0.8	EOT = 1.2
Case VII:	EOS = 1.2	EOT = 0.8
Case VIII:	EOS = 1.2	EOT = 1.0
Case IX:	EOS = 1.2	EOT = 1.2

This section will illustrate the results from all simulations (figure 7.3 to 7.6). The details of the results are shown in annex 11.

a. The growth of tourism output

All the simulations give almost the same results when tourism sector are in the recession phase. Differences among results are larger when tourism price gets higher. The range of the differences is quite wide when tourism price is doubled. Model IX, EOS equals to 1.2 and EOT equals to 1.2, predicts that tourism input will expand almost 100 percent. In the same simulation, model IV with EOS equals to 0.8 and EOT equals to 0.8 predicts the lowest growth of output which is below 50 percent. The base case, model I with EOS equals to 1 and EOT equals to 1.2 predicts the second highest growth of the input which is around 85 percent (table 7.3).

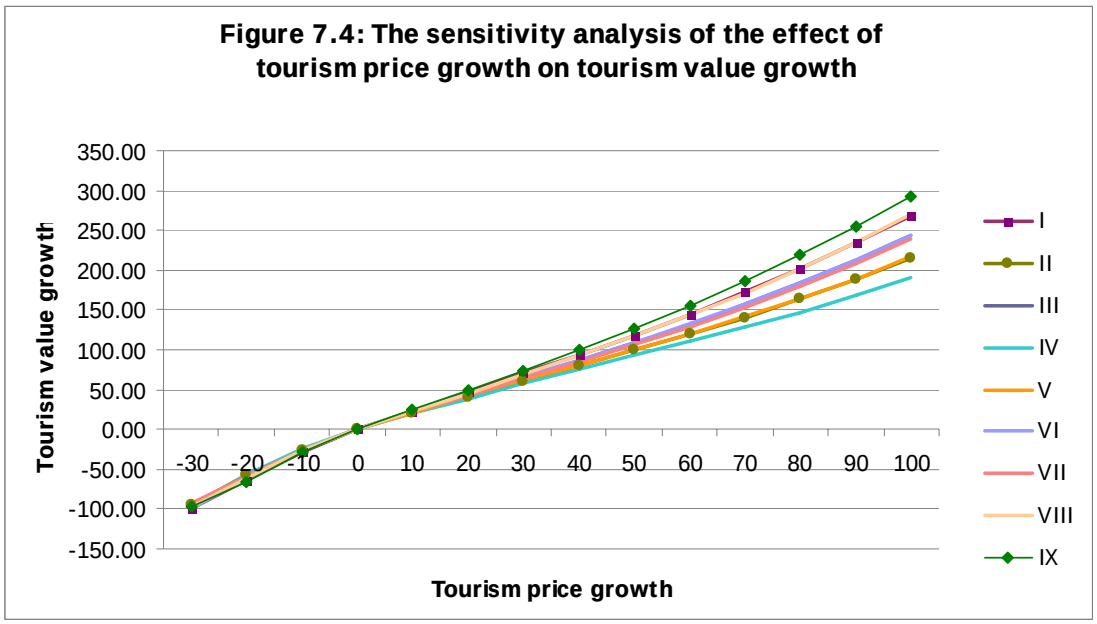
Figure 7.3: The sensitivity analysis of the effect of tourism price growth on tourism output growth



b. The growth of tourism value

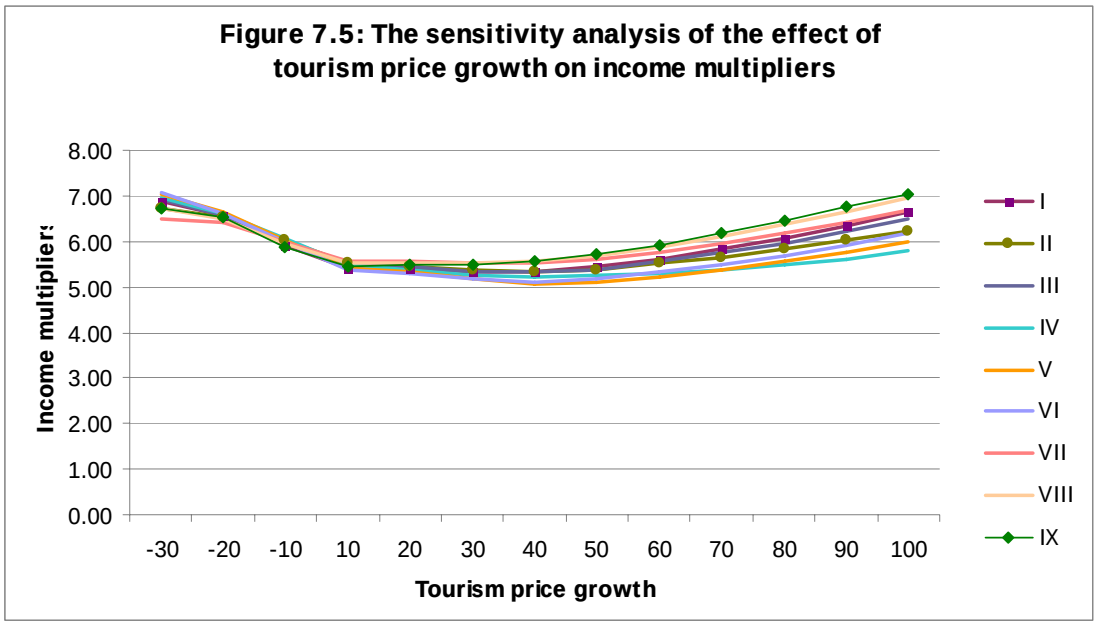
The results of the sensitivity analysis for the effects of tourism price growth on tourism value growth are quite alike in the previous section. All models predict quite the same results in the recession phase. The larger gap appears when tourism price goes up. Model IX predicts the

upper-bound of tourism value growth whereas model IV predicts the lower-bound. Model I predicts the second highest number which is around 269 percent. The gap between the upper-bound and lower-bound when tourism price is doubled is around 100 percentage points (table 7.4).



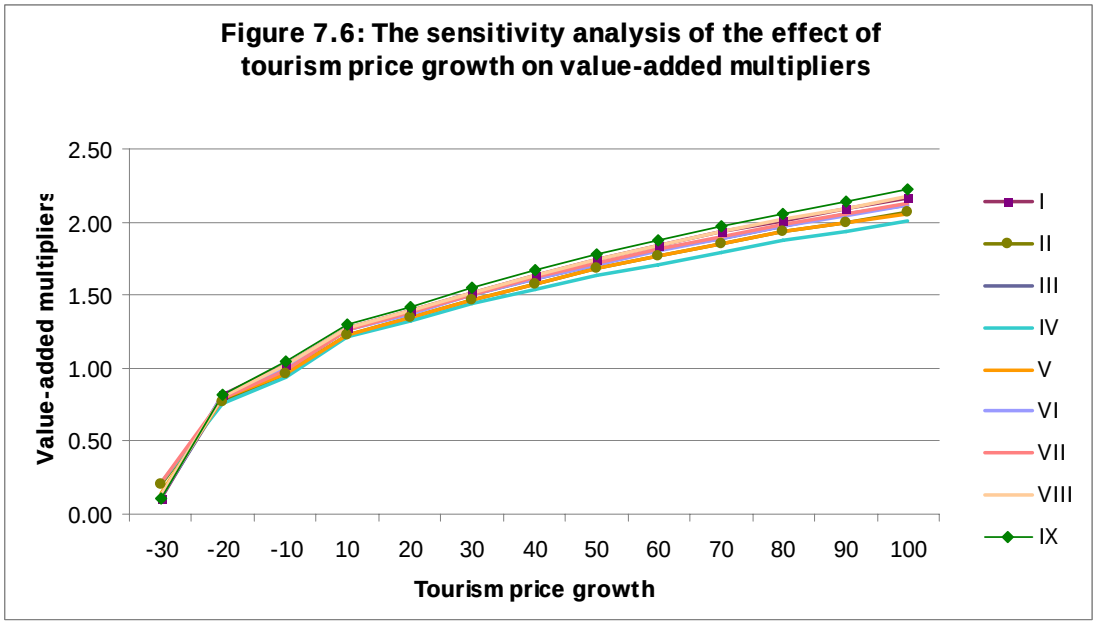
c. The income multiplier

All the models predict quite similar income multipliers. The numbers are located around 5.79 to 7.05 when tourism price is doubled. Model IX still predicts the upper-bound and model IV predicts the lower-bound. Model I predicts the result which lies in the middle of the chart (table 7.5).



d. The value-added multiplier

All the models also predict quite similar income multipliers. They range between 2.01 and 2.22 when tourism price is doubled. Model IX and model IV are still the setters of upper and lower-bound. Model I predicts the second highest value (table 7.6).



7.7 Discussion

This section will discuss five topics which are the vanishing and expansion of tourism sector, the multipliers, the dynamic of other economic sectors, the real income and the pro-poor tourism.

7.7.1 The vanishing and expansion of tourism sector

The vanishing of tourism sector is not mainly caused by the switch of labor to other sectors. It is rather because the shortage of material input. It can be seen in table 7.11 that the drop of labor is just around 19 percent when tourism output almost vanishes. At the same time, the material input falls sharply to almost 100 percent.

Material input is also the drive of the expansion of tourism output. It increases 21.89 percent when output rises 12.33 percent as tourism price goes up 10 percent. In the same setting, labor expands only 3.22 percent.

This is because material inputs share a larger portion in the cost of production. It shares around 50.83 percent when the labor shares around 49.17 percent. Even though the relative price ratio between labor input and material input is less than 1 in most of the cases (0.82 – 0.94), the expansion path is steep which means it requires much more additional material input than labor input to boost the production (Figure 7.7).

Table 7.11: The expansions of labor in tourism sector according to various levels of tourism prices.

Growth of tourism price (%)	Growth of tourism output (%)	The expansions of labor in tourism sector (%)	The expansions of material input in tourism sector (%)
-35	-99.99	-19.41	-99.99
-30	-98.37	-18.22	-99.93
-20	-55.23	-9.95	-77.23
-10	-19.75	-4.24	-32.37
0	0.00	0.00	0.00
10	12.33	3.22	21.89
20	22.89	6.10	41.64
30	31.17	7.94	58.38
40	38.63	9.14	74.71

Growth of tourism price (%)	Growth of tourism output (%)	The expansions of labor in tourism sector (%)	The expansions of material input in tourism sector (%)
50	45.71	9.91	91.39
60	52.88	10.34	109.56
70	60.23	10.54	129.44
80	67.86	10.58	151.34
90	75.97	10.50	175.97
100	84.60	10.33	203.70

Source: Calculation

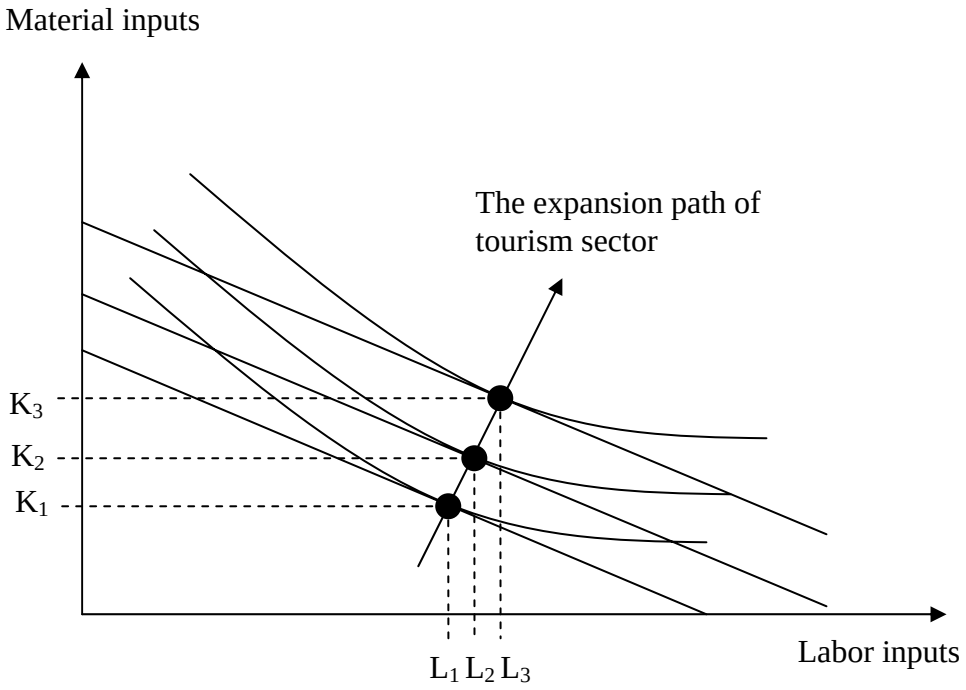


Figure 7.7: The expansion path of tourism sector

7.7.2 The multipliers

There are three points that are needed to be discussed. First, it should look at the range of income multipliers and answer whether it is accordant to the expectation of scholars. Second, it should explain why the additional labor endowment yields almost the same income multiplier as it appears in the simulation under fixed labor endowment. Last, it should also explain why the value-added multipliers locate in a narrow range.

a. The range of the income multiplier

As Mitchell and Ashley (2007) expected that the income multipliers range from 2 to 10, this study found that the income multipliers locate within the range. The multipliers in the first simulation range from 5.34 to 6.63 in the expansion phase and from 5.78 to 6.86 the second simulation.

The sources of income expansion are linked to the cost structure of tourism sector. The cost can be divided into material inputs and value-added. Material inputs share around 50.83 percent of the cost whereas value-added shares around 49.17 percent (Table 7.12). Among the material costs, inputs from commercial sector share the largest portion, 29.52 percent. Pillow shares the second largest portion, 17.36 percent. The leakage to outside the village by imported materials is small, 2.75 percent.

Table 7.12: Cost structure of tourism sector

Inputs	Share of total input (%)	
Material inputs	50.83	
Commerce		29.52
Pillow		17.36
Imported materials		2.75
Utilities		1.20
Value-added	49.17	
Total	100.00	50.83

Source: Survey

As the share of value-added in total cost is high, tourism income boosts household consumption. Commodities that are consumed domestically such as commerce and livestock are expandable.

Sectors that sell their inputs to tourism sector expand their productions. The value of production of pillow increases along with the expansion of tourism sector. Its size is doubled when tourism price is doubled (Table 7.5). Commercial sector grows 21 percent in the same situation.

b. Income multiplier under expandable labor endowment

It is as expected that the income multipliers in the simulation under the expandable labor endowment are almost as the same as those in the simulation under the fixed labor endowment. This is because the additional labor is small, just around 1 percent of the labor endowment of the whole village.

Another reason is that the additional labor is not guaranteed that they must join tourism sector. By the limitation of this VCGE model, it cannot add labor to a particular sector but to the whole village instead. It is possible that just a part of the additional labor may join tourism sector. Therefore, tourism sector is not fully boosted by additional labor.

The effects to other sectors can be viewed in two dimensions. On the one hand, other sectors are still negatively affected by the competition of attracting the labors. On the other hand, they are positively affected because it is possible for them to get additional labor to expand their outputs.

c. The value-added multiplier

The first point of discussion is that the value-added multipliers are smaller than the income multipliers. This is because value-added is a part of total effect. When an income multiplier is calculated based on total effect, a value-added multiplier is calculated based on the value-added. Therefore, the value-added multiplier is always smaller than the income multiplier.

The second point is that the value-added multipliers locate in a narrow range between 1.28 and 2.16 in the expansion phase (Table 7.4). This is because the ratio of value-added to the total effect is quite constant (Table 7.13). Therefore, when the income multiplier goes up, the value-added multiplier also goes up. Moreover, when the income multipliers locate in the narrow range, so do the value-added multipliers.

Table 7.13: Ratio of value added to the total effect

Growth of tourism price (%)	Ratio of value added to the total effect
10	0.2365
20	0.2586
30	0.2856
40	0.3067
50	0.3202
60	0.3271
70	0.3303
80	0.3311
90	0.3296
100	0.3265

Source: Simulation

The third point is that the value-added multipliers drop sharply in the recession phase. This is because value-added is destroyed heavily by the recession of the economy. When the income multipliers are around 5.93 to 6.88 in the recession phase, it means that the fall of tourism sector destroys around six times of its income in other sectors too. A positive number of the income multiplier does not mean that the reduction in tourism output will expand the output other sectors. In contrast, the number comes from the ratio of two negative numbers which indicates that other sectors are shrunk too. Therefore, the value-added in both tourism sector and other sectors drop heavily. When calculating the value-added multiplier which is the value-added to the shocking value and when the value-added approaches zero, then the value-added multiplier goes toward zero too.

7.7.3 The dynamic of other economic sectors.

There are several points to discuss in this section. First, it is curious why tea and coffee are negatively affected by both the expansion and recession of tourism. Second, it should be explained why livestock grows positively both in the expansion and recession of tourism. Third, it is interesting to know why service sector is negatively affected by tourism. Last, it should investigate why construction is positively affected by tourism even though its sales are totally sold outside the market.

a. Tea and coffee

Tea and coffee are heavily exported. Therefore, these two sectors do not gain positive benefit from domestic consumption. Even though it is exported by commercial sector, the buying sector does not grow up much enough to buy much more tea and coffee. The values of tea and coffee are also reduced a little bit because of the switching of labor to tourism sector.

In the recession phase, its sales are reduced because the sales by commercial sector drop. This is because of the drop of the commercial sector. Commercial production drops sharply when tourism sector is in the recession phase. The value drops 16.73 percent when tourism price drops 30 percent. The growth is larger than in the situation that tourism price rises 30 percent where the value rises only 4.76 percent.

b. Livestock

Around 99 percent of livestock's sales are sold directly to outside the village. Therefore, the sector does not benefit from the price change because its price is almost unchanged as it is the price taker. The output growth is the only source of positive benefit. Its production relies heavily on labor input, around 80.60 percent of total cost. The imported material shares another 19.39 percent of the cost. Only 0.01 percent of the cost goes to domestic materials. This kind of cost structure makes the sector easily absorb labor forces in the village. It can be seen that a labor can come to join the sector without the combination of other inputs. Therefore, when there are some labors which cannot be allocated to other sectors, the model put them into this sector. It can be viewed as a sector that absorbs residual labors. Consequently, its output rises in both cases when tourism are expanded or recessed.

c. Service

The service sector is a competitor of tourism sector. The cost structures of these two sectors are quite alike (Table 7.14). They compete to attract labor forces especially from the richest and second richest quintiles. They also compete to purchase material inputs from commercial sector. When the model shocks tourism revenue, it gives the priority to tourism sector to adjust the output first. Therefore, the service sector is disadvantage in the adjustment. It loses its inputs to tourism sector. Therefore, the service sector is shrunk when tourism sector is expanded. In contrast, the sector is expandable when tourism sector faces the recession.

Table 7.14: Cost structure of tourism sector

Inputs	Share of total input (%)	
	Service sector	Tourism sector
Commerce	4.93	29.52
Pillow	0.00	17.36
Imported materials	9.54	2.75
Utilities	0.06	1.20
Infrastructure	0.68	0.00
Manufacture	0.68	0.00
Value-added poorest quintile	0.64	1.76
Value-added second poorest quintile	1.53	2.63
Value-added middle quintile	7.05	4.34
Value-added second richest quintile	21.78	10.66
Value-added richest quintile	53.11	29.79
Total	100.00	100.00

Source: Survey

d. Construction

Construction benefits from the expansion of tourism because it is financed by the savings of villagers. Once the household income increases, the savings will be increased too. After that, savings will be spent back to the economy by the construction of more buildings.

7.7.4 Real income

It is obvious that the richest quintile is the top gainer of real income. This is because they gain around 61 percent of total tourism income by both direct and indirect effects (Table 7.15). The second poorest quintile is the second top gainer because they share around 20 percent of the income which is one-third of the richest.

Table 7.15: The distribution of tourism benefit to household quintiles in 2007

Quintile	Direct benefit (Baht)	Indirect benefit via the purchase of commodities from other sectors (Baht)	Total tourism benefit (Baht)	The distribution of tourism benefit (%)
The poorest	21,990	7,512	29,502	3.01
The second poorest	43,691	14,668	58,359	5.95
The middle	71,986	23,032	95,018	9.69
The second richest	176,913	23,194	200,107	20.40
The richest	494,210	103,844	598,054	60.96
Total	808,790	172,250	981,040	100.00

Source: Survey

The points that are needed to be discussed are at the benefits of the middle, second poorest and poorest quintiles. As it can be seen from Table 7.15 that the poorest quintile shares the least nominal income from tourism sector, it is doubtful why they can be the third top gainer in terms of real income. Moreover, it is still unobvious why the second poorest quintile is the loser even in the situation of tourism expansion. To answer these questions, it may be useful to look at major sources of household income.

The poorest quintile gain 58.50 percent of their income from tea, 19.35 percent from construction and 10.61 percent from tourism (Table 7.16). The tea price will rise around 29.90 percent when tourism price is doubled (Table 7.17). However, it cannot compensate the consumers' price which rises around 49.82 percent.

Fortunately, tourism price is high enough to compensate consumers' price. The growth of commercial price is lower than the growth of tourism price at all levels. Therefore, real income of the poorest quintile can be higher.

Table 7.16: Major sources of household income in 2007

Sources of income	Quintile					The whole village
	The poorest	The second poorest	The middle	The second richest	The richest	
Tea	58.50	63.79	54.64	37.54	16.64	33.83
Commerce	0.01	3.31	5.87	11.57	22.14	14.38
Tourism	10.61	5.84	6.05	10.02	14.04	10.88
Services	2.07	1.83	5.30	11.03	13.50	10.03
Construction	19.35	6.89	9.97	9.70	9.63	9.78
Coffee	6.20	8.30	7.05	7.98	3.12	5.52
Livestock	0.28	1.25	0.24	3.54	7.18	4.38
Administration	0.00	0.45	4.60	3.40	5.85	4.32
Pillow	0.00	4.13	3.66	0.88	3.63	2.90
Manufacture	1.19	2.94	1.30	0.88	1.13	1.28
Utilities	1.51	0.66	0.78	2.90	0.68	1.25
Pillow sewing	0.00	0.00	0.00	0.00	2.05	0.96
Plants	0.28	0.62	0.55	0.56	0.40	0.48
Total	100.00	100.00	100.00	100.00	100.00	100.00

Source: Survey

Table 7.17: The effects on commodities and services' prices from the simulation of various tourism prices under a fixed labor endowment.

Growth of tourism price (%)	Growth of tea price (%)	Growth of coffee price (%)	Growth of livestock price (%)	Growth of commercial price (%)	Growth of service price (%)	Growth of pillow price (%)
-35	-3.05	0.18	0.01	-2.81	-18.12	-91.46
-30	-3.00	-0.49	-0.02	-3.44	-13.77	-86.24
-20	-2.82	-1.04	-0.06	-5.89	2.39	-52.07
-10	-1.46	-0.14	-0.03	-3.07	2.42	-24.45
0	0.00	0.00	0.00	0.00	0.00	0.00
10	1.63	-0.10	0.04	3.37	-4.11	21.92
20	3.37	-0.18	0.15	7.18	-13.14	43.42
30	5.46	0.11	0.26	11.55	-24.75	61.15
40	7.91	0.79	0.39	16.35	-35.89	76.70
50	10.71	1.76	0.53	21.43	-43.48	90.98
60	13.88	3.05	0.67	26.73	-48.40	104.17
70	17.39	4.71	0.82	32.25	-51.87	116.69
80	21.23	6.74	0.97	37.95	-54.38	128.78
90	25.40	9.18	1.12	43.82	-56.20	140.49
100	29.90	12.01	1.27	49.82	-57.53	151.83

Source: Simulation

Table 7.18: The effects on commodities and services' prices from the simulation of various tourism prices under an expandable labor endowment.

Growth of tourism price (%)	Growth of tea price (%)	Growth of coffee price (%)	Growth of livestock price (%)	Growth of commercial price (%)	Growth of service price (%)	Growth of pillow price (%)
-35	-3.00	0.15	0.01	-2.79	-16.69	-91.46
-30	-2.95	-0.39	-0.02	-3.31	-13.07	-86.32
-20	-2.80	-1.02	-0.06	-5.81	2.43	-52.63
-10	-1.46	-0.14	-0.03	-3.05	2.44	-24.59
0	0.00	0.00	0.00	0.00	0.00	0.00
10	1.63	-0.10	0.04	3.37	-4.12	21.94
20	3.44	-0.15	0.13	7.19	-12.12	42.45
30	5.52	0.13	0.25	11.55	-23.78	60.55
40	7.97	0.80	0.37	16.35	-35.09	76.28
50	10.79	1.78	0.51	21.43	-42.79	90.54
60	13.94	3.06	0.66	26.74	-47.77	103.94
70	17.45	4.71	0.81	32.26	-51.26	116.51
80	21.28	6.74	0.96	37.96	-53.79	128.70
90	25.47	9.20	1.10	43.84	-55.64	140.23
100	29.95	12.01	1.27	49.83	-56.99	151.76

Source: Simulation

However, it is still doubtful why the second poorest quintile is the loser. They gain nominal income from tourism around two times larger than that of the poorest quintile (Table 7.15). Their major source of income is also tea, 63.79 percent of total income. They also benefit from the growing tourism price which should compensate the rising consumer's price.

An only thing that the poorest quintile is distinguished from other sectors is its largest income share from construction. They gain 19.35 percent of income from construction whereas other quintiles gain not larger than 10 percent of their income from this sector. However, to be clear on this point, it is useful to look at the distribution of benefit in the construction sector (Table 7.19)

Table 7.19: The distribution of construction income to household quintiles in 2007

Quintile	Direct benefit (Baht)	Indirect benefit via the purchase of commodities from other sectors (Baht)	Total construction income (Baht)	The distribution of construction income (%)
The poorest	53,250	0	53,250	7.26
The second poorest	51,554	0	51,554	7.02
The middle	118,709	0	118,709	16.18
The second richest	171,304	0	171,304	23.34
The richest	339,070	0	339,070	46.20
Total	733,887	0	53,250	100.00

Source: Survey

From table 7.19, the nominal income from construction sector was distributed to the poorest and the second poorest at almost the same portion. Thus, it is unlikely to say that it is the source of the difference between these two quintiles.

If it is not from the income side, the difference may come from the consumption side. It may be helpful to look at the consumption pattern of the poorest and second poorest quintiles (Table 7.20).

Table 7.20: Consumption pattern of households in 2007

	Household quintiles				
	The poorest	The second poorest	The middle	The second richest	The richest
Imported goods	67.74	67.45	73.29	71.00	56.23
Commerce	30.97	31.30	20.31	15.36	8.23
Services	1.28	0.84	0.90	0.23	0.24
Manufacture	0.01	0.40	-	0.00	0.18
Pillow	-	-	-	0.03	0.04
Savings	-	-	5.50	13.37	35.09
Total consumption	100.00	100.00	100.00	100.00	100.00

Source: Survey

From table 7.20, the poorest quintile consumes services at the larger portion of their consumption than the second poorest quintile, 1.28 and 0.84 percent. The price of service

sector decreases sharply when tourism is expanded. This may be the reason that drives the poorest quintile to be better-off. However, it is not sufficient to confirm the argument because when looking at the consumption of manufacturing products, the second poorest quintile consumes this item at the larger portion than the poorest quintile. The price of manufacturing product also decreases. Moreover, combining both consumptions of services and manufacturing products, the shares are almost equal for both quintiles, 1.29 and 1.24 percent. Therefore, it is not obvious that the different pattern of consumption leads to the huge difference of their welfare.

To be solid on this point, it is necessary to calculate the weighted average price growth for the income and consumption for both quintiles (Table 7.21). From these figures, it will be clearer to see the dynamic of their income and consumption.

Table 7.21: The weighted average of prices related to the income and consumption of the poorest and second poorest quintiles.

Growth of tourism price	Prices on income side		Inflation	
	The poorest	The second poorest	The poorest	The second poorest
50%	1.14	1.10	1.06	1.06
100%	1.36	1.29	1.15	1.15

Source: Calculation
Note: The inflation is the weighted average of prices of goods consumed in the village.

It is possible from table 7.21 that the poorest quintile gains more than the second poorest quintile because its weighted average price on the income side is greater. In the simulation of tourism price growth of 50 percent, the average income price of the poorest quintile rises 14 percent whereas that of the second poorest quintile increases only 10 percent. Then in another simulation of the doubled tourism price, the price on income side of the poorest quintile rises 36 percent while that of the second poorest quintile climbs 29 percent.

On the consumption side, their consumer's prices are quite alike. Therefore, the difference between the poorest and second poorest quintile is because the difference on the income side. The poorest quintile may gain more than the second poorest income because its average producers' price is higher than that of the second poorest quintile.

The last curiousness is when the consumers' prices are lower than the average prices on income side for both quintiles, the real income of both quintiles should increase. However, the results from the simulation indicate that the real income of the second poorest quintile drops. This may be because its nominal income growth is less than the growth of its consumer's price, the inflation that is specific to the quintile.

Outputs in some sectors that their prices go up may decrease sharply. Therefore, the value of those sectors will drop or slowly increase. It may affect the nominal income growth. When the nominal income growth is less than the growth of consumer's price then the real income drops. To make it clear, it can be proved by the evidence in table 7.22.

Table 7.22 The weighted average index of nominal income and inflation of the poorest and second poorest quintiles.

Growth of tourism price	Income side		Inflation	
	The poorest	The second poorest	The poorest	The second poorest
50%	1.14	1.03	1.06	1.06
100%	1.39	1.15	1.15	1.15

Source: Calculation
Note: The inflation is the weighted average of prices of goods consumed in the village.

In the simulation of tourism price growth of 50 percent, the nominal income of the second poorest quintile rises only 3 percent whereas its consumer's price rises 6 percent. This leads to the drop of its real income. In another simulation of doubled tourism price, its nominal income rises 15 percent which is equal to the rise of its consumer's price. Therefore, the real income does not increase in this case.

In the same table, the nominal income growth of the poorest quintile is larger than the growth of its consumer's price in both simulations. It confirms that the real income of the poorest quintile increases which makes the poorest quintile better-off.

7.7.5 The pro-poor tourism

It is hard to conclude that tourism is pro-poor. This is because the richest quintile is the top gainer of tourism benefit. It shares the benefit much larger than other quintiles. However, the poorest quintile also gains positive benefit. They are the third top gainer. Their real income increases when tourism expands even though its real income growth is just around one-sixth of the figure of the richest quintile.

When a definition of pro-poor tourism requires that tourism must make the poor gains more than the rich measured by the real income growth, community-based tourism (CBT) does not fulfill this task. When pro-poor tourism is defined as a tourism activitiy that makes the poor better-off no matter how the rich are, CBT is still not pro-poor. This is because the second poorest quintile is worse-off. Most of households in this quintile are poor. Therefore, by all definitions, CBT is not pro-poor.

7.8 Conclusion

Community-based tourism (CBT) yields benefits to a village in many ways.

First, it circulates the income flow within the economy. Its income multipliers are around 5.34 to 6.63 in the tourism expansion phase by the simulation under fixed labor endowment. In another simulation under expandable labor endowment, the multipliers range between 5.78 and 6.86.

Second, it creates value-added to the village economy. In both simulations under fixed and expandable labor endowment, the value-added multipliers are the same which range from 1.28 to 2.16.

This study figures out the distribution of tourism benefit taking both direct and indirect effects into account. It confirms that benefits from the tourism expansion distribute unevenly. The richest quintile is the top gainer of real income growth. The second richest quintile is the second top gainer. The poorest quintile becomes the third top gainer while the middle quintile ranks the fourth place when the tourism price is doubled. However, the second poorest quintile is a loser.

Community-based tourism is not pro-poor. Even though it helps the poorest quintile better-off, it leaves the second poorest quintile worse-off. Moreover, the differences of the benefits among the gainers are wide. The richest quintile gains three times higher than the second richest quintile, six times higher than the poorest quintile and ten times higher than the middle quintile.

Chapter 8
Conclusion and policy suggestion

This chapter will present the concluding remarks. It will suggest some policies to enhance the effects of tourism on the prosperity of the village economy. Finally, it will list some potential research topics in the future.

8.1 Concluding remarks

This study presents an economic analysis of community-based tourism (CBT) in Thailand by studying a case study of Mae Kam Pong village in Chiang Mai. First, it introduces the notion of community-based tourism, its philosophy and importance. Second, it reviews the recent development of community-based tourism projects around the world and academic literatures about community-based tourism. Third, it describes its survey method and the construction of the major data sets which are Social Accounting Matrix (SAM) and the panel data 2003 and 2007. Fourth, it highlights the village economy of Mae Kam Pong with the emphasis on its tourism economy. Fifth, it investigates the determinants of participation in tourism sector of villagers. Sixth, it figures out whether tourism can help the poor to get out of poverty. Seventh, it simulates the effects of tourism expansion and recession on income distribution within the framework of general equilibrium. Last in this chapter, it summarizes the important findings and proposes some policy suggestions.

8.1.1 The principle of community-based tourism

Community-based tourism is unique in its tourism product and management. Its tourism product is beyond eco-tourism such that tourists learn local culture and way of life. They do not just appreciate natural surroundings. In CBT, tourists touch people more than in typical eco-tourism. The management of CBT emphasizes the involvement of villagers in controlling and participating in the tourism sector. The whole villagers in the villager are owners of the sector. CBT aims to share the benefit as wide as possible among villagers.

The philosophy of the community-based tourism is when all villagers share burdens from tourism equally, e.g. noise pollution, garbage, water pollution, road erosion, they should share tourism benefit equally too.

8.1.2 Recent development of community-based tourism projects and literatures

The development of community-based tourism (CBT) projects in Thailand can be traced back to 50 years ago. It has developed from offering homestay for researchers and social activists to the full-functioned tourism for tourists. However, the modern CBT projects emerged around 1999 and 2000 when two famous villages launched their CBT projects, Plai Pong Pang in Samutsongkram province and Mae Kam Pong in Chiang Mai province. These two villages introduce systematic tourism management run by villagers. Like a school, they teach other villagers around the countries how to establish modern CBT projects.

In other countries, CBT projects primarily conserve the forest. They aim at providing villagers supplementary income from tourism in order to avoid them to invade forests. International organizations, local NGOs and government agencies drive the establishment of many CBT projects. They hope for the pro-poor effect of the projects.

A lot of academic literatures express the experiences learnt from the CBT development projects around the world. Major contributors in the field are Caroline Ashley, Jonathan Mitchell and Harold Goodwin. Their series of papers provide the idea and guideline how to distribute tourism income to the poor. They also try to prove whether CBT can help the poor to get out of poverty. However, there has been no quantitative evidence to prove the argument. It is the room for this study to fulfill the gap of knowledge.

8.1.3 The survey method and the construction of data

The study conducted a census of 116 households during August 2008 to March 2009 in Mae Kam Pong village in Chiang Mai, Thailand. The reason of choosing this village is the importance of the village as a school of other villages around the countries. Moreover, the possibility of the success in doing the field survey is high since there is no language problem, the distance is not too far from downtown, and facilities in village are ready for the long-stay of researchers.

The census aims to construct the Social Accounting Matrix (SAM). The database of SAM collects almost all economic transactions in the village in a reference period which covers May 2007 to April 2008. The census is the first time in Thailand to construct a SAM for a particular village.

Besides, the matching of data between a survey done by Social Research Institute, Chiang Mai University four years ago and this survey constructs a panel data of 2003 and 2007. The panel data matches 89 percent of households. However, both surveys contain not the same information. Therefore, it needs some adjustments in matching the data. Moreover, there are some limitations of calculating the related issues, for example the poverty line could be calculated only on the income side.

8.1.4 The village economy

Mae Kam Pong village finances itself mainly by agriculture. Its major product is fermented chewing tea. It can be viewed as a small open economy since it trades heavily with markets outside the village. Its tourism economy shares approximately 8 percent of the whole economy. When adding tourism-induced sector into account, the tourism economy expands to around 14 percent.

The distribution of income from tourism-induced sector flew almost equally to the poor before 2007. However, in 2007 after the limitation of membership in the sector, the income concentrated in the richest quintile.

8.1.5 The determinants of participation in tourism sector

This study investigates the determinants of participation in seven economic sectors using Seemingly Unrelated Regression (SURE). The seven economic sectors are listed as follows; homestay, core tourism, tourism-induced sector, agriculture, commerce, agricultural labor service and non-agricultural labor service.

The participation in high-returned sectors such as tourism-induced sector and commerce requires education. Education is not necessary for joining agricultural labor service and non-agricultural labor service. Location, experience in gaining tourism income, and household

labor surplus are influential in the decision to participate in tourism sector as well as some particular sectors.

8.1.6 Community-based tourism and poverty reduction

In the study of the effect of community-based tourism on poverty reduction, two steps of analysis are conducted. First, the logit model proves that poor households with more working hours in tourism-induced sector, commerce, agriculture and non-agricultural labor service can get out of poverty. Second, the regression with instrumental variable confirms that poor households who work intensely in tourism-induced sector get the increasing nominal income. Consequently, the poverty reduction occurs because of the increasing household income.

Not all types of tourism can reduce poverty. Tourism-induced sector can do it. Homestay and core tourism are ineffective.

There are several reasons why tourism-induced sector can reduce poverty. First, the labor productivity in the sector is competitive to other sectors'. Second, the size of the sector is large enough. Third, households spend working hours in this sector much enough. Last, elderly people can easily participate and earn supplementary income from this sector since it is a lighter job than working on farms.

Homestay cannot help poor households to get out of poverty with several reasons. First, only few poor households can offer homestay service. This is because it requires investment, e.g. westernized toilet and mattress for guests. Second, most of poor households stay far away from the village center where tourists are reluctant to choose to stay overnight.

Core tourism cannot reduce poverty because of many reasons. First, the size of the sector is small. Even though the labor productivity is high, the size of the sector is too small to generate much money. Second, the distance is also a barrier for the poor who stay in the outer cluster of the village. Villagers who stay closer to the village center can response quicker to the call for a trekking guide than those who stay further.

8.1.7 Income distribution of community-based tourism

The simulation uses the Computable General Equilibrium model at the village level (VCGE). Its data, the Social Accounting Matrix (SAM), reveals the economic structure of the year 2007. It simulates a counterfactual what will happen if tourism price is driven higher or lower than the level in 2007. The price is not set by the village; it is demand driven assuming a perfectly elastic tourism demand.

This study supports the argument of Mitchell and Ashley (2007) who expected that tourism income multiplier can be between 2 to 10 times. The results show that the income multipliers are around 5.34 to 6.63 in the tourism expansion phase by the simulation under fixed labor endowment. In another simulation under expandable labor endowment, the multipliers range between 5.78 and 6.86. In both simulations under fixed and expandable labor endowment, the value-added multipliers are almost the same which range from 1.28 to 2.16.

This study also confirms the argument of uneven tourism income distribution that were made by Kaosa-ard (2006) and Akarapong et al (2006). The results close the gap of knowledge when taking both direct and indirect effects into the analysis whereas the previous studies consider only the direct effect.

It confirms that when tourism price is doubled by the increasing tourism demand, the richest quintile will be the top gainer of the real income growth. The second richest quintile will be the second top gainer.

An additional result that Kaosa-ard (2006) and Akarapong et al (2006) may not expect is that tourism can make the poorest quintile better-off when tourism price is driven up 40 percent from the price level in 2007. They will be the third top gainer of tourism benefit when tourism price is doubled.

Both tourism expansion and recession will make the second poorest quintile worse-off. The second poorest quintile will suffer from the drop of their real income since the value of production from which they earn for living will rise slower than the consumer's price growth.

This study confirms that community-based tourism plays a minor role in helping poor household to get out of poverty by three reasons. First, the tourism benefit goes to the rich in a much larger portion than to the poor. Second, the poorest quintile will benefit only when tourism price is driven 40 percent higher than the level in 2007 which is unlikely to be realistic in the near future because of the price competition among CBT villages. Third, tourism will not help poor households in the second poorest quintile.

Finally, community-based tourism is not pro-poor with two reasons. First, the richest quintile will gain the benefit three times higher than the second richest quintile, six times higher than the poorest quintile, and ten times higher than the middle quintile when tourism price is doubled. Therefore, CBT is rather pro-rich. Second, tourism expansion will make the second poorest quintile worse-off. This suffered quintile consists of many poor households; therefore community-based tourism is not pro-poor.

8.2 Policy suggestions

Policy 1: Microfinance for the establishment of tourism service should be provided and targeted to right households.

Even though homestay and core tourism may not be able to help the poor to get out of poverty, they are pre-requisite for tourism-induced sector. Without the flow of tourists to a village, there is no market for souvenir and coffee shop. Therefore, before the establishment of tourism-induced sector with the aim of poverty reduction, a village needs to establish homestay and core tourism.

Homestay is not easy to let poor households to operate. Even though they may be willing to do, they do not match the standard. To control the standard of homestay over the countries, the Thai government set a Homestay Standard. Without reaching the standard, a village is not competitive to villages with high-standard.

It can be possible to support poor households with microfinance for the renovation of westernized toilet, kitchen and bedroom. However, poor households may be unable to apply for more loans. From the survey, most of poor households reach the limit of loans. They do not return previous loans. Then they cannot apply for a new credit.

Only the richest or second richest quintiles of households in a village are capable to apply for microcredit. Granting the credit to them may be controversial. However, they are good targets by several reasons. First, the credit can be put into the village immediately. Second, they can use the credit efficiently and effectively. Third, they are capable to return the credit on time. Last, they are capable to contact outsiders to attract tourists to visit the village.

This policy may favor the rich and not the poor such that the microcredit will lead to the concentration of tourism benefit among the rich. However, it cannot be ignored that the development of tourism service must start from the most ready households. It is the nature of tourism development in a village. The development project cannot bypass the rich and go directly to the poor for the hope that the poor can handle everything by themselves. It is not possible to do that. A community-based tourism project needs the rich to participate. It needs a strong pillar for further development. Then it should try to enhance the distribution of the benefit to the poor later through the establishment of tourism-induced sector.

For the action of lending microcredit, it is still hard to find funders. Bank for Agriculture and Agricultural Co-operatives which is closer to farmers and villagers than other banks is dealing within the scope of agricultural production. Commercial banks hardly grant a loan to villagers because the insecurity of land tenure, especially in remote villages on the mountain. A possible source is the cooperative loan within the village. To form a cooperative in the village, villagers collect money from those who are willing to be members. Afterwards, they offer loans to the members using the rotation system. However, to encourage the cooperative to target the credit to the rich in order to establish homestay service may be controversial among its members. Moreover, the amount of credit may not be enough for a household to renovate its facilities. The issue of who should be funders of the CBT promotion credit cannot be figured out in this study. It may need a new agency or new unit in a bank to offer the loan especially for CBT.

Policy 2: The establishment of tourism-induced sector should be promoted to distribute tourism benefit to the poor.

As it was found that tourism by itself could not help poor households to get out of poverty but the tourism-induced sector could instead, the establishment of tourism-induced sector is a highly recommended policy for a tourism village.

The promotion of tourism-induced sector in this case is different from the previous promotion of OTOP project[6]. The OTOP project aims to enhance light-industrial production in villages without the pre-requisite of tourism service in the villages. The project does not cover tourism villages. The recommended policy is the promotion of souvenir production or coffee shop in tourism villages. This is a gap that has not been fulfilled by any state-run project in Thailand.

For the action of supporting the tourism-induced sector in tourism villages, OTOP project can extend its support to cover the activities. The project should include the groups of production into its mailing list so that it can distribute news about market information, possible microcredit, opportunities to attend exhibitions and knowledge transfer to the villages.

Policy 3: Enhancement for the poor to participate in tourism sector is a must.

This study figures out the determinants of the participation in seven economic sectors. As education is crucial for the participation in tourism and high-returned sectors, capacity building and on-the-job training are the central mechanism to enhance the poor to participate in these sectors.

Education levels of villagers differ from generation to generation according to differences in obligatory educational systems. Before 1978, the primary school in Thailand was divided into 2 levels. The first level took 4 years and the second level took 3 years. Even though both levels were obligatory by law[7], many people attended the school only 4 years. From 1978 to 2002, the obligatory period was 6 years[8]. After that it was expanded to 9 years[9]. In modern Thai society, it is usual for boys and girls to stay in school as long as 12 years.

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6 OTOP project stands for One Tambon (sub-district) One Product which has been promoted through out the countries since 2000. It aims at the enhancement of locally light-industrial production in villages. Handicrafts and dried food are major products in the project. It does not aim to promote tourism service in villages.

7 The 1st until the 4th Primary Education Acts announced in 1921, 1930, 1935 and 1940.

8 The 5th Primary Education Act 1978, announced on 3 April 1978.

9 The Obligatory Education Act 2002, announced on 31 December 2002.

To raise the educational level in a household, it may target two groups. First, it should enhance boys and girls to attend college or university and attract them to come back and work in the village afterwards.

For this target, financial support is not a problem since the Thai government provides educational loan for all students in universities. They will return the debt whenever they get a job with salary over 10,000 Baht per month (around USD 335). If they cannot get the job, they need not to pay back the loan.

The problem is at the admission to universities. Students in rural area are less competitive than students in cities. Even though some universities arrange quotas for students from rural area, the number of seats is small.

Another problem is the brain drain. When students from a rural village can attend universities, it is hard for them to come back and work in the village. This is because they can earn higher salary from working in downtown.

Second, young people who finish grade 9 or 12 from secondary schools and stay in the village are hopeful for CBT development. These young men and women are actually able to learn new things and develop themselves. The most important point is that they are the ones who stay in the village.

Essential trainings are the know-how in dealing with tourists. First, English is a must for communication with foreign tourists. Second, hospitality management is crucial for welcoming both domestic and international guests. Third, sanitary management is useful to keep houses clean and safe for tourists. Fourth, ecology is beneficial for understanding their surroundings and creating selling points to tourists.

To enhance tourism-induced sector, production management is useful for running a small-scale production unit in a village. Souvenir design is good for the creation of new products. Accounting is also beneficial for making the revenue and expenditure systematic and controllable. Marketing is helpful for villagers to expand their markets in the future.

Trainings should come in easy ways. English has been taught in many tourism villages by small books with pictures and easy English words. They have been distributed by some non-government organizations. Accounting has been introduced to villagers by Thailand Research Fund (TRF). It has also been trained by local people in other villages such as Sam Kar village in Lampang province of Northern Thailand. The village is famous of its experience in doing household accounting. It is an accounting school for other villages around the country. It encourages other villages to fight poverty by doing accounting.

Policy 4: Benefit in tourism-induced sector should be shared to the poor.

It is clearly seen that the benefit of tourism-induced sector before 2007 distributed almost equally to villagers in Mae Kam Pong village. This is because the souvenir production is easy for everyone to participate. The expansion of the production also requires more labors. However in 2007, the membership of this production group was limited. From the simulation, it is shown that by the limitation of membership the benefit will not flow to the poor. Therefore, the crucial action that will make community-based tourism effective in poverty reduction is the openness of membership in tourism-induced sector.

There are several ways to make the membership open. First, for villages that begins the development of this sector, the openness of membership must be declared to the whole villagers. The production group has to keep promise of the openness. Another way is to form a new cooperative for a particular production which every villager is member. Moreover, if the production group is financially supported by some government agencies, the credit should come with a condition that the membership must be ever opened for all villagers. Otherwise, further loan will be terminated.

Second, for villages that have operated the sector and limited their membership, it is hard to intervene what was happened. It may not possible to talk to leaders of the group that they should extend the membership while they are enjoying the benefit. It is also hard to tax them by asking a bigger portion that they need to pay to the village fund.

For them, a conditional incentive may be effective. For the expansion of their production, they will need more current capital. It is not easy for them to collect more capital from such limited number of members. A government agency may propose to lend them the capital.

However, it will come with a condition that the group must open the membership to all villagers or gradually open it year by year.

Third, for not only tourism-induced sector but also other tourism activities, it can include poor households to participate more and more by another proposal of conditional incentive. A government agency may propose a new incentive for the village such as a hydropower electrical generator, solar cells, a small-scale water utility, a drinking water machine, educational scholarships for children in the village, travel awards and development loans. However, they are conditional to the number of poor households that participate in tourism activities. This policy will encourage elite people in the village to approach the poor and offer them some jobs in order to collect enough number of the poor to win the awards.

All in all, tourism development cannot bypass the rich or elite persons in the village. The development needs them to be a strong pillar of the development project. Tourism naturally starts from this elite group. Without them, it is almost possible to establish or maintain the tourism project in a village. It is not hopeful to let the poor get the loan and run the business by themselves. They are not strong enough to maintain the sector in long-run.

The effective mechanism is to support the elite and intelligent people in the village to establish the tourism sector and operate it smoothly. Gradually, there will be rooms for the poor to join the sector. The conditional incentive proposed in this study may be an effective way to achieve the better tourism income distribution in a village.

8.3 Further research

Research 1: Microfinance for community-based tourism

It is still unclear in this study that from whom villages operating community-based tourism can apply for microcredit. A further research question is what will be the best source that lends microcredit to CBT projects as well as tourism-induced businesses in villages. The research needs to review all possible choices. It should interview policy makers in related financial institutions. It requires the analysis of advantages and disadvantages of each source. It will also think about the practical mechanism to deliver the loan to villages. Moreover, it needs to analyze whether villagers can pay back the loan within a substantial period. The benefit of this research will be at the practical level to launch a new campaign of microcredit for community-based tourism in Thailand.

Research 2: Re-investigation of community-based tourism and poverty reduction: Pooling cross-sectional and time series data from CBT villages

As this study is only a case study of Mae Kam Pong village, it cannot generalize the result to all CBT villages in Thailand. A major problem is the lack of panel data. To overcome this problem, a 5-year research project should be started to collect data from around 30 CBT villages across the countries. The survey should be done twice within 3- 4 years for each village. Then, a cross-sectional and time series data can be constructed with 60 observations in terms of villages or around 600 - 800 households. If there is around 30percent of poor households in the first survey, then the project will have around 180 – 240 observations of poor households that can be investigated the dynamic of poverty incidence. The result from this research will be more convincing. Moreover, stories behind the dynamic of the poor from these villages will be fruitful for the discussion.

Research 3: Effectiveness of conditional incentives on the openness of tourism-induced sector

This study proposes that conditional incentives may be useful for the openness of tourism-induced sector. However, there is no guarantee that they will be effective. The prospective research may collect data from a trial and error basis. It will cooperate with some government agencies to offer the conditional incentives to some 3 to 5 villages that are operating or potential to operate tourism-induced activities. Then it needs to observe the decisions of villages within 1 or 2 years after the offers. However, it will be a research with case studies which cannot be examined by quantitative method.

Another way to conduct the same research is to apply experimental game theory to the problem. Researchers can set scenarios with various incentives. Players in the game imitate the roles of decision makers in a village. The experiment can invite people from two sources. First, people in general can participate in the experiment. Second, key persons who are decision makers in CBT villages may be invited to attend the experiment. With this research method, researchers need not to apply real incentives to villages. It will also save time for achieving the research results.

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Annex

Annex 1: Questionnaire for the construction of Village-SAM

The questionnaire in this study is 125-page long. It adapts main features from the questionnaire of Arjunan Subramanian (2007) with his personal permission. It includes 22 parts as follows:

Notes:

1. Parts of production, service and trading activities, collect both revenue and costs.
2. Data on assets emphasize on the flow which includes purchasing, selling, receiving and giving.
3. Some parts contain many pages for the possibility that a household may have many sources of income. In case that the household has only one source of income, e.g. one cash crop, the remaining pages of the parts can be skipped.
4. Parts that are not relevant to activities of a household can also be skipped.
5. In a version of Arjunan Subramanian (2007), there are some questions related to precious assets, e.g. gold and money in bank accounts. This study deletes these questions because it is not appropriate to ask the Thai about these kinds of assets. Otherwise, villagers may refuse to answer other questions.
6. Values of assets in the reference period which is the stock value are also collected. However, they are not for the construction of SAM but for econometric models.
7. It is recommended to collect the data in details rather than just in pieces of rough information. Detailed data can be aggregated into a broader figure later. However, the rough number cannot be decomposed into details.
8. It is also recommended that a researcher should not forget to collect some suppoting data outside the questionnaire. Later, they will be helpful to prove whether the findings from the quantitive models are correct.

Annex 2: Description of information in the SAM table

Row 1: Activities

Row 1, Column 2 : Value of all production and trade in the economy. Another view reads value of commodities got from production and trade, not including from stocks in last period.

Row 2: Commodities

Row 2, Column 1 : Values of good sold to production and trading sectors. Another view reads buying of instant goods from production and trading sectors.

Row 2, Column 4 : Goods sold to households. Another view reads household consumption of goods which were produced and traded inside the economy.

Row 2, Column 5 : Goods sold to investment activities. Another view reads investment activities buy goods produced and traded inside the economy.

Row 2, Column 6 : Goods exported to the rest of the world. Another view reads the rest of the world buy goods produced inside the economy.

Row 3: Factors

Row 3, Column 1 : Factors sold to production and trading sectors. Another view reads production and trading sectors buy factors.

Row 3, Column 5 : Factors sold to investment activities. Another view reads investment activities buy factors available inside the economy.

Row 3, Column 6 : Factors exported to the rest of the world. Another view reads the rest of the world buy factors available inside the economy.

Row 4: Households

Row 4, Column 1 : Household income gained from profit. Another view reads profit from production activities that went to households.

Row 4, Column 3 : Household income gained from selling factors, i.e. labors, land, capital. Another view reads values of factors that went to households.

Row 4, Column 4 : Household income gained from transfers from other households. Another view reads household transfers that went to other households.

Row 4, Column 6 : Household income gained from transfers from the rest of the world. Another view reads transfers from the rest of the world that went to other households, e.g. remittance and subsidy.

Row 5: Investment

Row 5, Column 4 : Investment from household savings. Another view reads household expenditure in a form of savings.

Row 5, Column 6 : Investment from the rest of the world. In the Village SAM, it covers the withdrawal of money from bank accounts if there is no bank inside the village. In national SAM, it means capital inflow. Another view reads expenditure of the rest of the world to invest inside the economy.

Row 6: Consumption spent to the rest of the world

Row 6, Column 1 : The rest of the world sold goods to production and trading sectors. Another view reads production and trading sectors imported goods from the rest of the world.

Row 6, Column 3 : The rest of the world sold factors to production and trading sectors. Another view reads production and trading sectors imported factors from the rest of the world. For example, employment of labors outside the economy, interest payment to financial institutions outside the economy, land rent from land owners who live outside the economy, rent of machines or equipments from persons or institutions outside the economy.

Row 6, Column 4 : The rest of the world sold goods to households. Another view reads households directly imported goods from the rest of the world.

Row 6, Column 5 : The rest of the world sold goods to construction. Another view reads construction directly imported goods from the rest of the world.

Row 7: Transfers to the Rest of the world

Row 7, Column 4 : The rest of the world got money transfers from households. Another view reads money transfers or donations from households to the rest of the world.

Row 10, Column 5 : The rest of the world got money transfers from the village. Another view reads money transfers or donations from village to the rest of the world. In this case, it is treated as capital export which means all the savings in the village will go to bank accounts outside the village.

Annex 3: Statistics of inconsistent and missing data on the production side

According to section 3.3.5, the inconsistent and missing data on the production side were manipulated. This section reveals the range of data that is considered to be consistent in some economic sectors. Households that are not in the consistent range are considered to be the outliers. The consistent range is considered following these criteria.

1) The RVA ratio must be a positive number and ranges between 0 and 100.
2) The RVA which is repeated by many firms in the sectors is considered as a reliable ratio.
3) The RVA that is exactly 100 percent is because the cost is missing.
4) The RVA which is too low is because the cost is overstated.

The consistency of the production is based on the ratio of retained value added in household (RVA). It is believed that the production of a particular product of all households should be quite similar. This is because the technology of production is transferred from the same ancestors, especially tea which is the traditional cash crop for more than half of the century. Table A1 presents the range of RVA that is concerned to be consistent of major products. Then, table A2 will count the number of observations whose RVA are within and outside the range. Observations with missing value are also shown in the table.

Table A1: Range of consistent data in terms of RVA calculated from only firms that perform the consistency

No.	Production sector	N	Range of consistent RVA (%)			
			Min	Max	Mean	Standard deviation
1	Tea	70	70.38	99.95	94.21	5.53
2	Coffee	59	54.27	89.26	76.33	9.78
3	Chicken	18	31.68	83.63	64.38	17.82
4	Chicken egg	8	16.67	96.97	82.31	26.89
5	Cow	6	86.40	90.88	88.73	1.77
6	Fish	7	50.33	68.19	62.07	5.53
7	Retailing	5	7.37	13.50	10.92	2.33
8	Wholesaling of Tea	5	7.72	12.46	10.34	1.74
9	Wholesaling of coffee	3	5.80	6.11	5.93	0.16
10	Restaurant	2	24.40	37.67	31.04	9.38
11	Alcoholic beverage retailers	6	25.61	45.30	39.97	7.27

Source: Survey

Table A2: Number of consistent and inconsistent observations and number of missing data on the production side of the village

No.	Production sector	Numbers of consistent observation	Numbers of inconsistent observation	Missing observations	Total observations
1	Tea	70	39	7	116
2	Coffee	59	30	4	93
3	Chicken	18	0	0	18
4	Chicken egg	8	0	4	12
5	Cow	6	0	0	6
6	Fish	7	0	0	7
7	Retailing	5	0	0	5
8	Wholesaling of tea	5	0	0	5
9	Wholesaling of coffee	3	0	0	3
10	Restaurant	2	0	0	2
11	Alcoholic beverage retailers	6	0	0	6

Source: Survey

Annex 4: Retained value added rates (RVA rates) of production activities in 2007

Table A3: RVA rates in 2007

No.	Production activities	Retained value added (Baht)	Retained value added rates (%)
1	Tea	2,437,752	89.90
2	Coffee	398,125	75.50
3	Plants	31,861	52.81
4	Animals	328,316	80.60
5	Pillow*	93,285	13.32
6	Household manufacture	96,103	82.30
7	Services	752,694	84.10
8	Commerce	926,952	12.02
9	Souvenir	72,000	20.00
10	Coffee shop	71,100	48.37
11	Utilities*	13,453	5.03
12	Administration	324,310	86.15
13	Pillow sewing	72,346	93.00
14	Homestay	381,071	52.00
15	Core tourism	291,821	69.59

Source: Calculation

Note : * RVA is calculated by the financial returns to share holders.

Annex 5: Dynamic of household income during 2003 and 2007

Details of the household income in 2003 and 2007 with their ratios to total income are presented in this section.

Table A-4: Major sources of household income in 2003

Sources of income in 2003	Income in 2003 (Baht)				
	N	Max	Min	Mean	s.d.
Agriculture	99	156,395	271	31,247	23,065
Finance	7	40,000	100	16,514	15,412
Non-agricultural labor service	47	100,000	100	19,864	24,506
Agricultural labor service	21	15,000	300	5,074	4,989
Core tourism	25	15,843	176	2,592	3,985
Tourism-induced sector	0	0.00	0.00	0.00	0.00
Commerce	13	62,896	57	11,710	21,171
Homestay	8	12,480	1,300	4,875	3,647
Manufacture	15	8,359	104	1,890	2,546
Total	104	115,693	12,347	49,039	25,924

Source: Survey in 2004 by Social Research Institute, Chiang Mai University.
Author's recalculation of retained value added from productions.

Table A5: Ratio of income to the total household income in 2003 ranked by the mean ratio

Sources of income in 2003	Ratio to total household income in 2003 (%)				
	N	Max	Min	Mean	s.d.
Agriculture	99	100.00	0.27	77.06	26.24
Finance	7	100.00	0.43	49.22	42.14
Non-agricultural labor service	47	100.00	0.28	32.73	29.20
Agricultural labor service	21	100.00	0.64	19.08	23.15
Commerce	13	75.27	0.10	15.44	24.10
Homestay	8	18.09	2.61	8.76	5.58
Manufacture	15	42.31	0.43	6.65	10.34
Core tourism	25	25.45	0.22	4.64	5.89
Tourism-induced sector	0	0.00	0.00	0.00	0.00

Source: Survey in 2004 by Social Research Institute, Chiang Mai University.

Table A-6: Major sources of household income in 2007 sorted by numbers of households gaining the income

Sources of income in 2007	Income in 2007 (Baht)				
	N	Max	Min	Mean	s.d.
Agriculture	95	144,134	107	30,758	23,056
Finance	67	42,000	5	4,923	8,416
Non-agricultural labor service	61	169,860	135	23,850	30,703
Agricultural labor service	47	8,576	223	2,348	2,012
Core tourism	40	136,942	10	7,006	21,612
Tourism-induced sector	33	153,120	114	20,224	29,017
Commerce	26	130,400	5	32,939	46,257
Homestay	24	27,450	156	15,061	9,829
Manufacture	23	20,400	232	4,056	5,060
Total	104	408,936	308	68,166	58,100

Source: Author's survey in 2008.

Note: Income consists of retained value added from productions, labor factor payments, capital gain, and money transfer. Retained value added rate in each production can be seen in the annex 4.

Table A-7: Ratio of income to the total household income in 2007 ranked by the mean ratio

Sources of income in 2007	Ratio to total household income in 2007 (%)				
	N	Max	Min	Mean	s.d.
Agriculture	95	98.89	0.17	55.05	28.40
Non-agricultural labor service	61	96.47	0.18	29.13	27.78
Commerce	26	99.81	0.02	23.84	29.21
Tourism-induced sector	33	100.00	0.20	21.61	21.86
Homestay	24	58.52	0.22	17.61	14.63
Agricultural labor service	47	97.43	0.48	10.90	20.99
Finance	67	95.59	0.01	10.13	18.71
Manufacture	23	32.60	0.18	6.90	7.74
Core tourism	40	33.49	0.01	6.10	7.59

Source: Author's survey in 2008.

Table A8: Changes of all households' income 2003 – 2007 sorted by the contributions to the net change

Sources of income	Income change in that category (Baht)	Contribution to the net change (%)
1. Commerce	704,195	27.70
2. Tourism-induced sector	680,652	26.77
3. Non-agricultural labor service	521,264	20.50
4. Homestay	322,485	12.68
5. Core tourism	215,463	8.47
6. Finance	214,281	8.43
7. Manufacture	64,938	2.55
8. Agricultural labor service	3,842	0.15
9. Agriculture	-171,445	-6.74
Total (Net change of income of all households)	2,542,418	100.00

Source: Author's calculation.

Annex 6: Correlation among independent variables

Table A9: Correlation among independent variables

	SCHOOL	AGE	WOMEN	DISTANCE	MEMBERS	DEPRAT03
Schooling (SCHOOL)	1.000000					
Age in 2003 (AGE)	-0.266357	1.000000				
Women in 2003 (WOMEN)	0.162652	-0.287452	1.000000			
Distance within 1 km from village center (DISTANCE)	-0.067750	0.021360	0.076316	1.000000		
Number of household members 2003 (MEMBERS)	0.014321	-0.461032	0.302768	0.040797	1.000000	
Dependency ratio 2003 (DEPRAT03)	-0.345935	-0.265313	0.213111	0.076395	0.414631	1.000000
Change of dependency ratio (D_DEPRAT)	0.043984	0.124189	-0.152911	-0.076070	-0.005518	-0.423593
Change of number of household members (D_POP)	0.200281	0.158491	-0.116878	0.138825	-0.477732	-0.186761
Initial income in 2003 (INCOME2003)	0.170415	0.026875	0.149760	0.154391	0.194842	-0.132258
Poverty gap in 2003 (POVGAP03)	0.155922	0.189468	0.059712	0.143421	-0.192711	-0.249143
Ratio of tourism income to total household income 2003 (RAT_TOUR03)	0.232150	-0.124799	0.114344	-0.001792	0.117007	-0.069593

Source: Calculation by Stata

Table A10: Correlation among independent variables (cont.)

	D_DEPRAT	D_POP	INCOME2003	POVGAP03	RAT_TOUR03
Change of dependency ratio (D_DEPRAT)	1.000000				
Change of number of household members (D_POP)	-0.011903	1.000000			
Initial income in 2003 (INCOME2003)	0.105242	-0.025330	1.000000		
Poverty gap in 2003 (POVGAP03)	0.103234	0.159623	0.920970	1.000000	
Ratio of tourism income to total household income 2003 (RAT_TOUR03)	0.085978	0.018519	0.172112	0.136251	1.000000

Source: Calculation by Stata

Annex 7 : Procedure of the construction of poverty line

Poverty line of each household was constructed following this procedure.

Step 1: Poverty lines for Chiang Mai province in 2002, 2004 and 2007 were quoted from the National Economic and Social Development Board of Thailand (NESDB). The number was not available for 2003 therefore this study used an average between 2002 and 2004 instead. The averaged number for 2003 was 1,144 Baht per person per month or 13,728 Baht per person per year. The number for 2007 was 1,394 Baht per month or 16,728 Baht per year.

Step 2: Urban and rural poverty lines of Northern region in 2002, 2004 and 2007 were quoted from NESDB. The decomposition of the lines for a particular province was not available. The ratio for 2003 was also unavailable. The study calculated the average values between 2002 and 2004 for it again.

The averaged urban and rural poverty lines in 2003 were 1,273 Baht and 1,060 Baht per person per month. The overall poverty line was 1,104 Baht.

For 2007, the urban and rural poverty lines were 1,469 and 1,292 Baht respectively. Its overall poverty line was 1,326 Baht.

Step 3: Find weights of urban and rural poverty lines in overall poverty line of the Northern region.

In 2003, a formula was used as follows:

1,104 = a * Urban + (1-a)* Rural
1,104 = a * 1,273 + (1-a)*1,060

a = 0.2066
1-a = 0.7934

In 2007, it was calculated using the same formula.

1,326 = b * 1,469 + (1-b)*1,292

b = 0.1921
1-b = 0.8079

Step 4: Assume that the weights of Chiang Mai province were the same as that of the Northern region. Then calculate urban and rural poverty line for Chiang Mai.

In 2003,
1,144 = 0.2066*Urban + 0.7934*Rural
Urban = (1,273 / 1,060) * Rural
Urban = 1.2009 * Rural
Rural poverty line = 1,098.41 Baht per person per month
Urban poverty line = 1,319.08 Baht per person per month

In 2007,
1,394 = 0.1921*Urban + 0.8079*Rural
Urban = (1,469 / 1,292) * Rural
Urban = 1.1370 * Rural
Rural poverty line = 1,358.25 Baht per person per month
Urban poverty line = 1,544.33 Baht per person per month

Apply the rural poverty line calculated from this step as the poverty line for the village since the village was located in the rural area of Chiang Mai province.

Step 5: Treat the poverty line derived from the previous step as a poverty line for adult male who needs at least 2,100 kilocalories per day for a regular living. For persons of different age and gender, calculate poverty lines according to the adult equivalence. The adult equivalence was based on food requirements studied by Nutrition Division, Health Department, Ministry of Public Health of Thailand in 2003. The figure was adopted by NESDB in its calculation of official poverty lines of Thailand.

Table A12: Adult equivalence used in this study

Age	Male	Female
Under 1 year old	0.381	0.381
1-3 year(s) old	0.476	0.476
4-5 years old	0.619	0.619
6-8 years old	0.667	0.667
9-12 years old	0.810	0.762
13-15 years old	1.000	0.857
16-18 years old	1.095	0.881
19-30 years old	1.024	0.833
31-50 years old	1.000	0.833
51-70 years old	1.000	0.833
More than 70 years old	0.833	0.738

Source: Nutrition Division, Health Department, Ministry of Public Health of Thailand in 2003 cited in NESDB's Thailand's official poverty lines

Step 6: List household members in each household. Specify their genders and ages. Then calculate the poverty line for each individual.

Step 7: Aggregate each individual poverty line into the poverty line of a household.

Annex 8: Correlation among working hours in economic activities

Table A13: Correlation among working hours in economic activities

	Homestay	Core tourism	Tourism-induced sector	Agriculture	Commerce	Agricultural labor service	Non-agricultural labor service
Homestay	1.0000						
Core tourism	0.4176	1.0000					
Tourism-induced sector	0.3145	0.6384	1.0000				
Agriculture	0.2585	0.0097	-0.0429	1.0000			
Commerce	-0.0680	0.1066	0.0754	-0.2457	1.0000		
Agricultural labor service	-0.1361	-0.1295	-0.1517	-0.0300	-0.1521	1.0000	
Non-agricultural labor service	-0.0596	-0.0522	-0.0857	-0.1350	-0.0417	-0.1250	1.0000

Source: Calculation by Stata

Annex 9: Two-stage least squares to handle the problem of simultaneous equations

In the investigation of the effects of the participation in tourism activities on household income change, it is believed that the working hours in tourism activities, W_t , is affected by the income change in the last period, ΔI_{t-1} . However, if the working hours in tourism activities are affected by the income change in the same period, ΔI_t instead, then they will form a system of simultaneous equations. This annex is a note that concerns the problem even though it is unlikely the case that may happen. It is also a note how to handle the case if someone would like to re-estimate the model following this setting.

The problem of simultaneity can be shown as follows:

$$\Delta I = \alpha_0 + \alpha_1 W + \sum_{i=2}^{N} \alpha_i X_i + \varepsilon_1 \quad \text{.....(9.1)}$$

$$W = \beta_0 + \beta_1 \Delta I + \sum_{j=2}^{M} \beta_j Z_j + \varepsilon_2 \quad \text{.....(9.2),}$$

where

ΔI = Household income change during 2003 and 2007

W = Working hours in tourism activities in 2007

X = Determinants of household income change

Z = Determinants of working hours in tourism activities

ε = error term

Textbooks such as Gujarati (1995), Maddala (2001), Schmidt (2005) and Studenmund (1997) suggest the similar way to find the instrumental variables. It begins by regressing the endogenous variables with all the exogenous variables. Then calculate the predicted value of the endogenous variables. Finally, applying these predicted values into the original model will solve the endogeneity problem.

By the method of two-stage least squares, equation (9.3) and (9.4) are the regressions of endogenous variables with all the exogenous variables.

$$\Delta I = \phi_0 + \sum_{i=1}^{N} \phi_i X_i + \sum_{j=N+1}^{M} \phi_j Z_j + \nu_1 \quad \text{.....(9.3)}$$

$$W = \eta_0 + \sum_{i=1}^{N} \eta_i X_i + \sum_{j=N+1}^{M} \eta_j Z_j + \nu_2 \quad \text{.....(9.4)}$$

Then, the predicted value of the endogenous variables can be obtained by equation (9.5) and (9.6).

$$\Delta \hat{I} = \phi_0 + \sum_{i=1}^{N} \phi_i X_i + \sum_{j=N+1}^{M} \phi_j Z_j \quad \text{.....(9.5)}$$

$$\hat{W} = \eta_0 + \sum_{i=1}^{N} \eta_i X_i + \sum_{j=N+1}^{M} \eta_j Z_j \quad \text{.....(9.6)}$$

After that, the predicted values are used as the instrumental variables in the original models as shown in equation (9.7) and (9.8).

$$\Delta I = \alpha_0 + \alpha_1 \hat{W} + \sum_{i=2}^{N} \alpha_i X_i + \varepsilon_1 \quad \text{.....(9.7)}$$

$$W = \beta_0 + \beta_1 \Delta \hat{I} + \sum_{j=2}^{M} \beta_j Z_j + \varepsilon_2 \quad \text{.....(9.8)}$$

When a set of joint determinants, H, are presented in both equations, the problem can be shown by equations (9.9) and (9.10).

$$\Delta I = \alpha_0 + \alpha_1 W + \sum_{i=2}^{N} \alpha_i X_i + \sum_{h=N+1}^{R} \alpha_h H_h + \varepsilon_1 \quad \text{.....(9.9)}$$

$$W = \beta_0 + \beta_1 \Delta I + \sum_{j=2}^{M} \beta_j Z_j + \sum_{k=M+1}^{Q} \beta_k H_K + \varepsilon_2 \quad \text{.....(9.10),}$$

where

X = The pure determinants only of household income change

Z = The pure determinants only of working hours in tourism activities

H = The joint determinants both of household income change and working hours in tourism activities.

In this case, Schmidt (2005) suggests that the variable H cannot be used in equation (9.3) and (9.4) as an instrumental variables otherwise either the problem of multicollinearity or omitted variable may occur. Therefore, the presence of H must be only in the original equations which are (9.9) and (9.10). It cannot be used to generate the predicted value of the endogenous variables in equation (9.3) and (9.4).

The information of the determinants of working hours in tourism activities, Z and H, are found in chapter 5. The only problem is that the variable X is still unknown. As long as X is discovered, the predicted value of the working hours can be estimated.

The estimation strategy can be conducted as follows. First, it will regress the household income change with all possible determinants including the determinants of the working hours in tourism activities. Second, when a joint determinant, H, is found significant in this model, it is excluded from the list of variables that will generate the predicted value of the working hours. Third, the predicted value of the working hours will be estimated by only the

pure determinants of the working hours, Z and the pure determinants of income change, X. Last, the predicted value of the working hours will serve as the instrumental variable in the main model.

The limitation of the instrumental variable method should be noted here. It is not applicable when more than one tourism activity are possible to be determinants of income change. The working hours in tourism activities are divided into three variables. They are the working hours in homestay, core tourism and tourism induced sector. The main model should contain all of them in one equation as illustrated in equation (9.11). However, it is not possible to do so.

The estimation of equation (9.11) will possibly harm the model with multicollinearity. Because they are generated by almost the same set of variables, they may be highly correlated and violate the OLS assumption when they are assigned to be regressors together. Therefore, it is safer to estimate each of them separately.

Instead of estimating equation (9.11), the study will estimate equations (9.12), (9.13) and (9.14).

$$\Delta I_t = \alpha_0 + \left(\alpha_1 \hat{W}_{1t} + \alpha_2 \hat{W}_{2t} + \alpha_3 \hat{W}_{3t}\right) + \sum_{i=4}^{N+2} \alpha_i X_i + \sum_{h=N+3}^{R+2} \alpha_h H_h + \varepsilon_1 \quad \text{.....(9.11)}$$

$$\Delta I_t = \pi_{10} + \pi_{11} \hat{W}_{1t} + \sum_{i=2}^{N} \pi_{1i} X_i + \sum_{h=N+1}^{R} \pi_{2h} H_h + \varepsilon_{11} \quad \text{.....(9.12)}$$

$$\Delta I_t = \pi_{20} + \pi_{21} \hat{W}_{2t} + \sum_{i=2}^{N} \pi_{2i} X_i + \sum_{h=N+1}^{R} \pi_{2h} H_h + \varepsilon_{21} \quad \text{.....(9.13)}$$

$$\Delta I_t = \pi_{30} + \pi_{31} \hat{W}_{3t} + \sum_{i=2}^{N} \pi_{3i} X_i + \sum_{h=N+1}^{R} \pi_{2h} H_h + \varepsilon_{31} \quad \text{.....(9.14)}$$

where

$\hat{W}_1$ = The predicted value of working hours in homestay in 2007

$\hat{W}_2$ = The predicted value of working hours in core tourism in 2007

$\hat{W}_3$ = The predicted value of working hours in tourism-induced sector in 2007

The estimation of equation (6.10) was tried. It was found that the regression with more than one instrumented variable yielded puzzling results such as the curious signs of coefficients and fluctuating standard errors. In contrast, using only one instrumented variable yielded better-behaved results.

Annex 10: Dynamic of households

Definitions
Group 1: Participated in tourism in 2003 and continued to 2007
Group 2: Participated in tourism in 2003 but stopped before 2007
Group 3: Participated in tourism in 2007 but not in 2003
Group 4: Did not participate in tourism at all

Table A14: Number of household in each group (Unit: households)

	Group 1: Participated in tourism in 2003 and continued to 2007	**Group 2:** Participated in tourism in 2003 but stopped before 2007	**Group 3:** Participated in tourism in 2007 but not in 2003	**Group 4:** Did not participate in tourism at all
Number of households (Total: 104 households)	21	8	35	40

Source: surveys in 2004 and 2008

Table A15: Average income change of households during 2003 - 2007 (Unit: US Dollar per household)

Sources of household income	**Group 1:** Participated in tourism in 2003 and continued to 2007	**Group 2:** Participated in tourism in 2003 but stopped before 2007	**Group 3:** Participated in tourism in 2007 but not in 2003	**Group 4:** Did not participate in tourism at all
Agriculture	-167.97	-262.20	193.77	-160.42
Manufacture	9.33	44.55	24.85	14.24
Commerce	389.78	0.64	234.46	130.29
Agricultural services	-17.74	17.43	-2.06	10.56
Non-agricultural services	128.78	405.37	220.59	58.15
Finance	14.30	24.27	62.60	107.43
Tourism	998.19	-96.59	479.87	0.00
Total	1,354.65	133.48	1,214.08	160.26

Source: Calculation from survey data

Table A16: Summation of household income change in each group during 2003 - 2007 (Unit: Baht)

Sources of household income	**Group 1:** Participated in tourism in 2003 and continued to 2007 **(N=21)**	**Group 2:** Participated in tourism in 2003 but stopped before 2007 **(N=8)**	**Group 3:** Participated in tourism in 2007 but not in 2003 **(N=35)**	**Group 4:** Did not participate in tourism at all **(N=40)**
Agriculture	-3,527.40	-2,097.67	6,781.59	-6,417.18
Manufacture	196.07	356.40	870.33	569.78
Commerce	8,185.39	5.06	8,205.80	5,211.41
Agricultural services	-372.75	139.52	-71.53	422.68
Non-agricultural services	2,704.27	3,242.84	7,721.02	2,326.48
Finance	300.06	194.20	2,190.67	4,296.90
Tourism	20,962.10	-772.66	16,795.58	0.00
Total	28,447.74	1,067.72	42,493.46	6,410.03

Source: Calculation from survey data

Table A17: Decomposition of the change of household income during 2003 - 2007 (Unit: percent)

	Group 1: Participated in tourism in 2003 and continued to 2007	**Group 2:** Participated in tourism in 2003 but stopped before 2007	**Group 3:** Participated in tourism in 2007 but not in 2003	**Group 4:** Did not participate in tourism at all
Agriculture	**-12.40**	**-196.46**	15.96	**-100.11**
Manufacture	0.69	33.38	2.05	8.89
Commerce	28.77	0.48	19.31	*81.30*
Agricultural services	**-1.31**	13.07	**-0.17**	6.59
Non-agricultural services	9.51	*303.71*	18.17	36.29
Finance	1.05	18.19	5.16	67.03
Tourism	*73.69*	**-72.36**	*39.53*	0.00
Total	**100.00**	**100.00**	**100.00**	**100.00**

Source: Calculation from survey data

Note: This is not the income growth. It is the percentage of income change in each category to the total income change.

The bold number indicates the income that the households sacrificed to shift to other sources of income.

The italic number indicates the major contributor to the positive change of income.

Annex 11: Sensitivity analysis of elasticity of substitution and elasticity of transformation in VCGE model

The results from the sensitivity analysis of the VCGE model under various settings of elasticities of substitution and elasticities of transformation are presented in Table A18 to A26.

Table A18: The results of the simulation of various tourism prices under a fixed labor endowment using elasticity of substitution equals to 0.8 and elasticity of transformation equals to 0.8.

Growth of tourism price (%)	Growth of tourism output (%)	Growth of tourism value (%)	Income multiplier (times)	Value added multiplier (times)
-30	-94.33	-96.03	6.96	0.22
-20	-45.69	-56.55	6.61	0.76
-10	-15.86	-24.27	6.05	0.94
0	0.00	0.00	0.00	0.00
10	9.06	19.97	5.47	1.21
20	15.64	38.77	5.37	1.32
30	20.67	56.87	5.26	1.44
40	25.08	75.11	5.22	1.54
50	29.15	93.73	5.26	1.63
60	32.17	111.47	5.31	1.71
70	34.64	128.89	5.37	1.79
80	37.38	147.28	5.47	1.87
90	40.93	167.77	5.62	1.94
100	44.95	189.90	5.79	2.01

Source: Simulation

Table A19: The results of the simulation of various tourism prices under a fixed labor endowment using elasticity of substitution equals to 0.8 and elasticity of transformation equals to 1.

Growth of tourism price (%)	Growth of tourism output (%)	Growth of tourism value (%)	Income multiplier (times)	Value added multiplier (times)
-30	-97.60	-98.32	7.04	0.15
-20	-49.65	-59.72	6.64	0.79
-10	-17.50	-25.75	6.02	0.96
0	0.00	0.00	0.00	0.00
10	10.30	21.33	5.42	1.23
20	18.25	41.90	5.34	1.35
30	24.12	61.36	5.17	1.47
40	28.69	80.17	5.08	1.58
50	33.02	99.53	5.12	1.68
60	37.36	119.78	5.22	1.77
70	41.79	141.04	5.36	1.85
80	46.92	164.46	5.55	1.93
90	52.34	189.45	5.75	2.00
100	58.73	217.46	5.99	2.06

Source: Simulation

Table A20: The results of the simulation of various tourism prices under a fixed labor endowment using elasticity of substitution equals to 0.8 and elasticity of transformation equals to 1.2.

Growth of tourism price (%)	Growth of tourism output (%)	Growth of tourism value (%)	Income multiplier (times)	Value added multiplier (times)
-30	-99.21	-99.45	7.06	0.12
-20	-53.21	-62.49	6.62	0.82
-10	-19.02	-27.12	5.98	1.00
0	0.00	0.00	0.00	0.00
10	11.52	22.67	5.37	1.26
20	20.98	45.18	5.31	1.37
30	27.95	66.34	5.18	1.50
40	34.01	87.61	5.12	1.61
50	39.77	109.66	5.18	1.71
60	45.68	133.09	5.32	1.80
70	51.58	157.69	5.49	1.89
80	57.78	184.00	5.69	1.97
90	64.57	212.68	5.92	2.04
100	71.97	243.94	6.18	2.11

Source: Simulation

Table A21: The results of the simulation of various tourism prices under a fixed labor endowment using elasticity of substitution equals to 1 and elasticity of transformation equals to 0.8.

Growth of tourism price (%)	Growth of tourism output (%)	Growth of tourism value (%)	Income multiplier (times)	Value added multiplier (times)
-30	-92.41	-94.69	6.71	0.20
-20	-47.36	-57.89	6.53	0.77
-10	-16.73	-25.06	6.02	0.96
0	0.00	0.00	0.00	0.00
10	9.96	20.96	5.52	1.23
20	17.63	41.16	5.46	1.35
30	23.63	60.72	5.37	1.47
40	28.60	80.04	5.34	1.58
50	32.90	99.35	5.39	1.68
60	37.13	119.41	5.51	1.77
70	41.43	140.43	5.65	1.85
80	46.41	163.54	5.83	1.93
90	51.57	187.98	6.03	2.00
100	57.18	214.36	6.24	2.07

Source: Simulation

Table A22: The results of the simulation of various tourism prices under a fixed labor endowment using elasticity of substitution equals to 1 and elasticity of transformation equals to 1.

Growth of tourism price (%)	Growth of tourism output (%)	Growth of tourism value (%)	Income multiplier (times)	Value added multiplier (times)
-30	-96.10	-97.27	6.90	0.12
-20	-51.49	-61.19	6.57	0.79
-10	-18.29	-26.46	5.99	0.99
0	0.00	0.00	0.00	0.00
10	11.14	22.25	5.47	1.26
20	19.92	43.90	5.44	1.38
30	27.43	65.66	5.35	1.50
40	33.42	86.79	5.32	1.61
50	39.02	108.53	5.39	1.71
60	44.84	131.74	5.55	1.81
70	50.98	156.67	5.74	1.89
80	57.46	183.43	5.96	1.97
90	64.46	212.47	6.21	2.05
100	72.35	244.70	6.49	2.12

Source: Simulation

Table A23: The results of the simulation of various tourism prices under a fixed labor endowment using elasticity of substitution equals to 1 and elasticity of transformation equals to 1.2 (base case).

Growth of tourism price (%)	Growth of tourism output (%)	Growth of tourism value (%)	Income multiplier (times)	Value added multiplier (times)
-30	-97.67	-98.37	6.88	0.11
-20	-55.23	-64.18	6.57	0.82
-10	-19.75	-27.78	5.93	1.02
0	0.00	0.00	0.00	0.00
10	12.33	23.56	5.41	1.28
20	22.89	47.47	5.40	1.40
30	31.17	70.52	5.34	1.52
40	38.63	94.08	5.35	1.64
50	45.71	118.57	5.45	1.74
60	52.88	144.61	5.62	1.84
70	60.23	172.39	5.84	1.93
80	67.86	202.15	6.08	2.01
90	75.97	234.34	6.35	2.09
100	84.60	269.20	6.63	2.16

Source: Simulation

Table A24: The results of the simulation of various tourism prices under a fixed labor endowment using elasticity of substitution equals to 1.2 and elasticity of transformation equals to 0.8.

Growth of tourism price (%)	Growth of tourism output (%)	Growth of tourism value (%)	Income multiplier (times)	Value added multiplier (times)
-30	-90.81	-93.57	6.50	0.22
-20	-48.43	-58.74	6.43	0.79
-10	-17.40	-25.66	5.98	0.99
0	0.00	0.00	0.00	0.00
10	10.78	21.86	5.58	1.26
20	19.47	43.36	5.56	1.38
30	26.52	64.48	5.51	1.50
40	32.47	85.46	5.53	1.62
50	37.82	106.73	5.62	1.72
60	43.20	129.12	5.77	1.81
70	48.90	153.13	5.96	1.90
80	55.31	179.56	6.19	1.98
90	62.14	208.07	6.43	2.06
100	69.45	238.90	6.70	2.13

Source: Simulation

Table A25: The results of the simulation of various tourism prices under a fixed labor endowment using elasticity of substitution equals to 1.2 and elasticity of transformation equals to 1.

Growth of tourism price (%)	Growth of tourism output (%)	Growth of tourism value (%)	Income multiplier (times)	Value added multiplier (times)
-30	-94.70	-96.29	6.73	0.13
-20	-52.86	-62.29	6.50	0.80
-10	-18.90	-27.01	5.94	1.02
0	0.00	0.00	0.00	0.00
10	11.91	23.10	5.52	1.28
20	21.34	45.61	5.54	1.40
30	30.32	69.42	5.53	1.52
40	37.86	93.00	5.56	1.64
50	44.91	117.37	5.69	1.74
60	51.98	143.17	5.87	1.84
70	59.47	171.10	6.10	1.93
80	67.41	201.34	6.36	2.02
90	75.87	234.15	6.65	2.09
100	84.90	269.80	6.95	2.17

Source: Simulation

Table A26: The results of the simulation of various tourism prices under a fixed labor endowment using elasticity of substitution equals to 1.2 and elasticity of transformation equals to 1.2.

Growth of tourism price (%)	Growth of tourism output (%)	Growth of tourism value (%)	Income multiplier (times)	Value added multiplier (times)
-30	-96.53	-97.57	6.74	0.11
-20	-57.14	-65.71	6.53	0.82
-10	-20.36	-28.32	5.89	1.04
0	0.00	0.00	0.00	0.00
10	13.10	24.41	5.46	1.30
20	24.57	49.48	5.49	1.42
30	34.05	74.27	5.48	1.55
40	42.77	99.88	5.55	1.67
50	51.22	126.83	5.71	1.78
60	59.63	155.41	5.92	1.88
70	68.33	186.16	6.17	1.97
80	77.34	219.21	6.45	2.06
90	86.69	254.71	6.75	2.14
100	96.36	292.72	7.05	2.22

Source: Simulation

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