Pak Mun Dam and its Impact on Local Residents of Ubon Ratchathani Province, Thailand: A Quantitative Analysis

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Abstract

Many dams have been built along the Mae Khong River, bringing up many issues, including that of sustainable livelihood. Pak Mun Dam is one of the most controversial dams in Thailand, and its issues have continued to today. While many studies on dams have been conducted, this is the first quantitative study, using the Structural Equation Model to understand the eight dimensions of well-being. The survey on which this dissertation is based collected 250 pieces of data for the impacted community and 250 pieces of data for the non-impacted community of the Khong Jiam district in the Ubon Ratchathani province of Thailand.

The eight dimensions of well-being are based on concepts and theories about achieving sustainable livelihoods. Within these eight dimensions, there are 24 out of 40 items that have a lower mean for the impacted community, in comparison to the non-impacted community, which is statistically significant.

Based on the sustainable livelihood framework model, institutions (in this case, the government) play the role of providing strategies to increase well-being assets directly in terms of overall well-being and through dimensions of well-being. In this model, the government's interventions are public services, quality of job training, and the satisfaction level for the Pak Mun Dam solution.

The empirical results of the first order factors show that there are seven factors that are statistically included as first order factors with twenty items. These twenty items represent the factors of economics, community, environment, politics, working conditions, culture, and family. Second order factors were included in the structural model as independent variables in order to predict the dependent variable of overall well-being. Economic well-being and social well-being are statistically significant factors for predicting overall well-being; they can also be mediators of the model. The results from the structural model show that there is full mediation within this model, which means that the government's impact on overall well-being can only be explained through increasing economic and social well-being. The satisfaction level of Pak Mun Dam's government solution would impact overall

well-being through the mediation of economic well-. The government's quality of job training and the provision of government services would impact overall well-being through social well-being.

In addition to the benefit of standardized estimates of economic and social well-being, the institutions can use the twenty items to help specify factors and provide better policy to maintain sustainable livelihoods based on their precise information. The marginal rate of substitution (MRS) result also shows the relationship between economic well-being and social well-being: local community residents would give up more of their economic well-being to gain more social well-being. This shows that their social well-being is a very important factor for their livelihoods.

The study is significant for six reasons. First, it is the first quantitative study of the well-being of local residents impacted by the dam; it also provides more complete information and deeper understanding about each dimension of well-being. Second, this study is the first study that combines more dimensions of well-being based on SLF into a single study. Third, it has furthered the work of existing studies with SEM to SLF to investigate the impact of the dam. Fourth, it informs policymakers so that they can provide more suitable policies to achieve sustainable livelihoods. Fifth, the study also adds the MRS concept to understand local residents' decision-making process on well-being, and it can be used to create the well-being index and trade-off analysis for SLF projects. Last, testing the important of institute with specific needs of local residents would be more efficient for SLF project.

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Pak Mun Dam and its Impact on Local Residents of Ubon Ratchathani Province, Thailand: A Quantitative Analysis

Chapter 1: Introduction

Introduction

Water resource management, electricity production, and flood protection are just a few essential functions of a dam, and many dam projects have been proposed for the Mae Khong River in Thailand. Pak Mun Dam is located where three major rivers—the Mun, the Chee, and the Mae Khong—converge in the northeastern region of Thailand. Many local residents have experienced some impacts from the dam, either directly or indirectly, since its completion in 1994. Residents have claimed negative impacts to their livelihood and have protested the dam or demanded to have its gate opened permanently, and many non-governmental organizations (NGOs) have used information from previous studies to support this position. Previous studies have noted changes to economic well-being (EWB), social well-being (SWB), and environmental well-being (ENWB), but well-being is not the only significant issue. This dam is controversial. Many studies mention negative effects on the local community, including economic impact, loss of fishing, loss of income from fishing, lack of water, and detrimental ecological changes through loss of fish species within the site. In addition, a significant cultural event has been canceled because dam construction flooded the event site. Local residents have been separated from their families, resulting in a loss of relationships, and have lost their jobs, resulting in a loss of identity and culture. Eventually, impacted local communities petitioned the government to open the dam's sluice gate permanently and to compensate them for income lost during the dam's construction, but the government has refused to do so.

Background and Geographic Information about the Khong Jiam District and Ubon Ratchathani Province

Located in the far eastern region of the Ubon Ratchathani province, adjacent to the Mae Khong River and across from the Laos boarder, the Khong Jiam district is a popular tourist destination. The Mun River runs through the southern part of the district, and the Khong River runs along the border between Laos and Thailand. The Pak Mun Dam is located at the confluence of the two rivers. The villages along the Mun River have been impacted most negatively by the dam.

The Khong Jiam district has five subdistricts with 50 villages. Approximately 32,693 people live in an area of 295.4 square miles, and most people work in the rice paddy fields and fish in the rivers.

Figure 1. Map of Ubon Ratchathani Province. Retrieved from
https://www.awakohchang.com/ubonratchathani/ubonratchathani_map.html.
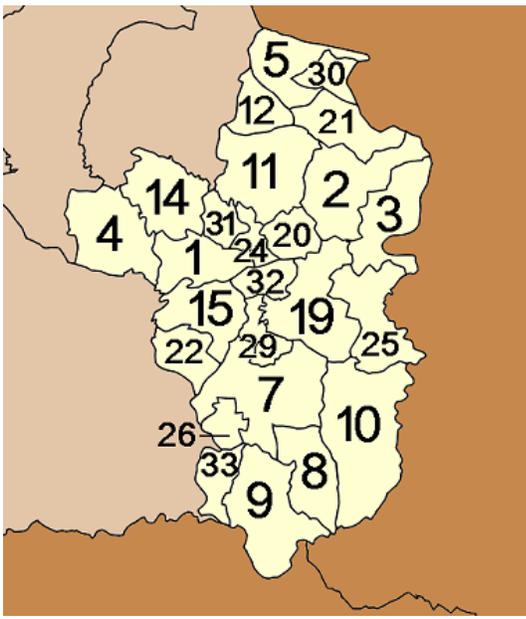
Figure 2. Map of Ubon Ratchathani province with all districts. Retrieved from
http://www.ubonratchathani.go.th/th/

On the map in Figure 2, number 3 represents the Khong Jiam district. Table 1 shows the numbers that represent other districts.

Table 1. Names of Districts in Khong Jiam Province

Number	District	Number	District
1	Muang Ubon	22	Samrong
2	Si Mueang Mai	24	Don Mot Daeng
3	Khong Jiam	25	Sirindhorn
4	Khueang Nai	26	Thung Si Udom
5	Khemarat	29	Na Yia
7	Det Udom	30	Na Tan
8	Na Chaluai	31	Lao Suea Kok
9	Nam Yuen	32	Sa Wang Wirawong
10	Buntharik	33	Nam Khun
11	Trakan PhuetPhon		
12	Kut Kha opun		
14	Muang Sam Sip		
15	Warin Chamrap		
19	Phiboon Mangsahan		
20	Tan Sum		
21	Pho Sai		

Background of the Dam
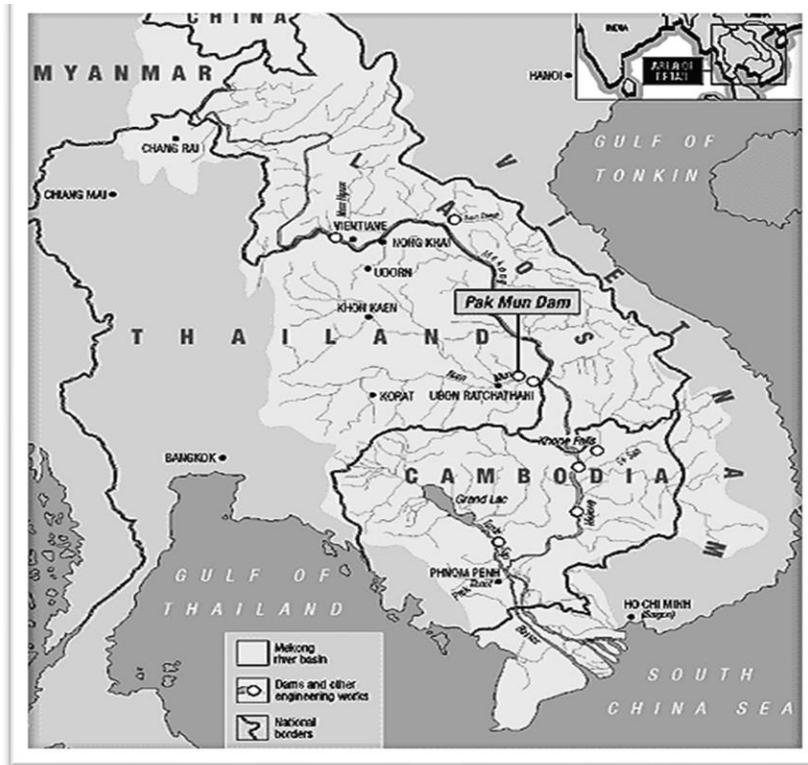
Figure 3. The location of Pak Mun Dam

General Information on Pak Mun Dam

Pak Mun Dam is one of the most significant dams in Thailand. Located in the Mun and Chi river basins at Ban Hua Heo village, the dam is a roller-compacted concrete structure with a maximum height of 17 meters and a total length of 300 meters. The reservoir has a surface area of 60 km^2 at the normal high-water level of 108 meters above mean sea level (Amornsakchai, 2000).

The main reasons for constructing the Pak Mun Dam were hydropower, irrigation in Khong Jiam district, without any negative impact to Kaeng Tana rapid which is the main tourism area in the dam project site. Electricity Generating Authority of Thailand expected that the dam would produce 75 MW capacity and annual output of 280.2 GWh. The dam was built with a loan of approximately $25 million from the World Bank, but the actual construction cost was $260 million. Moreover, compensation for the residents who had to

be relocated comprised approximately $44 million (in 1999), and compensation for fishing income losses during the three years of construction totaled approximately $15.8 million. The dam was finally completed and opened in 1994 (Amornsakchai, 2000).

Dam Issues and Expectations

Many protesters and NGOs asked the government to stop building the dam, but the government ignored them (Manorom, 2009). After the dam was completed and began operating, the amount of electricity produced was lower than the amount proposed to the World Bank. In addition, the livelihood of local communities had been changed significantly. Protesters petitioned their government to improve their livelihood and return it to its state prior to dam construction. Many NGOs and local residents requested that the dam's sluice gate be opened to accommodate fishing, thus allowing residents to regain their previous livelihood.

In assessing the overall impact of the dam, NGOs, reports, articles, news, and research studies have classified the many negative impacts into eight dimensions that provide the focus of this study. Questionnaires for this study were based on this information and on the literature review for each dimension. The categories are as follows.

1) Economic well-being: The closing of the sluice gate has had a negative economic impact. Many residents still fish as before, but fishing production is only 20–40% of what it once was (Manorom, 2006). The production revenue of fish has decreased about $1.4 million dollars per year since the dam's completion (Amornsakchai, 2000). Furthermore, many residents must buy fish since they cannot catch enough fish to consume. Many local residents earned income from fishing before the dam was built. As the number of fish decreased, they lost their

income during the three years of the dam's construction (Amornsakchai, 2000). The survey questions in this study were based on the residents' personal financial conditions when they experienced income reduction.

2) Social well-being: Communities have been separated because construction forced their residents to move to other places. Many residents were not placed in the same community. This dam also changed their relationships because the river is the place where they met and interacted, developed their social network of exchange, and shared information (Amornsakchai et al., 2000). Moreover, the community changed after the dam was opened because they were unable to participate in cultural ceremonies and were unable to fish together.

3) Working well-being: The local residents complained that they had lost their jobs and had to work in areas that did not fit with their previous working experience, such as farming, broom making, and handicrafts (Kiguchi, 2016).

4) Family well-being: Relocation of residents has had a negative social impact because young people have had to move to cities to find jobs, and thus the local residents' way of life has changed. Residents also have had to move away from their ancestral homes (Kiguchi, 2016). Because of this, close relationships between family members have been lost. The corresponding survey questions are related to family relationships, how family members feel about each other, and the amount of time spent together since family members were separated by construction of the dam.

5) Cultural well-being: The dam is located where locals and tourists traditionally celebrated the annual Thai New Year or SongKran festival. About 50 rapids were

considered "sacred" by the local communities, but since the dam's completion, the rapids have been underwater. The local communities lost their character, and the number of participants steadily decreased (Amornsakchai, 2000). Thus, the festival was canceled after the dam was completed and was held in the temple instead. The survey questions regarding cultural well-being asked participants about their understanding of the culture, how they felt about participating in cultural activities, and how cultural events focused on traditions, such as the Thai New Year ceremony, united the community.

6) Environmental well-being: The dam has impacted the environment negatively. Since 1994, 96 of 265 species of fish have left the region, and two have disappeared completely (Manorom, 2006). The survey questions regarding environmental well-being asked local residents about the quantity and quality of fish and water available to them.

7) The dam's electricity output was lower than proposed, from 136 MW to only 40 MW (Amornsakchai, 2000).

NGOs claim that area residents no longer have sustainable livelihoods. Residents and NGOs used a study by Manorom and Vallibhotama (2006) to support their request to open the sluice gate permanently to improve both their livelihood and the ecosystem around the dam, but the request has not been approved by the government, even though the government promised to open it in 2011. Seven years have passed since this study, and local residents still claim that their lives are worse because of the dam.

Statement of the Problem

Pak Mun Dam has been problematic since it was built. The dam was expected to benefit the northern region of Thailand in terms of electricity production, but the outcome did not provide as many benefits as expected. In addition to producing less electricity than expected, the dam affected biodiversity, fish stock, and fish migration negatively. Since the completion of the dam, 169 species found before construction are absent, and 51 species appear in lesser quantities. At least another 50 species of rapid-dependent fish have disappeared (Amornsakchai, 2000). This dam also has impacted the local community in many ways, as discussed below.

Residents have claimed that their lives and livelihoods have changed and have been negatively affected by the main measurements of social, economic, and environmental domains, including such specific factors as quality of water, decreasing numbers of fish species, loss of income, loss of community cohesion, and the suspension of the community festival during construction and after the dam's completion. Seven years after the government's refusal to open the sluice gate permanently, it seems their lives have never been changed positively, even though there have been both positive and negative impacts for the Khong Jiam district (these will be discussed in Chapter 2).

Previous studies have expressed primarily what those researchers want others to know about. As a result, many have been biased too heavily on one side or have focused on a limited number of domains, while positive impacts might lie within the omitted domain. Manorom (2008), who has worked on the Pak Mun Dam, proposes that it is necessary to study more aspects of how the dam has impacted the community and to monitor these aspects for a long period of time. In addition, objective well-being (ObjWB) indicators for each domain have been studied, but subjective well-being (SubWB) has not

been included as an important indicator for many domains. Combining both ObjWB and SubWB would provide a better understanding of residents' well-being and would provide more precise information to the government. Moreover, a quantitative study of this case has never been conducted using the achievement of three goals of sustainability theory based on economic, environmental, and social aspects. The outcome of this study would help us to understand the importance of each well-being dimension, the importance of the government's intervention (both institutional and policy), and how government intervention could improve the well-being dimension and overall well-being (OWB). This dam has been controversial for a long time, and a complete study would provide information that could help prevent repetition of the same problems for other proposed dams.

The results of this study will provide and document information for any future dams that may be built along the Mae Khong River, some of which have already been proposed. For example, the Xayaburi Dam and the Don Sahong Dam in Laos and the Sambor Dam in Cambodia would have similar issues to Pak Mun Dam

Purpose of the Study

The purpose of this research is to study how the ObjWB and SubWB of local residents have been impacted by the Pak Mun Dam using a multidimensional well-being model and the Sustainable Livelihoods Framework (SLF). Multidimensional well-being has been used to measure the well-being of people in United Nations (UN) studies. The UN and many countries use similar methods of multidimensional well-being. For example, the UN has used the Human Development Index, which uses 11 dimensions to measure

people's well-being. The Organization for Economic Co-operation and Development (OECD) uses five dimensions for its Better Life index. The British Department for International Development (DFID, 1999) SLF also focuses on the capital of five dimensions that are based on three principal areas: economic, social, and environmental. SLF is considered the multi dimension model.

The goals of this study are as follows:

1) This study will gather significant information regarding the well-being of the impacted community as compared to the non-impacted community so that this information can be used as a model for future dams along the Mae Khong River.

2) This study will compare the differences between the well-being of the previous community and newly settled residents in the study population to observe the change of well-being based on different times of settlement.

3) This study will advance the understanding of well-being information by using quantitative methods to achieve a sustainability theory based on economic, environmental, and social aspects.

4) This study will test the model to achieve a multidimensional well-being model based on SLF goals.

Research Questions

1) How does well-being differ between the control group and the study group?

2) How different are the well-being domains between the old community and the late-settled residents in the study group?

3) How does each domain's well-being impact overall well-being? What is the statistical significance of well-being domains for the overall well-being of the study group?

4) What is the marginal rate of substitution (MRS) between economic, environmental, and social well-being dimensions?

5) How does government (institutional) intervention address the issue of improving sustainable livelihood development?

Significance of This Study

This research will provide a significant contribution to the underdeveloped area of well-being with multiple dimensions and SubWB in the case of Pak Mun Dam. The main significance of this study is that no previous study combines SubWB and ObjWB to measure the OWB of residents affected by this dam. The overall dimensions should be used appropriately to describe the real impact of the dam on local residents. Furthermore, a quantitative study on well-being that achieves the sustainable livelihood goal based on economic, social, and environmental aspects has never been done. If the study of this dam's impact is to be applicable to any dam proposed to be built in this region, it is necessary to include nonbiased information with sufficient research. Another significant benefit of this research would be providing information to determine the factors the government should focus on to assist residents if opening the dam permanently is not an option. Two decades have passed, but the government has not solved all the issues; many residents still suffer from the effects of dam completion. This is the first quantitative study of the community's well-being using a structural equation model.

Chapter 2: Literature Review

This chapter focuses on the well-being theory, including both subjective well-being (SubWB) and objective well-being (ObjWB). Each section will be studied in terms of different well-being dimensions and the marginal rate of substitution of each well-being dimension. The chapter will provide information for each domain that impacts SubWB and ObjWB.

Well-Being

As a concept, well-being has been discussed often in development studies (Gasper, 2004). In many studies, it has multiple definitions, including happiness, life satisfaction, quality of life, life ability, and even social capital (Drabsch, 2012). The concept of measuring well-being is based on Sen's Capability Approach (CA) (Sen, 1980). Popular since the 1980s with regard to human well-being, Sen's approach focuses directly on quality of life through the functioning and capacity of an individual person. *Functioning* states include the "being and doing" of the person, and *capacity* refers to the set of functions that the person can access. The CA asserts that a high quality of life depends on multiple functions, but many researchers have questioned which functions are relevant for a quality of life evaluation. Sen (1999) included multiple functions of personal physiology, environmental factors, social conditions, family relations, and relational perspectives based on the concept of freedom to choose. He also noted that people have different adjustment capacities, even if they are provided with resources for each function.

Many philosophers have further developed the capability approach by adding justice as an important factor. While Sen focused on people's freedom, Nussbuam (1988) developed the capability of justice, which focuses on people's dignity by adding the

political principles of human rights. The different weights of each dimension (functioning and capability) are based on personal value judgment. Even though Sen did not mention a fixed number of capabilities that should be included, he recommended, "live long; escape avoidable morbidity; be well nourished; be able to read, write, and communicate; take part in literary and scientific pursuits; and so forth" (Sen, 1984: 497). This advice includes only external and social aspects. Gasper (2002) has criticized Sen for not including other important values that motivate human action, such as feelings for other people (empathy) and commitment to feelings beyond personal well-being. This is true, as Sen only mentioned the basic needs, physical matter, and social aspects to achieve higher satisfaction (utility). Aristotelian theory maintains that achieving higher utility is utilitarianism. Sen's concept might not be enough to achieve higher human well-being, but it needs to be considered.

The CA was originally developed to measure well-being and the different dimensions of the well-being index. Since its publication, the concept of well-being has been revised, and many dimensions have been added. The most important added part is the internal feeling—psychological aspect and satisfaction. Sen later mentioned that this SubWB is considered to be the basis of his CA. CA, in turn, is the foundation for human development theory, which has been used to measure human well-being in many countries' indexes for human development, including the United Nations Development Program (UNDP)'s Human Development Index (HDI), the Quality of Life Index (QOL), and the Index of Social Progress (ISP).

In 1972, the King of Bhutan began tracking gross national happiness (GNH). In 2012, the measurements focused on standard of living, good governance, psychological

well-being, community vitality, cultural diversity and resilience, health, education, and ecological diversity and resilience (Berkshire, 2012). Residents were asked to answer questions related to nine dimensions of well-being, as mentioned above. The GNH index is calculated using the same weight for each dimension. This is an example of using SubWB as the primary measurement of human well-being. In 1974, Richard Easterlin tried to explain why, when highly developed countries such as the USA and those in Europe saw their economic growth increase dramatically, their happiness remained constant for a long period of time. In 1996, the UK was the first country to use sustainable development indicators to measure the well-being of a community.

Well-being comprises two areas: ObjWB and SubWB. ObjWB focuses on the material conditions that affect a person's life or the external factors that impact life itself, rather than merely the person's perception. Similar to Kahneman (2002), Cahyat, Gonner, and Haug (2003) have defined two conditions of ObjWB: core well-being—or such basic needs as material wealth, knowledge, and health—and sectional environments, such as natural, economic, political, and social spheres, and intersectional environments, such as infrastructure and services.

SubWB is a more internal, intangible well-being—not tangible in the way that ObjWB is derived. SubWB can be broken down further based on Kahneman's (2002) inclusion of emotional well-being, or the emotional quality of a person's everyday experiences and life evaluation. SubWB focuses on the emotions and feelings of people in terms of how they think about satisfaction in their lives (Diener, Oishi, & Lucas, 1999).

The main three areas that SubWB uses to measure well-being include cognitive evaluations of one's life, happiness, and satisfaction; positive emotions such as joy and pride; and negative emotions such as pain and worry. Parfit (1984) and Sumner (1996) recommended that such measurements should be done separately to derive a more comprehensive appreciation of people's lives.

SubWB can be measured by asking people directly about their happiness and life satisfaction; in such cases, the following three methods are used to measure SubWB: evaluation, experience, and eudemonia (Kahneman & Riis, 2005; Dolan et al., 2006; Waldron, 2010).

The Evaluation Measurement for SubWB

SubWB can be measured simply, just by directly asking subjects about their happiness in various domains of life, such as overall life satisfaction, health, job, etc. Frey and Stutzer (2002) and Van Praag and Ferrer-i-Carbonell (2005) noted that life satisfaction has been also studied by economists. While one study finds that happiness level has been studied instead of life satisfaction (Waldron, 2010), the outcome for both happiness level and life satisfaction provide similar results. Thus, they have been used as the same variable for SubWB.

The happiness level uses an experience measurement that is very close to real well-being for individuals, as this shows their feelings during a stated period of time. The bad and good, respectively, can be perceived by asking about pleasure and pain (Crisp, 2006). These positive and negative feelings or emotions can be expressed in terms such as happy, worried, sad, anxious, excited, etc.; the last section of SubWB uses eudemonic measures

to assess psychological needs such as meaning, autonomy, control, and connectedness (Ryff, 1989).

In 2011, Dolan and Metcalfe established the ONS Opinion Survey, a survey for subjective well-being. Based on the previously mentioned methods, the ONS uses four questions to determine SubWB measurement. For the evaluation method, the questions focus on how satisfied people are with their life overall. The experience measurement asks how they felt yesterday. The last measurement (eudemonia) asks two questions: how much purpose the respondent finds in life, and what valuable and worthwhile things the respondent has done.

While the concept of, and approaches to assessing, well-being have been well developed, more multidimensional domains have been introduced to measure well-being. This information has informed governmental policy considerations for many countries. Shape (1999) presents a survey of indicators that includes the three main indexes used worldwide to measure the well-being and quality of life of people in various countries. The UNDP's HDI, the QOL, and the ISP are good examples of newly developed multidimensional human well-being indexes. More domains have been added, such as the Canadian Index of Well-being (Michalos et al., 2011) and The Organization for Economic Co-operation and Development' s Interactive Better Life Index, which has been used to measure well-being in many countries. These indexes can encompass many dimensions. In addition to the multidimension model based on UNDP's HDI, there is a multidimension model based on the three pillars of sustainability: economic, social, and environmental. This concept was developed by Hammond (2004) but was originated by Clift (1995).

This chapter includes a literature review of each dimension used to measure well-being, the importance of each dimension to well-being, and the indicators used for each dimension. All are based on a sustainable livelihood of economic, social, and environmental aspects. These indicators will be included in the multidimension well-being model in the methodology chapter.

Economics (wealth).

Economic or wealth status is a critical domain that represents the well-being of a community, as progress in economic activities brings about a better quality of life through higher income and increased opportunity to consume more products and services. Favorable economic status will enable at least the basic needs in life, such as food, medical services, and shelter. Many indicators can be used to measure economic well-being.

The primary indicator is *income*, which can include income sources, income level, and income stability (Smith & Summers, 2011). Sources of income determine the security of the household and whether it would be able to arrange income over time. In general, higher income leads to higher quality of life. The Australian Bureau of Statistics (ABS) (2012) and Osberg and Sharpe (2003) use *economic insecurity*, such as less saving, debt, and temporary jobs, as their indicator for household economic well-being. Higher incidences of less saving and debt would create economic insecurity.

As part of income, *household productivity value* would be considered a measurement of economic security (ABS, 2012; Smith & Summers, 2011). Home productivity includes farming and harvest yield, as studied by Cahyat, Gonner, and Haug (2007), who also suggest that more productivity increases income and, thus, quality of

life. This guarantees that people will have sufficient food or products to consume, even if income from employment fluctuates. In general, higher household productivity results in more saving, more self-security, and more earned income.

Employment status represents the ability to work and use one's knowledge and previous experience to earn income to support oneself and a family through higher purchasing power and demand. Besides being a source of income, basic goods such as food and other capital can be used to fulfill basic economic needs for a family.

Stock of wealth or material wealth (Osberg & Sharpe, 2003) is another indicator to measure economic well-being. This also indicates the wealth of the family. Cahyat, Gonner, and Haug (2007) and Milligan, Fabian, Coope, and Errington (2006) collected information about whether local residents owned anything such as a means of transportation (e.g., a car), communication equipment such as a radio or TV, or a refrigerator to preserve their food. Physical capital generally includes the buildings and equipment used to produce goods and services, and these are also considered part of the stock of wealth (Hallowell & Pulnam, 2004).

Other basic needs include *shelter and the condition of shelter*. Streeten (1995) acknowledges this as one of the major basic needs for a person; there are many people who cannot afford to have their own space. Shelter is necessary for protection from harm and the elements, as well as for privacy. High-quality shelter is represented by the use of permanent materials, and this type of shelter increases well-being (Knight & Gunatilaka, 2012). In terms of crowding and housing space, a crowded house impacts health, both physical and mental, and lowers the well-being of the household (Baker et al., 2004).

SubWB also relates to *emotions, feelings, or worries of the economic condition* of an individual person or household, and this can represent another aspect of economic well-being (Prawitz et al., 2006a). Hanson (2007) also uses Prawitz's (2006) personal financial wellness (PFW) to attach financial stress to health risk, which is one measurement of subjective economic well-being.

Community well-being.

Social well-being is the second of the three main domains used to measure OWB. James (1890) and Mead (1934) noted that human well-being is the process of public and private production. Based on role theory, humans can overcome incongruity between private and public life and images (Goffman, 1959; Shaw & Costanzia, 1982). Being part of society or accepted by the community is crucial for humans to achieve basic social needs. When well-being was first being studied, the social dimension was a very broad area, encompassing community integration, community cohesion, education, politics, and culture. The approach in this study is based on the UNDP's HDI(Human Development Index, the QOL(Quality of Life,0 and OECD(Organisation for Economic Cooperation and Development}'s index, which distinguishes many elements within social dimensions to create a separate dimension. Only social integration—social relationship that strengthens the community—connects to the main parts of social well-being. The following are social well-being items within the social well-being dimension.

First is *social relationship;* this is the feeling of being part of the community and the feeling of being supported by society. Several studies (Cahyat, Gonner, & Haug, 2007; Rahman, Mittelhammer, & Wandschneider, 2003; Sen,1985) have noted that involvement in village decision-making determines how members of a community help

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each other and is also an indicator of social relationship. These researchers have also studied levels of trust and conflict in communities. The conflict indicator determines how peaceful and secure people are in a community. In addition to these indicators, Sen (1985, 1992) used social justice, inequality in life, and changes in a community as indicators for standard of living and quality of life, meaning that less social justice or large gaps in equality of social classes lead to lower well-being. Hagerty (1999) used women's participation in the workplace to determine women's rights to be part of the community (gender equality), as women are not treated the same as men in many developing areas.

Smith and Summers (2011) noted *social cohesion*, which includes the feeling of being connected by sharing the same interests, the same culture, and the same identity, as a crucial indicator for social well-being. Cahyat, Gonner, and Haug (2007) used the feeling of being acknowledged, respect, and the level of trust as measurements of SWB for social connection.

Social participation is also included in social connection (e.g., Knight & Gunatilaka, 2012; Putnam, 2000), and this type of community participation creates "social capital" that can produce positive SWB. It also creates a rewarding feeling of contact with other people and being a part of society. Some indicators defined by Smith and Summers (2011) determine whether the community has a social support program, a social engagement program, family bonding, or democratic engagement in the community. Any of these would increase the tightness of the community and SWB.

In addition to *community integration* and social cohesion, Coleman (1993), Putnam (2000), OECD (2001), and Woolcock (2001) have determined that social capital or social network can have positive impacts on *social trust* within the community. People who are

part of a community, have good connections, and live peacefully in a society acknowledge the importance of achieving social equality, and there is evidence that social inequality can reduce SWB (Veenhoven, 2008).

Besides the programs that encourage stronger community connections, as mentioned earlier, community size itself can have a major impact on social well-being. The size of a community impacts both ObjWB and SubWB (Noelle-Neumann, 1997). In the case of increasing ObjWB, Popastefanou and Rojas (1997) noted that the size of the community matters and that a big city can provide a positive impact via more jobs, more income, better education, and better infrastructure. At the same time, city living may lower ObjWB through higher crime, pollution, and crowdedness, and may lower SubWB via feelings of isolation and loss of community integration.

The final indicator of social well-being is _safety and security or freedom from harm_, which can be measured by crime rates and the conditions of fairness and safe living (Australian Capital Territory-ACT, 2004). This can also be described as the personal security indicator (Rahman, Mittelhammer, & Wandschneider, 2003). All these indicators are normally used to measure social well-being. Diener and Trable (1997) included more indicators, such as homicide rate, number of police per capita, and rate of rape in their measurement of social well-being.

Environment.

In addition to economic and social domains, environment is a main factor for measuring sustainable development (Defra, 2005). Environment impacts human well-

being significantly because it fulfills basic human needs, such as water, air, and food. An imbalanced ecological system would have negative impacts and could be harmful for humans and production. Many previous studies have mentioned multiple indicators that can be used to measure ENWB; since ENWB is such a broad domain, these would include the land, water, air, forest, etc. The following are some examples of indicators used to measure ENWB.

Smith and Summers (2011) recommended three measurements for this domain: functional stability, functional redundancy maintained, and habitat heterogeneity. *The quality and condition of land* is another environmental indicator. Land is the source of production of resources, so that the quality and condition can be used to check for ENWB. Murphy (2010) also recommends programs for restoring degraded land to improve its condition, and these services can be used to measure well-being. The *condition and quality of water* is a very important indicator (ABS, 2012). Osberg and Sharpe (2003) and Cahyat, Gonner, and Haug (2007) studied the quality of water for consumption. Later, Smith and Summers (2011) suggested that the measurement for this domain can test whether water is potable, swimmable, and fishable.

Change of temperature level is another environmental indicator. Negative climate change may cause adverse pollution, which can cause health problems such as lung disease and asthma (Rishi & Khuntia, 2012). Environmental issues such as pollution level, noise, overcrowding, and temperature not only have a negative impact on OWB, but can cause stress, a negative effect for SWB (Luechinger, 2009).

In addition to the condition of natural resources, as mentioned earlier, facilities, services, and programs offered by the environment can be used as indicators for ENWB.

Murphy's (2010) study recommended *the amount of recycling and the level of sewage treatment* as important indicators of well-being. *Potential for environmental enhancement projects* is another example. In this case, three measurements other than the environmental condition itself are used to determine ENWB: the amount of money invested in environmental improvement programs, the percentage of preserved land, and the percentage of citizens who participate in environmental management activities (Murphy, 2010). Based on these examples, it is hard to deny that the environmental domain is very important. Overall environmental quality has been the main domain for sustainable theory and is one of the elements in many indexes of well-being used worldwide (Rahman, Mittelhammer, & Wandschneider, 2003). Given our dependence on the environment, we benefit from environmental conditions such as good weather, green spaces, beautiful landscapes, clean air, fresh water, and good soil, among others. Thus, high-quality and significant quantities of environmental benefits will increase people's quality of life or well-being.

Health.

Human capital is critical for a nation's development, as lower-quality human capital leads to lower production. The quality of human capital depends not only on the level of education, but also on the health status of citizens. Obviously, good health shows the condition of well-being and facilitates financial support for the family. Health well-being (HWB) encompasses both good physical health and good mental health status. People face much difficulty in life, and this can impact mental health negatively. HWB once was part of social well-being, but it has correlations with other dimensions. Economic well-being can impact health if it means a lack of sufficient food or medical treatment. Lacking these

resources would negatively impact health conditions, both physical and mental (stress). Furthermore, environmental conditions that have been impacted by global warming could negatively impact health through conditions such as heat stress, while declines in air and water quality can contribute to some diseases (Parker & Schwartz, 2010). Based on the literature, many indicators are used to express HWB, and these are used to test both physical and mental well-being.

High well-being may correlate with an individual's longevity, while low well-being often indicates a weaker immune system, leading to greater vulnerability to disease (Diener & Seligman, 2004; Rahman, Mittelhammer, & Wandschneider, 2003). Diener, Diena, and Triable (1997) used three measurements to assess HWB based on both health condition and health care services: infant mortality, doctors per capita, and longevity. Physical fitness is one indicator used to measure physical well-being, and this also relates to the higher possibility of improving economic status—in other words, better physical fitness leads to higher productivity. Eckersley (2007b, 2008b) found a relationship between economic well-being and HWB, noting that the rich tend to be healthier and happier than the poor because of their ability to access and pay for health care services. Baron and Kenny (1986), Knight and Gunatilaka (2012), and Stokes (2009) use health satisfaction as an indicator for both SWB and HWB. Similarly, Thoits and Newitt (2001) note that poor health conditions negatively impact not only ObjWB but SubWB. Some studies have used sleep time as one physical HWB indicator, as ordinary humans require a certain quantity and quality of sleep to facilitate the body's ability to function (Streeten, 1995). The Health Behavior Index (HBI) recommends using self-reporting on the frequency of exercise and smoking, and the amount of fruit and vegetables consumed in

a week, as indicators for health ObjWB. For mental health conditions, Smart and Sanson (2005) found that more than 50% of young people were experiencing one or more health problems associated with depression, anxiety, antisocial behavior, and alcohol use. Such mental illnesses can lower working performance and production, and this, in turn, lowers well-being. SubWB can measure mental HWB by assessing positive feelings toward one's life (Diener, Emmons, Larsen, & Griffin, 1985; Keyes, 1998; Ryff, 1989). Depression and mood disorders are other measurements for SubWB and mental HWB (Keyes, 2006). Depression and the pressure of negative mental HWB and SWB can be attributed to many factors, including using drugs, pressure from the workplace, or losing one's job (Askitas and Zimmermann, 2011). In general, much data on mental HWB can be collected through self-reporting on feelings, happiness, worries, and sadness level.

In addition to the physical and mental health conditions of the people themselves, health care services and facilities and health care programs such as depression prevention and suicide prevention initiatives can be used to measure a community's HWB. Cahyat, Gonner, and Haug (2007) and Smith and Summers (2011) have shown that the difficulty of traveling to a distant health center can lower HWB and eventually lower productivity. Cahyat, Gonner, and Haug (2007) also included the number of doctors and nurses as an important indicator for the quality of health care services and HWB. Berger (1996) found that increasing physical HWB (for example, through activity) is associated with improved mental HWB via stress reduction and mood enhancement. Stress reduction could also be associated with religion practices (religious well-being).

Government or politics.

It is sometimes difficult to define government or politics and well-being, but the basis of this relationship is that politics facilitate other factors to support well-being (Duncan, 2005). This means that people should be able to rule, control, and protect their own rights, vote for their own benefits from the government, and trust in the government's promises (Heuvel, 2009). They should have the right to request accountability and criticize the government's work, but in many areas in the world, this right is not granted. Based on Sen's Ideal of Justice, people have the capacity to request freedom and equal treatment (Deueulin & McGregor, 2010). Since this dimension is a very basic need, many indicators are used to measure government or political well-being (PWB) based on the above definition. Rahman, Mittelhammer, and Wandschneider (2003), Baliamoune (2003), and Hagerty (1999) have all used civil liberties and political rights as indicators within their HDI. Smith and Summers (2011) also claimed civil liberties and justice as indicators for social services. Murphy (2010) used the right to vote and the proportion of people who exercise this right as his measurement for a citizens' rights domain. Basic rights that citizens can exercise include the right to vote, the right to claim benefits, and the right to be treated equally with others. These rights must be provided and protected by the state. They are the tools that provide future benefits to the community through public services and policies that eventually increase total well-being (Frey, 2011). The need for these services to improve equality and rights, such as gender rights and the land and property rights of the poor, can be seen in many developing countries.

The World Bank's annual Worldwide Government Indicators list includes "government effectiveness," "control of corruption," and "voice and accountability" as political indicators for well-being. "Voice and accountability" in this context means the

ability of people to monitor and influence government conduct (Knight & Gunatilaka, 2012). This indicator can also mean individual freedoms and social fairness because the government regulates and controls issues. PWB also includes the government's commitment to policy (trust), equity, and justice (Frey & Stutzer, 1999). Moreover, political freedom and democratic participation rights (Frey, 2011) are important indicators because people should be able to use their own rights and freedoms to support the political parties that can represent them and be their voices.

Trust and accountability among institutions and politicians is a crucial indicator for PWB; politicians are voted into power by people who expect them to fulfill their promises (Beaumont, 2011). It is critical that people are able to monitor their government. Faith in governmental transparency, which indicates a lack of corruption (Guisan, 2009), is another indicator for PWB. Guisan (2009) also mentioned that a government's level of transparency would be considered an important indicator of PWB.

Moreover, the government must provide *basic services* and *efficient services* to achieve income redistribution and economic stabilization. Perceptions regarding government programs can be used to evaluate PWB. A sufficient quantity and quality of government programs have been used to explain well-being through, for example, the provision of educational services and facilities, health care, infrastructure, and state security (Cahyat, Gonner, & Haug, 2007; Smith & Summers, 2011). Government regulations also correlate significantly to many well-being domains, such as environmental and social domains that include, for instance, laws on air quality, soil and sediment, water quality, and the right to clean air, land, and water. These government services improve other well-being domains, and these, in turn, eventually increase overall

well-being. These government services must satisfy people's capabilities based on Sen's CA (1980).

Culture.

While culture may not appear to impact well-being in the way that economic, social, health, and environmental factors do, it affects well-being, life satisfaction, and happiness directly and significantly (White, 2006). Culture represents the identity of the community; it is what people have lived with and is part of their everyday life. Culture is not simply art, music, and literature, as we may assume; rather, it is the collection of behavior patterns, values, and beliefs that characterize a particular group of people (Novitz & Wilmott, 1989). Further, culture consists of the complex patterns of behavior that evolve over time and define any group. Culture includes manners, social codes, taste, food, dress, attitudes, politics, and how people respect others. Culture relates very strongly to other dimensions, especially the three bottom-line dimensions of sustainable development—economic, social, and environmental. Many cultures are developed by a community's environment. Culture increases SWB by supporting the social connectedness of the community. Furthermore, culture positively impacts SWB by increasing community confidence, social inclusion and engagement, and people's ability to understand their own culture and others who have backgrounds different from their own.

Culture also can increase economic benefits (economic well-being) by providing tourist attractions that can create jobs, reduce poverty, encourage communication, and improve the environment (St. George, 2004). However, even though it poses many positive benefits for community well-being, culture may cause negative impacts for some people in their own communities, especially for women. Many cultures limit female roles in the

family and community, and this can decrease women's pride and self-esteem. Women are much happier and more productive in communities where genders are treated equally. Another possible detriment is when people believe their community can cure illness, but this, in fact, is worse for both the community and its residents (Feierman & Janzen, 1992; Johnson & Sargent, 1991; Nitchter & Lock, 2002). As discussed, culture can impact well-being both positively and negatively. Some cultural conditions can increase productivity directly, but in many cases, the impact on well-being is indirect. Culture has been developed over generations—it is the way of life, the core or norm that the whole community has followed, the identity and pride of the community—and it is expected to pass on traditions from generation to generation.

Nowadays, culture is one dimension that is considered part of overall well-being. Many indicators have been used to measure cultural well-being (CWB). Cultural involvement can be demonstrated by the numbers of people attending cultural events and the time spent visiting and appreciating works of art, museums, or other historical sites. The number of historical sites, museums, and cultural centers in the community also can be used as indicators for CWB. Moreover, positive CWB results when culture and traditions are taught formally through schooling and non-formally at home. A basic SubWB measurement would be based on the behavior of the local community, which includes heritage protection—showing that local residents feel the culture belongs to their community and would like to pass it on to their children.

The feeling of belonging and a sense of pride in tradition and heritage (Collier, Sadao, Otto, & Polloi, 1997) is another SubWB indicator for CWB. This sense of pride increases a person's self-esteem and self-identity. The resulting self-esteem benefits the

person psychologically. Encouraging young people to attend traditional ceremonies and events increases the feeling of cultural protection and the willingness to pass cultural traditions on to the next generation. Monitoring the development of cultural programs and ceremonies is the best practice to measure the strengthening of culture and community involvement (Salvaris, 2007).

In addition to the inside community indicators discussed previously, outside community indicators are important for CWB. Support, assistance, and promotion from the government and provincial authorities are important. Traditions and cultural events can be supported by many stakeholders in the forms of financial support, advice for marketing, promotion, and advertisement, and facilities improvement, which can play an important role in extending the culture (Salvaris, 2007)

Family.

As the smallest but most important unit in society, family provides a strong foundation for the community. Good emotional and physical care and support shape one into a better person for society. Family well-being (FWB) can be based on the relationships of family members and how they arrange the environment and conditions within the home. Home is the place where people usually feel the most comfortable and where the family provides support and safety. Maslow (1987) noted that humans have basic needs for survival—such as food and shelter—and higher needs that include safety, belonging, and love. Family is the basic unit that provides these foundations. FWB contains an assumption that families work best and eventually contribute to society by providing knowledge regarding the roles of society's members, basic rights to their own

benefits, law and regulation knowledge, and basic religious knowledge (Baldwin, 1996). Family foundation also has a significant impact on other well-being dimensions.

According to Martinez (2003) and Maligan, Fabian, Coope, and Errington (2006), many indicators shape a person during childhood, including parenting. Domains such as community (social) support, education, health, government, and economic factors are other indicators of well-being that can significantly impact FWB. Economic domain indicators can play a key role in FWB; for example, economic indicators relate to the number of children living in poverty, employer-based family-supportive policies, the ability to pay the bills, parents' ability to provide for the family's basic needs, and the ability to monitor children. Economic hardship creates negative actions within the family, slowing children's growth, causing family emotional issues, and lowering FWB. The government also plays a crucial role by providing programs such as access to basic health care, a livable minimum wage, compensation for low-income families, child protection, and support programs for marriage. These public programs can encourage family cohesion and, consequently, greater well-being. Education, family care, and parents' attention to their children's education are additional indicators used to measure FWB.

Two family functioning theories have been used to measure FWB. The Circumplex Model of Marital and Family Systems (Russell & Sprengkle, 1984; Olson, 1999) comprises three main areas of family cohesion: emotional bonding, family flexibility that employs role relationships, and family communication. The McMaster Model of Family Functioning is similar to the Circumplex Model but includes more details for each indicator, such as problem solving, communication among family members, roles, affective responsiveness, and affective involvement. The ABS has developed its

own measurement of FWB that is not totally based on the two previous models. This model uses interactions between family members, such as love, emotional support, parenting, and sharing of resources, all of which still partially relate to the previous two models (Wollny, Apps, & Henricson, 2010).

Some other studies measure relationships between family members, such as those between children and parents or between the parents themselves (the interpersonal quality of a couple's relationship), how well they can parent their children, or the relationships between grandparents and children (Fahey, Keithy, & Polek, 2012). Based on the study of Fahey, Keith and Polek (2012), the parent-parent relationship can be in the form of caring for each other, helping each other when facing problems, spending more time together, and showing affection to each other, all of which contribute to higher FWB. Indicators that can be used to assess the quality of parenting include how easily they can discuss issues with their children, whether the parents can correct their children without losing control, or if their children follow the rules as set. As mentioned above, FWB is critical in shaping the person for the community: The family must provide safety to promote both physical and mental health and provide the foundations of culture, tradition, social connections, and how to be part of a community (Babington, 2006). In many FWB models, as mentioned previously, FWB information can be collected as SWB questions, but balancing of work hours and time spent with family members is also an important indicator for measuring FWB.

Job and workplace.

Job and workplace represent an important part of human well-being. Having a job provides many positive mental impacts, such as self-esteem and self-worth. At the same

time, a job is a financial source of support that eventually leads to a significant impact on other ObjWB dimensions. Since a person with full-time employment needs to spend 40 hours a week at the workplace, employment conditions and workplace environment are important for both SubWB and ObjWB. Inadequate workplace conditions and heavy workloads can lead to poor health conditions and lower SubWB and ObjWB. Poor health caused by workplace conditions could include both mental and physical health problems. Unemployment impacts well-being negatively, as unemployed persons tend to experience pressure and depression (Mendes & Saad, 2011) and often feel insecure financially and lose their self-esteem. At the same time, poor health conditions lead to decreased workplace efficiency, and this can negatively impact economic well-being.

Being employed provides psychological benefits that contribute to more SubWB, self-worth, and life satisfaction, and less pressure from economic insecurity. On the other hand, being employed can be a negative experience if the working conditions and hours worked cause negative physical and mental impacts (Cooper, Davidson, & Robinson, 1982; Lehmkuhl, 1999).

Trust and feelings of belonging, work design, and a well-organized company are also crucial job satisfaction indicators for SubWB (Turner, 2002).

In the case of the Pak Mun Dam, local residents affected by the dam were assigned to projects to train for a new career. The quality of such training can be used as one JWB indicator. Karasek (1989), Schaufeli and Enzmann (1998), and Warr (1998) observed that employee well-being should be based on four main indicators: emotional exhaustion, psychosomatic health complaints, physical health symptoms, and work satisfaction, all of which combine SubWB and ObjWB. In addition to employee well-being, job demand, job

autonomy, and workplace social support are important indicators of JWB and are indicators that significantly impact SWB (Warr, 1989). The characteristics of job demand are based on the conditions, the pressure and time length of a job, and job complexity (Russell, 1980; Tellegen, 1985). Job autonomy includes the opportunity for freedom (De Jonge, 1995; De Jonge, Landeweerd, & Van Breukelen, 1994), and the workplace provides information and social support from the boss and colleagues (Bergers, Marcelissen, & De Wol, 1986). Many institutes use concepts similar to those mentioned previously to measure JWB and to achieve both SubWB and ObjWB based on the quality of the job/work. The institutes include the International Labour Organization (ILO) (2012), the United Nations Economic Commission of Europe (UNECE) (2010), EUROFOUND (2012), and How's Life (2011), all of which share the same indicators of sufficient income, working hours, security of employment, lifelong training, and safety of the work environment.

Government intervention and well-being.

This study is adapted from the Sustainable livelihood Framework concept. The SLF framework uses five dimensions that are similar to our study, but our study adds more social-related dimensions. This framework allows us to understand how institutes use SLF to achieve livelihood outcome.

SLF explores the main factors that impact livelihood and how these factors relate to each other to improve livelihood for communities. Livelihood capitals can be impacted by the vulnerability context and from transforming structures and processes. The impact of transforming structures and processes can be in the form of institutions and policies, such as creating assets of capital through government policy, law, and regulation; determining

access, such as ownership rights; or influencing rate of asset accumulation, such as taxation or policies that effect a return to different strategies.

Based on this framework, negative vulnerability context and negative transforming structures and processes through policy would lower the positive livelihood outcome. On the other hand, efficient policy and commitment would produce a more sustainable community (DFID, 1999). Good examples of institution and policy that impact each form of capital (economic, social, environmental) are as follows.

Vulnerability context	Livelihood assets H, N, F, S, P	Transforming structure and processes	Livelihood Strategies	Livelihood outcome
Shocks				*More income
Trend		Structure / Process		*Increased well-being
Seasonality		*level of government / Law		*Reduced vulnerability
		Policies		*Improved food security
		*Private sector / Culture		*More sustainable use of natural resources base
		Institution		

Key

H=Human capital, S=Social capital, N=Natural capital, P=Physical capital , F=Financial capital

Diagram 1: Sustainable livelihood framework (DFID, 2002)

Diagram 1 provides a model of how processes and structures would impact the well-being capitals and how this information can be used to inform multiple livelihood strategies for achieving better well-being.

The Relationship Within the Assets in the Framework

The strategy that combines well-being capitals to achieve a positive livelihood outcome has two relationship types:

1. Sequencing: This would start to learn if the particular combination of assets or a specific type of asset would lead to a better livelihood.
2. Substitution: This will allow us to understand that to have better livelihood, the combination of assets can be changed by trading off between assets in the combination assets.

The Relationship of Framework Components

1) Assets (capital) and vulnerability context: The vulnerability context, which comprises shocks, trends, and seasonality, can be both positive and negative for assets (capital). For this study, the shocks from the Pak Mun Dam have a negative impact on capital, as local residents cannot access the assets (capital) as before.
2) Assets (capital) and transforming structure and process: The institute and policy would impact the access and accumulation of assets (capital). A good

example of the impact from transforming structure and process (institute and policy) is as follows:

2.1) Creation of assets: This occurs in many ways. A government can create assets by providing infrastructure, developing technology, or instituting policy that increases social capital.

2.2) Determination of assets: This provides the authorization to access the capital, such as licensing, rights, etc.

2.3) Influence of assets accumulation: Regarding financial capital, a government can institute a taxation policy to increase financial capital.

The Relationship Between Assets and Livelihood strategy and Livelihood Outcome

1) Assets and livelihood strategy: The quantity of assets that would impact livelihood, as more assets (capital) lead to livelihood security. The strategy should have a positive impact on a high amount of capital (assets for each dimension).

2) Assets and livelihood outcome: As mentioned, more assets (capital for each dimension) increase livelihood outcome. Since the assets that a person has is based on the combination of total resources they have, different combinations of capital achieve different livelihood outcomes. Sometimes, people might require minimum amounts of capital to maintain their livelihood, or sometimes they might require a certain amount that differs from the minimum amount. Examples of government intervention via institutions and operations (structure and process) for each well-being dimension are provided below.

A government can increase both the ObjWB and the SubWB of its people. Kenworth (1999) and Lobao and Hooks (2003) noted that a government could decrease societal poverty and inequality to increase human well-being. Heady (1993) and Diener and Suh (2000) tested the impact of government intervention on human well-being through the effects of welfare spending, labor market regulation, and other SWB factors. A government can also intervene in the form of a project, laws and regulations, or fiscal policy. Public services (infrastructure), health care, social, education, environmental improvement and protection, economic, cultural, and working dimensions are all ways through which governmental spending and social welfare can improve quality of life.

Increasing capital for each dimension of well-being can be achieved in many ways:

Economic: The role of government in the market. The free market can create problems when markets fail, such as externality, public goods, etc. A government must intervene to solve these problems. Even though such intervention has the goal of solving the problems, not all interventions can be successful.

Social: SWB can be analyzed by combining many social-related dimensions, such as education, health, culture, family, working, etc. In this case, SWB is based solely on social capital, which is important because it relates to trust, norms, and the relationship of community members (World Health Organization, 1998). This social capital would lower transaction costs for many community activities. Baum and Palmer (2000) mentioned that the building of a healthy community must be demonstrated through social and civic participation. Governments intervene in many programs to improve the social capital and create a stronger network and increased participation, such as creating a formal association

and a club in a community. Informal associations can also create a strong network, such as social interaction of a neighborhood. Moreover, government can create a volunteer program to create a strong bond within the community.

Putnam (2000) found that the strong bond of social capital has a strong correlation with other elements related to social well-being, such as education, child welfare, lower crime, health, happiness, and democratic government.

Environmental: A government can create laws and regulations to protect and improve the environment, such as reducing automobile pollution, controlling the spread of pollution, and control over pollutants such as industrial smoke, open dumps, untreated sewage, and chemical waste. Furthermore, a government can purchase services (agents) and provide information and school training. It can provide benefits and compensation to private companies if they adopt sustainable concepts for their businesses. A government can provide environmental policies that include government specifics or encouragement or requirements for firms to employ particular technologies or inputs, taxation, and tradable permits (Stavins, 2003). Governments finance and deliver on environmental protection directly through central governmental departments.

A government can sustain CWB in many ways, such as supporting, protecting, and providing maintenance, conservation, and promotion for historical sites. "A government can establish laws and regulations to facilitate protecting historical places" (Waitangi Tribunal, 1985, p. 57).

Working: A government can intervene in many ways, such as business regulations, to support better well-being for workers. These regulations would include limiting the

number of workers and improving working conditions to ensure health and safety (Childs, 1985).

Stress can be caused by negative work characteristics (Bogg & Cooper, 1995; Evans & Carrere, 1991; Mark & Smith, 2012). Xanthopoulou (2007) observed that personal resources and job resources can lower job dissatisfaction and that these job resources can be in the forms of autonomy, social support, professional development, and training. Training systems comprise a portion of regulations, so a government could require employers to provide coaching, training courses, and seminars (Marbun, 2016). Trying to balance work and life would also lower stress from working (Bloomer, 2014).

Health care services: A government can issue an efficient health care policy, such as providing health care or clinical services. These could encompass disease treatment, prenatal and delivery care, family planning, assessment, advice, and public health, including school health care programs, nutrition and family planning information, and disease prevention (World Bank, 1990).

Family: A government can support the relationships of family members, and thus family well-being, through many programs, including intensive family support and programs for parents or family recovery. Home visit-based programs can be implemented to decrease family issues. Functional family therapy and certain government programs also provide multidimensional treatment foster care programs that concentrate on younger children with behavioral problems (Fisher and Gilliam, 2012).

A government also can create family policies that include taxation or financial assistance to relieve pressure brought on by family creation, childrearing, or family caregiving (Callan, 2014).

Politics: Policy should include the right to and protection of free speech and trust in the public sector or government (Bouckaert, 2005). Quality of government, trust in government, and low corruption would increase human well-being (Putnam, 1993). As mentioned, government policy should aim to improve people's quality of life. However, access to capital for each dimension of well-being plays a key role in maintaining a community with sustainable livelihood. This access provided by suitable government policy would benefit people.

Chapter 3: Methodology

This chapter describes the methods used to answer the research questions posed in Chapter 1 related to the overall impact of the Pak Mun Dam on the well-being of residents. Methods will be discussed based on individual research questions. In this chapter, the questionnaire construction, modeling by using SEM, MRS calculation are mainly discussed.

Research Questions

Research Question 1: How does well-being differ between the control group and the study group?

Research Question 2: How different are the well-being domains between the old community and the late-settled residents in the study group?

Research Question 3: How does each domain's well-being affect overall well-being? What is the statistical significance of well-being domains for the overall well-being of the study group?

Research Question 4: What is the marginal rate of substitution (MRS) between economic, environmental, and social well-being dimensions?

Research Question 5: How does government (institutional) intervention address the issue of improving sustainable livelihood development?

Measurement Section

The measurement section contains the detail for each research question.

The cross-sectional survey design for this study implied that data would be collected in real time (2014). The primary technique for collecting quantitative data was a questionnaire containing a Likert-type scale and open-ended questions. Each domain

included indicators of both SubWB and ObjWB. These variables, with their items within, would utilized for all measurements to answer all five research questions.

1) Economic well-being (EWB). The EWB domain represents changes in EWB caused by the dam. This is one of the three main domains pertaining to sustainable livelihood. Residents claim that the dam has had a negative economic impact, including changes to their income housing conditions for those who had to move to a new home. Indicators for this domain, based on the personal financial measurement by Wilmarth (2012), are described below. The Likert-type scale for this dimension was different from other dimensions because it used a scale of 1–10, and this study has appropriated the personal financial survey used because the survey has validity. This did not affect the results, however, because SEM allows different scales for each dimension to be used for analysis.

1A) *Level of financial stress*: Residents are asked to rate this situation on a 10-point Likert scale from 1 (*overwhelming stress*) to 10 (*no stress at all*).

1B) *Satisfaction with financial situation*: Residents were asked to select choices of 1 (completely dissatisfied) to 10 (completely satisfied).

1C)*Feeling about current financial condition*: Residents were asked to select choices of 1 (overwhelmed) to 10 (feeling comfortable).

1D)*Can't afford to go out*: Residents were asked to select choices of 1 (all the time) to 10 (never).

1E*)Living paycheck to paycheck*: Choices ranged from 1 (all the time) to 10 (never).

1F*) Worry about living expenses*: Choices ranged from 1 (all the time) to 10 (never).

1G) *Confidence regarding financial emergency (finding Baht 1,000)*: Choices ranged from 1 (no confidence) to 10 (high confidence).

1H) *Stress about finances in general*: Choices ranged from 1 (overwhelming stress) to 10 (no stress at all).

2) *Community well-being (ComWB)*

ComWB was another domain for which residents identified a negative change. They mentioned that their community structure had been changed because of the movement of their people. Some residents had to move to a new community because theirs was displaced by the dam. Many members of the younger generation had to move to the city to find new sources of income. Some individuals found it difficult to adjust to the unfamiliar environment. Social well-being indicators were based on concepts of social integration, social acceptance, social cohesiveness, and social safety, as identified in the literature review.

2A) *Social acceptance*: This refers to the feeling of being part of a community. It was assessed through the question, "Do you think the community has listened to your ideas, advice, or complaints for any issue in the community?" with responses ranging from 1 (*not at all*) to 5 (*always listens to my ideas*).

2B) *Social integration*: This refers to the tightness of community, or feelings of close connection within the community. Participants were asked, "How often do you participate in a community meeting to discuss an issue?" with responses ranging from 1 (*never*) to 5 (*all the time*).

2C) *Social assistance*: This was assessed using the question, "Do community members frequently help other community members in need of food, money, or work?" with responses ranging from 1 (*never*) to 5 (*always*).

2D) *Safety of the community*: Because the area around the dam has become a travel destination, thus leading to the presence of strangers in the area, this item relates to feelings of safety in the community. Participants were asked two questions: "How safe do you feel about walking alone at night time among members of your own community?" with 1 indicating the lowest feeling of safety and 5 the highest, and "How safe do you feel about walking alone at night when there are visitors in the area?" with 1 as the lowest and 5 as the highest feelings of being safe.

2E) *Satisfaction with social well-being*: Residents were asked, "What is your level of satisfaction with social relationships in the community?" with 1 indicating the lowest level and 5 the highest level of satisfaction.

3) *Environmental well-being (ENWB)*

An assessment of ENWB was based on the quality of the environment. As reported previously, the Pak Mun Dam has changed the quality of both the fish and the water. Furthermore, the dam has become one of Ubon Ratchathani's travel destinations. The increased number of visitors to the area was perceived to have an impact on residents in terms of traffic congestion and noise. ENWB was measured based on the indicators described below.

3A)   *Water purchasing*: This item assessed residents by asking, "Do you have to buy water for household consumption?" with responses ranging from 1 (*always*) to 5 (*never*).

3B)   *Availability of water*: Participants were asked whether there has been any shortage of river water (for bathing, washing, or drinking) during the last 12 months, with choices as follows: 1 (*the whole year*), 2 (*most of the year*), 3 (*half of the year*), 4 (*several months*), and 5 (*never*).

3C)   *Fish quality*: Residents were asked, "How much do you grade for the taste of fish?" with responses ranging from 1 being the lowest and 5 the highest.

3D)   *Crowdedness*: Participants were asked, "What level is the crowdedness of the community?" with responses ranging from 1 (*the least crowdedness*) to 5 (*the highest crowdedness*).

3E)   *Environmental satisfaction based on water quality (SWB)*: Residents were asked, "What is your level of satisfaction with the water quality of the Mun River and the Mae Khong River?" with 1 indicating the lowest and 5 the highest level of satisfaction.

3F)   *Environmental satisfaction based on fish quality (SWB)*: This factor was determined by answers to the question, "What is your level of satisfaction with the fish quality in the Mun River and the Mae Khong River?" with 1 being the lowest and 5 the highest satisfaction level.

4)   *Political well-being (PWB)*

After the dam's completion in 1994, the government did not keep many of its promises, and its solutions to reported problems have not satisfied locals. This is a problem

that residents frequently mention, and protestors gather annually to ask the government for better solutions. This is mentioned in the introduction regarding the failure of solutions. Indicators for the PWB domain were based on government services provided to the local community, residents' trust in the government, and residents' level of satisfaction with government efficiency, as determined by the following measures:

4A) *Have you been able to reach the services from the government ?- Electricity- Basic education – Street- Health care service- Water supply?*

Scored on a scale from 1 is for one service and 5 for all services.

4B) *Government's job training*: Residents were assessed through the question, "How do you grade the quality of job training and extension services provided by the government ?" scored on scale from 1 to 5, with 1 is the lowest and 5 is the highest.

4C) *Central government commitment to policy*: Residents were assessed through the question, "How much do you trust the central government?" scored on a scale from 1 to 5, with 1 being the lowest and 5 the highest level of trust.

4D) *Local government commitment to policy*: Residents were assessed through the question, "How much do you trust the local government?" scored on a scale from 1 to 5, with 1 being the lowest and 5 the highest level of trust.

4E) *Satisfaction with government services*: Residents were asked, "What is your overall level of satisfaction with government services, including education, health care services, infrastructure, electricity, and clean water supply?" with 1 being the lowest and 5 the highest level of satisfaction.

4F) *Satisfaction with local government services*: Residents were asked, "What is your overall level of satisfaction with the local government's administration?" with 1 being the lowest and 5 the highest level of satisfaction.

4G) *Satisfaction with Pak Mun Dam solution by government:* " What is your satisfaction level with the central government's performance on the Pak Mun Dam issue? With 1 being the lowest and 5 the highest level of satisfaction.

4H) *Government respect of the voice of the local resident*: Residents were asked, "How much do you think the central government respects your voice?" with 1 being the lowest and 5 the highest level of satisfaction.

5) *Health well-being (HWB)*

Based on the literature review, HWB in this study includes both mental and physical health. Mental health can be affected when residents must adjust themselves to a new place and new jobs. Furthermore, residents have expressed worries about losing income and the general negative impact of the dam on their livelihood (Sangso, 2003). These changes likely had some impact on both the physical and mental health conditions of residents. The HWB indicators are described below.

5A *Physical self-health condition*: Residents were asked about the number of visits made to a hospital or clinic in the last calendar year with 1 being more than 5 visits and 5 for no visit.

5B)   *Stress and pressure*: Mental health is part of HWB. Residents were asked the question "How is your current stress level?" with 1 being the lowest level and 5 the highest level of stress.

5C)   *Full of energy*: Residents were asked the question, "Have you recently been feeling full of energy?" with responses ranging from 1 (*not at all*) to 5 (*all the time*).

5D)   *Sleeping difficulty*: Residents were asked the question, "Do you have any difficulty with sleeping?" with responses ranging from 1 (*all the time*) to 5 (*never*).

5E)   *Health satisfaction*: Residents were asked, "How satisfied are you with your health condition now?" with 1 being the lowest and 5 the highest condition.

6) *Job well-being (JWB)*

Job conditions were also affected by the dam because many residents had to move to new places. Furthermore, people who still live close to dam have had to find other jobs to substitute for their loss of income from fishing, and many residents have been forced to perform jobs that are not their specialties (Wattanaputh, 2000). Because of these factors, many residents have claimed negative impacts on their job conditions.

In general, it is necessary to achieve higher self-confidence and self-respect, a sense of purpose, and a feeling of meaningful fulfillment from work to achieve better JWB. This form of well-being is present when an individual knows what he or she can do their best and has the expectation of doing it. Based on the above factors, the indicators for JWB for this study were as follows:

6A) *Hours of working (workload)*: "How many hours do you work every week?" with choices as follows: 1 (*fewer than 10 hours a week*), 2 (*11–20 hours per week*), 3 (*21–30 hours per week*), 4 (*31–49 hours per week*), and 5 (*more than 40 hours a week*).

6B) *Proud of current job*: Residents were asked, "Are you proud of your job?" with 1 indicating the lowest level of pride and 5 the highest.

6C) *Job fit*: Assessment of this indicator was based on scoring the statement, "The job fits my skill, knowledge, and experience very well," with responses ranging from 1 (*disagree*) to 5 (*strongly agree*).

6D) *Job satisfaction (SWB)*: The question, "Are you satisfied with your job?" measured fulfillment and meaning at work. The score ranged from 1 to 5, with 1 indicating the lowest and 5 the highest.

7) *Cultural well-being (CWB)*

CWB is important because a community must take pride in its own culture. The community under study includes strong traditions of Isan culture that represent the community of the northeastern region of Thailand. The culture of this community is similar to Laotian culture, which can be used as a reference for many future dams along the Mae Khong River. Locals, however, have complained about changes to their traditional ceremonies, which are held along the Mun River close to the dam site. Based on the literature review, the pride and involvement of the community and the support and cooperation of the stakeholders of the local community, CWB is treated in this study as an important indicator of well-being according to the following factors:

7A)   *Children's understanding of local culture*: Residents were asked, "Do you think your children understand the goal of going to temple?" with responses ranging from 1 (*not at all*) to 5 (*definitely*).

7B)   *Community integration*: Residents were asked "Do you feel close to the community when attending the local ceremonies?" with responses ranging from 1 (*not at all*) to 5 (*definitely*).

7C)   *Self-understanding*: Residents were asked "Do you understand the importance of going to temple?" with responses ranging from 1 (*not at all)* to 5 (*definitely*).

8) *Family well-being (FWB)*

After the dam was completed, it became difficult for some community members to find new jobs or maintain their incomes. Parents had to look for new jobs or had to work much harder to maintain their standard of living. This may have affected their family relationships by limiting the time available to spend together, so that the relationships between parents or between parents and children may have changed. The indicators for this part of the study were based on concepts of parent-parent, child-parent relationships, and the children's involvement with the parents.

To measure this factor, participants were asked whether their lives had changed in the following areas over the previous 10 years, with responses ranging from 1 (*not at all*) to 5 (*extremely changed*) regarding time with family and time with children.

8A)   *Time spent with family*: Residents were asked, "Has the amount of time you spend with your family changed increasingly over the last 10 years?" with responses ranging from 1 (*not at all*) to 5 (*a lot*).

8B)   *Family help*: Residents were asked, "Do you think individuals would turn to each other for help when something is troubling them?" with responses ranging from 1 (*not at all*) to 5 (*definitely*).

8C)   *Emotional support*: Residents were asked, "How much emotional support can you gain from your family members when it is needed?" with 1 indicating the lowest and 5 the highest amount.

8D)   *Overall family relations*: Residents were asked, "What is your overall score for your family's relations?" with 1 indicating the lowest and 5 the highest score.

Measurement for research question 1. Variables for the overall well-being model. Residents were asked to select one response option from Likert scale questions, which contain eight well-being dimensions. The items for each domain would be compared between unaffected community and affected community.

Measurement for research question 2. The survey gathered information regarding socioeconomic information, including education level, income, number of family members, and number of jobs held. Furthermore, the survey also asked for information regarding well-being for each dimension so that it could be used to compare the older residents (established in the community before 1994) and new residents (established in the community from 1994 to the current time) of the affected community with the sample size of 245. The result was expected to show the differences between the residents with different settlement times.

The cross-sectional survey design for this research question implied that data would be collected in real time (2014). The primary technique for collecting quantitative data was a questionnaire containing a Likert-type scale and open-ended questions. Each domain included indicators of both SubWB and ObjWB.

Measurement for research question 3. The structural equation model (SEM) was used in the study because it contains multiple independent variables (exogenous variables). There are eight latent exogenous variables containing 40 indicators for the measurement model, and one observed endogenous variable for the structural model, which is overall well-being.

SEM has been popular in social science research, and it requires a large sample size of at least 200, but preferably 400, subjects (Hooper, Coughlan, & Mullen, 2008). The benefit of the SEM is that it can be used to study the relationship among latent constructs that are indicated by multiple measures (Lei & Wu, 2007). SEM is a flexible method through which many tasks, such as multiple regression and factor analysis, can be performed at one time. SEM implies a structure for the covariance of observed variables, which is known as the covariance structure model. Furthermore, SEM analyses are based on theoretical, previous hypothesis testing from studies where theory fitted with the data. For this study, the multidimension model of well-being was developed using the sustainable livelihood framework (SLF).

The SEM analyzed the measurement model and the structural model. The confirmatory factor analysis (CFA) was used to measure the direct impact of unobserved variables of each well-being domain based on their observed indicators in this measurement model. CFA is based on theories and hypothesis testing from previous

studies. The measurement model deconstructs the overall model to assess the relationship of each factor or indicator to each domain (unobserved) variable. The non-statistically significant indicators based on the evaluation of the component and model fit for each model were eliminated in this measurement model.

These latent variables (exogenous variables) affect endogenous variables, affecting overall well-being. The structural model would follow the measurement model.

The structural model represents the correlation of each latent variable or unobserved variable (well-being domain) with the observed endogenous variable of overall well-being. This estimation process is the multiple regression model. The estimated coefficient from this structural model process reveals the impact of each domain on overall well-being. The process of testing for the good fit of the model is similar to the testing of the measurement model, using the goodness of fit indices. To be able to increase the model fit, it is allowed to covary the items within the same domain, but a specific relationship must be in place. In Path Diagram 1, the structural model shows the relationship of the well-being domains in the circles to the overall well-being (square shape) on the right of the diagram.

The measurement and structural model for this study can be drawn as follows in Path Diagram 1:

SEM for research question 3. SEM analysis follows the main five processes (Kline, 2010):

1) Model specification: This is the first process to verify which indicators should be included for each factor. Many different factor models can be postulated based on

different hypotheses, so it is necessary to use the information from previous research or theories. For this study, the indicators for each domain were selected and set based on the theories mentioned in the literature review and the previous studies related to each dimension. The CFA assists in the process of measurement model section.

2) Model identification: This was used to test whether the parameters could be estimated by calculating for the degree of freedom. If the degree of freedom was larger than 0, this means we have more solutions because the known parts measured more than the unknown part parameter.

3) Model estimation: in this process, the analysis is an iterative procedure to minimize the differences between the sample variance/covariance matrix and estimated population variance matrix. Maximum Likelihood (ML) estimation is popular to use. AMOS software was used to determine ML for this research.

4) Model testing: This requires testing of whether the specified model fits with the data. If the specified model does not fit with the data, that model must be modified to achieve a higher fit. For this study, the goodness of fit uses many indices, as follows.

Table 2

Indices for Model Fit

Indices		Fit Criteria
RMSEA	Root Mean Square Error of Approximation	The smaller the better: a number < 0.05 is a good fit, 0.05–0.08 is a reasonable fit, and > 0.1 is a poor fit.
CFI	Comparative Fit Index	> 0.90 is considered a good fit

SRMR	Standardized Root Mean Square Residual	< 0.08 good fit (Hu & Bentler, 1999)
CMIN/df	Minimum discrepancy divided by its degree of freedom	< 5.00 good fit (Marsh and Hocevar, 1985)

The fit criteria mentioned in the third column of the table was used when the base value was compared with the result from AMOS. If the value of AMOS was larger than the base value from the table, the model fit well with the data. However, if the model did not fit well with the data, as indicated by a low value of the above indices, it was necessary to revise the model. Then model modification was needed.

5) Model modification: This process was used in the case of a poor fit. Adding more parameters as recommended by the model modification process would increase the fit of the model. The AMOS results for the model modification indices provided this information.
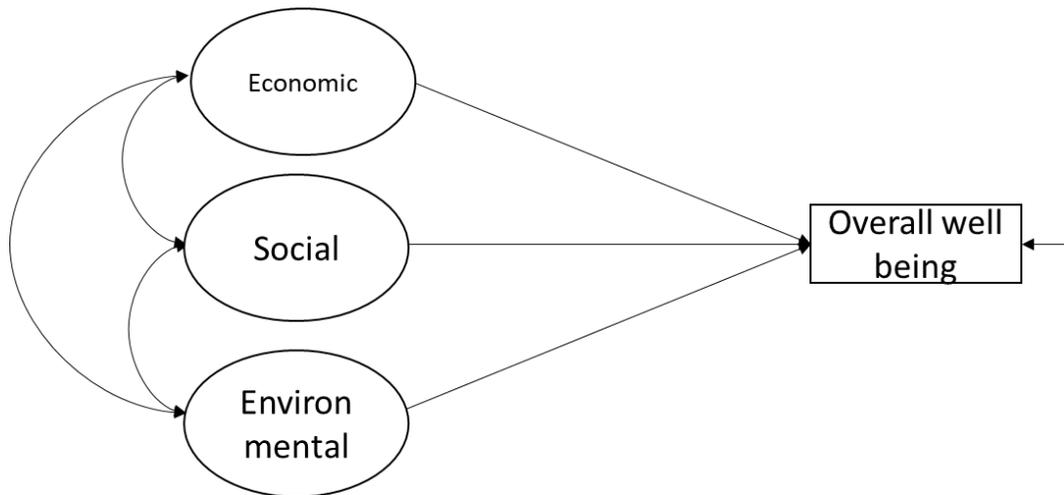
Path Diagram 2: General picture of path diagram for model, which represents the three main areas of economic, social, and environmental well-being that achieve a sustainable livelihood.

Statistical Analyses

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This research used multivariate analyses to investigate research question 3. Descriptive statistics were used to create a demographic profile of each sample.

Table 3

Dependent and Independent Variables Used in Multivariate Analyses

Variable	*Description*
Dependent variable	Overall well-being can be related to the question, "How good is your life?" or "How would you rate your life as a whole?" The scale is from 1 to 5, with 1 as the lowest and 5 as the highest. This variable represents the dependent variable for the structural model, and other well-being domains are the independent variables.

Independent variables

EWB	A continuous variable of the composite economic well-being score ranging from 1–10 (modeled as a latent construct).
ComWB	A continuous variable of the composite social well-being score ranging from 1–5 modeled as a latent construct).
ENWB	A continuous variable of the composite ENWB score ranging from 1–5 (modeled as a latent construct).
PWB	A continuous variable of the composite PWB score ranging from 1–5 (modeled as a latent construct).
HWB	A continuous variable of the composite HWB score ranging from 1–5 (modeled as a latent construct).
JWB	A continuous variable of the composite working condition well-being score ranging from 1 to 5 (modeled as a latent construct).
CWB	A continuous variable of the composite CWB score ranging from 1–5 (modeled as a latent construct).
FWB	A continuous variable of the composite FWB score ranging from 1–5 (modeled as a latent construct).

Demographic Correlates

Income	The currency is in Thai Baht per month. <500, 500–1000, 1001–1500, 1501–2000, 2001–2500, 2501–3000, 3001–3500, 3501–4000, 4001–4500, 4501–5000, 5001–5500, 5501–6000,6001–6500, 6501–7000, 7001–7500,7501–8000, 8001–8500, 8501–9000, 9001–9500, 9501–10000, >10000.
Education	Lower than or equal to grade 6, grades 7–9, grades 10–12, 2-year degree, bachelor's degree, graduate degree.
Family size	A continuous variable of the number of people in the household, ranging from 1–12.

Years of settlement   A continuous variable of the number of settlement years in the current community, ranging from 1–83.

Measurement for research question 4. In addition to finding the impact of each dimension on overall well-being through the measurement model, the standardized estimate of each dimension can be used to calculate for marginal rate of substitution (MRS). MRS can provide a better understanding of how people trade one area of well-being to gain more of another well-being dimension. This would allow us to understand the relationships among well-being dimensions.

Marginal rate of substitution (MRS). Customers have many choices, with many combinations of goods and services. MRS is the rate at which a consumer is prepared to exchange goods X and Y and maintain the same utility and happiness. For example, if a consumer gains more of one type of economic well-being in exchange for giving up another type of well-being; the MRS xy between good X and good Y is the ratio of marginal utilities of goods X and Y.

The indifferent curve, showing the same happiness with different combinations of goods consumption, can be represented by

U(x,y) = A,

where A represents a constant utility along an indifference curve, and marginal utility represents the utility that has been gained from additional consumption of that good.

After setting the total differential of the indifference curve to zero to maximize the utility or happiness, the result is:

$$\frac{\partial U}{\partial X}\,dx + \frac{\partial U}{\partial Y}\,dy = 0$$

$$\frac{dY}{dX} = \frac{\left(\frac{\partial U}{\partial X}\right)}{\left(\frac{\partial U}{\partial Y}\right)}$$

and $\left(\frac{\partial U}{\partial X}\right)$ and $\left(\frac{\partial U}{\partial Y}\right)$ are marginal utilities of goods X and Y, respectively, thus:

$$\frac{dY}{dX} = \left(\frac{MU_x}{MU_y}\right)$$

$\frac{dY}{dX}$ represents the slope of indifference curve and is considered the MRS_{xy}.

$$MRS_{xy} = -\frac{MU_x}{MU_y}.$$

This means the MRS of x for y, which means the amount of giving up good Y to gain one more unit of good X.

This concept, which provides a better understanding of how affected residents make decisions regarding their well-being, has been used for research question 4. The presence of substitute relationships helps us to understand the relationships among well-being dimensions. The ratio of standardized estimates for each dimension will represent the MRS.

Measurement for research question 5. The second group comprises factors of government intervention (government services provision, government training, and government solution satisfaction level by affected residents), but the dependent variables are latent variables of the seven dimensions of well-being.

This study shows the government's actions regarding the effects of Pak Mun Dam on residents' well-being, including all eight well-being and overall well-being factors. The model includes all 40 items of the eight well-being dimensions, plus overall well-being. The eight well-being dimensions are latent variables, and the measured overall well-being variables are the dependent variables (or endogenous variables for SEM). Government aid

for Pak Mun Dam-area residents is an independent variable (or an exogenous variable for SEM). The path diagram for this model can be presented as follows:

Government aid to Pak Mun Dam residents include:

The government services: the government services provided to these residents, including education, health care, and basic services. Questions were asked regarding the number of services that the government offered to affected residents.

The training quality; the quality of training for another income option. The training relates to professional training, but not to fishery, and most of the training relates to farming. Pak Mun Dam was initially constructed to produce electricity, but the later purpose was irrigation. Affected residents were asked to rate the quality of the government training.

The satisfaction level of the government's Pak Mun Dam solution: Satisfaction with the government's performance was measured through answers to the question, "What is your satisfaction level with the government's performance on the Pak Mun Dam issue?" with 1 being the lowest and 5 the highest satisfaction.

For this research question, government interventions affect overall well-being through each well-being dimension as mediator.

The mediator would help to understand how the government's intervention affects OWB through other well-being dimensions. This is illustrated in Diagram 2. The relationship between government intervention and OWB through well-being dimensions can be in many forms, such as follows:

Types of mediation can be in the form of full mediation, partial mediation, inconsistent mediation or no mediation at all.

To determine the type of mediation, it is necessary to check the statistically significant impact for both the direct and the indirect effect.

In the case of full mediation, government intervention has no direct effect on the eight dimensions of well-being. In the case of partial mediation, government intervention affects overall well-being directly, and there is an indirect effect on well-being. Based on results, it showed that there were two cases of full mediation and no mediations that happened.

For inconsistent mediation, when signs of direct or indirect effect are different, the total effect is smaller. There would be no complete indirect effect in the case of no mediation.

For this study, to test for mediation analysis, bootstrap analysis was used.
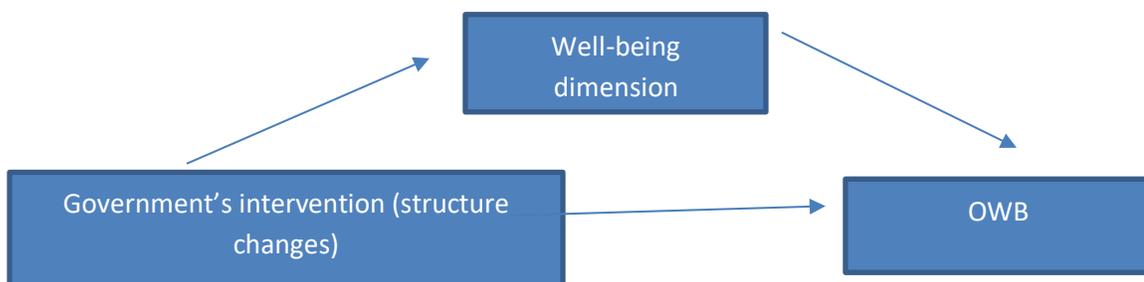
Diagram 3 shows the impact of government intervention on OWB through well-being dimensions. The relationship between government intervention and OWB is referred to as direct effect, and the relationship between government intervention and OWB through a well-being dimension is referred to as indirect effect.

This diagram was based on the SLF framework that allows the structural equation model to combine the well-being affects on OWB and the government's intervention to increase the well-being capital to eventually increase the OWB.
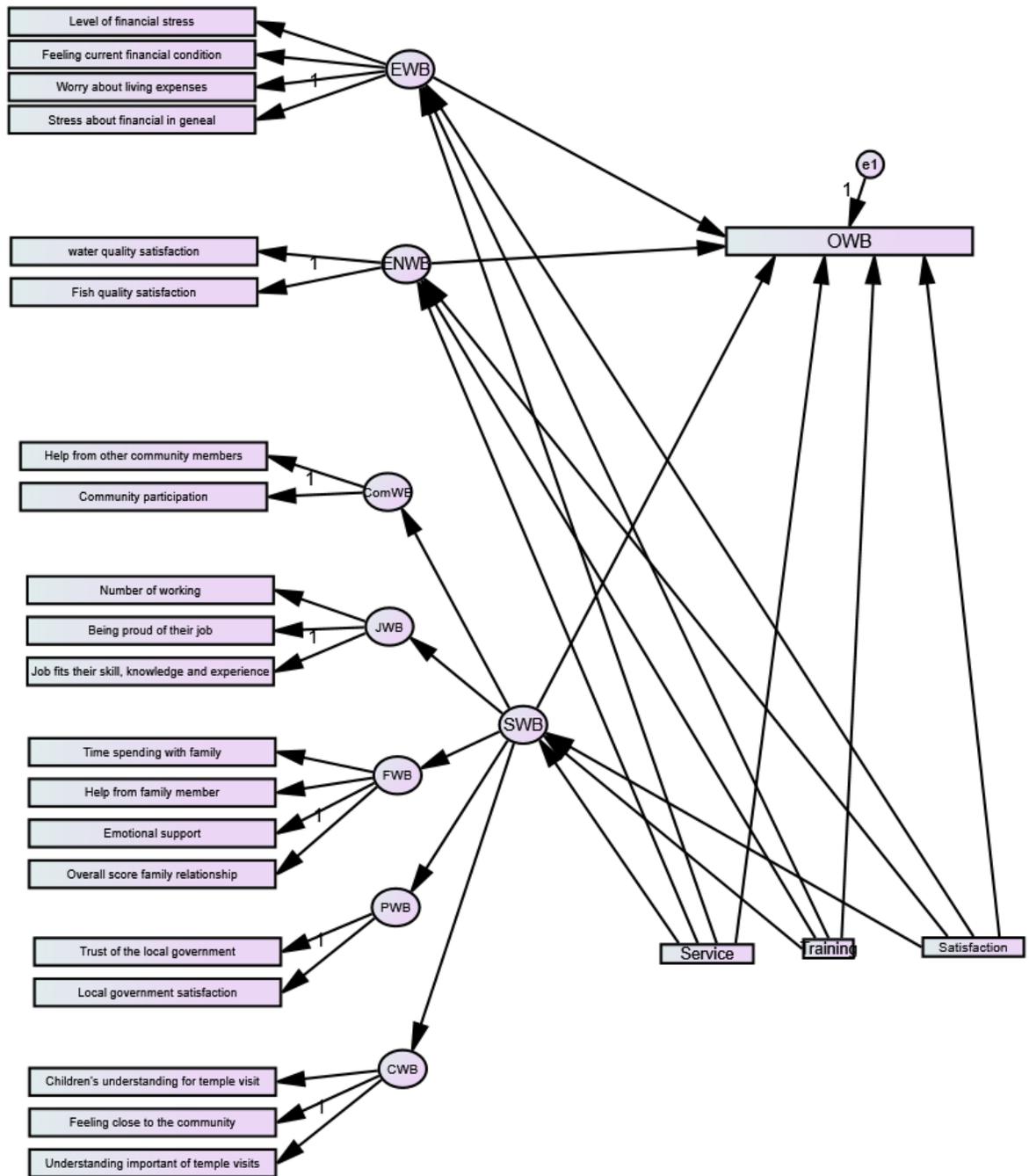
Diagram 4 shows the theoretical model of government's intervention based on SLF.

Data Collection

The survey, including data collection, was conducted by a team in affected communities located close to the dam and in unaffected communities located north of the dam that have similar characteristics in terms of population numbers, land size, and proximity to the river.

The Control Group

The control group for this study includes villages whose communities, located far from the dam site, are not directly affected by the Pak Mun Dam. The control group comprised the villages located next to the Mae Khong River in the Na Pho Klang subdistrict. This subdistrict is similar to the Khong Jiam subdistrict, where the experimental group resides, in terms of population size and the fishing and agricultural way of life. There are eight villages in the subdistrict, which encompass 1,428 households and a total population of 7,261 people.

The Study Group

Two villages in the Khong Jiam subdistrict, Hua Hew village and Hua Hai village, were selected as the experimental group because they are located close to the Pak Mun Dam. Hua Hew village, especially, was severely affected by the dam. The list of villages affected was based on the study of Phongam (2005). Khong Jiam subdistrict has 1,992 households and 6,359 people. Hua Hew village has 301 households with a population of 933, and Hua Hai Pattana village has 131 households and a population of 505.

The Pilot Survey

The pilot test was conducted with 30 heads of households in Por Sri village in the Khong Jiam subdistrict. This was necessary to test the validity and reliability of the

questionnaire and to determine whether the items belonged to the eight domains or constructs of well-being.

Reliability and Validity of Measures

The scales used in this study measure the unobservable characteristics of eight domains, which are latent variables that cannot be directly observed by the survey. Reliability of a measure relates to the consistency of the instrument, whereas validity relates to the fit of what the instrument is actually measuring. It was important to measure internal consistency with the pilot test before the actual survey was conducted to know whether the items fit with the latent variables.

A Priori Sample Size Estimation and Power Analysis Process

The sample size is used to estimate the a priori power analysis. Because administering a survey can be costly, estimation for sample size before conducting the survey is necessary. The power analysis was used to estimate for the sample size for this study. The power analysis for the structural equation model is like other traditional power analyses that require estimates of parameters, especially model fit. The root mean square error of approximation (RMSEA) has been estimated to find the power value of the model. Using the appropriate RMSEA and the degree of freedom to gain the 0.8 power value would assist in estimating the appropriate sample size. The power value of 0.8 was recommended; anything lower than 0.8 is not valid in most research (Cohen. J, 1988). A larger sample size will have higher power. Power is used to avoid type II errors and is equal to 1; a higher power means a high probability of rejecting the false null hypothesis. Because higher power carries a higher cost of collecting data for a larger sample size, it is not necessary to have extremely high power because it increases the cost of the research.

The degree of freedom. The degree of freedom is used to calculate for sample size through power analysis. It can be calculated using this process:

f = q (q + 1) / 2 – number of estimated parameters,

where q is the number of observed variables. This degree of freedom can be used with RMSEA to estimate the sample size based on the table in Hancock and Freeman (2001).

If a specific number for the degree of freedom does not show on Table 6, it is necessary to calculate it using the following formula:

$$n_{df_T} = n_{df_L} - \left(\frac{df_L^b - df_T^b}{df_L^b - df_H^b}\right)\left(n_{df_L} - n_{df_H}\right),$$

where n represents the sample size, df_T is the number of degrees of freedom for the target (T), df_L is the number of degree of freedom for the lower level (L), and df_H is a level of freedom that is higher than the target value.

Based on the research, there are 40 observed variables with eight dimensions of latent variables. Furthermore, there is one endogenous variable (overall well-being) affected by these eight latent variables. The estimated parameters can be counted as the number of regression coefficients, covariances of the eight dimensions of latent variables, and number of residual variances.

1) Observed indicators (q) for this research = 41

2) The total number of estimated parameters can be calculated as follows:

Number of observed variables = 41 indicators

Number of eight dimensions (latent) with covariance of 28

Number of regression coefficients equal to 41

Number of resident variances equal to 41

$$Df = \left\lfloor \frac{41(41+1)}{2} \right\rfloor - (28 + 41 + 41) = 749$$

A calculation of degree of freedom using ε of .02, recommended by Hancock and Freeman (2001), was used to determine the sample size for this research. The table sample size for this research can be found in Diagram 1 in the appendix section.

Based on the Hancock and Freeman table (2001) with $\varepsilon_{1=0.02}$, the highest *df* is 250, but the *df* for the a priori power analysis for this research is equal to 749. The recommended sample sizes for *df* are 212 to reach a power level of 0.99 and as few as 125 for a power level of 0.8. Because the *df* for this research is 749, to reach a 0.99 power level the sample number must be much lower than 212, and 125 for a power level of 0.8. Based on a power level of 0.99 with a *df* of 250 on the table, with the higher *df* of 749, the sample size is expected to be much lower than 212. With 212 subjects for this study, it reached a power level of 0.99. To avoid missing data and rejecting participants, the number of surveys for the experimental group was increased by 18%, from 212 to 250 subjects.

Post hoc power analysis. Power analysis is important to test for the power to reach 0.8, as explained in the a priori sample size section. A priori analysis of sample size and statistical power were done before we officially conducted the survey in the field, and the results were used to calculate the sample size. The post hoc power analysis was analyzed after the data were collected to test the power of the model with data

The calculation of statistical power for the multiple regression model. If the post hoc power is greater than 0.8, the number of subjects in this study would have a high probability of rejecting the false null hypothesis, and thus the study can avoid a type II error.

Post hoc power analysis can be calculated online: https://www.danielsoper.com/statcalc/default.aspx.(Citation, 2019) The information that

is needed for the calculation is the number of predictors for the multiple regression model, the probability level (which is set equal to .05), and the sample size of 235 (this number is lower than the initial sample size of 245 because of the outlier and the squared multiple correlation [R^2]).

Training for Survey Staff

Five college students were hired from Ubon Ratchathani Rajabaht University to administer this study and underwent 1 day of training before the survey was conducted. The training covered the process of introducing the survey staff and asking participants for their permission to participate in the survey, along with reading them the statement of consent, which allowed them to stop the survey at any time. Furthermore, the staff was instructed on how to inform the participants that they were allowed to skip any questions that they did not want to answer. The target groups were selected according to the names of the villages that had been affected by the dam, as identified in the study of Phongam (2005). The survey staff divided the target groups and determined in which households they would conduct the survey, which interviewed the head of the household or the wife of the head of the household.

The survey staff read the survey aloud to residents and assisted in writing answers. Each survey took about half an hour to complete and was conducted inside the participants' homes because many of the questions pertained to their personal information such as income and working status, and some questions were sensitive, such as those regarding their political well-being. At the end of the survey, a gift was given for completing the survey. Gifts were used to motivate residents to participate. Survey staff mentioned this before starting the survey.

We started by approaching 250 people in the affected community. Among them, seven (2.8%) refused to answer the questionnaire. We then presented questionnaires to the unaffected community. Among the 250 people approached, five (2%) refused to answer.

This chapter contains the methods which are used to answer research questions.

Chapter 4: Results

Results are displayed in three sections. The first part includes data analysis results. The second section compares affected and unaffected communities. The third section compares the impacted community before the dam's construction with the same community after the dam opened in 1994. The fourth section shows the effects of factors on the well-being of the affected community. The final section focuses on the structural changes that affect the residents' overall well-being (OWB) through other well-being dimensions as mediator.

Result of Reliability and Validity of Measures

Among the eight domains, only one, the economic domain, has a low Cronbach's alpha. We use the indicators of personal financial well-being from the financial economic well-being study of Wilmarth (2012) which registered, separately, a Cronbach's alpha of 0.89 (2007) and one of 0.91 (2011).

The other domains have a Cronbach's alpha of > 0.7, which indicates a strong internal consistency reliability, but Hinton, Brownlow, McMurray and Cozens (2004) also mentioned that an alpha that fails in 0.5–0.7 shows the moderate reliability, which the alpha for CWB is close to at 0.7(0.639)

Table 4

Cronbach's Alpha for All Well-Being Dimensions

Domain (Construct)	Cronbach's Alpha
SWB	0.793
ENWB	0.765
PWB	0.826

HWB	0.787
JWB	0.713
CWB	0.639
FWB	0.710

There are six constructs or domains that have a Cronbach's alpha greater than 0.7. Cultural well-being is less than 0.7. Based on previous studies in Chapter 2, this is the best construct because it contains important factors. The EWB questionnaire was based on the study of Wilmarth (2012).

Normality Testing

For many of the multivariate methods used in this study, it is assumed that data should have a multivariate normal distribution. Univariate normal distribution for each variable does not mean that they will have multivariate normal distribution, so we need to test for this.

The Affected Community's Normality Distribution of Variable Data

Based on Table 9 in the appendix section, most of the skewness values and Kurtosis values are acceptable, and only the item of "taste of local fish" has a Kurtosis value larger than 8.00. The value of skewness and Kurtosis, which are outside of |3| and |8|, would have problematic normality for the structural equation model (Kline, 2005). The affected community's normality distribution of variable data shows that they have normality distribution for univariate normality. After testing multivariate normality using AMOS software, the Kurtosis multivariate score has a critical value larger than 1.96 so that bootstrapping is the method used to solve the multivariate nonnormality issue.

Bootstrapping is a resampling method that creates sampling distribution to estimate standard errors and create confidence intervals. This method is important for SEM in the case of non-normal data and has more accurate Type I error rates. Furthermore, for the case of mediation, bootstrapping is also used to confirm the mediation effect (Hu, 2010).

The Unaffected Community's Normality Distribution of Variable Data

Based on Table 9 in the appendix, most of the skewness and Kurtosis values are lower. Only the variable of "reaching government services" has a skewness value smaller than-3.00 (-3.001), and its Kurtosis is 11.579, which is larger than 8.00. Based on this information, the data have a normal distribution for univariate normality but not for multivariate normality.

Outliers

Using the result of Mahalanobis's D^2, the outliers of both communities have been eliminated.

Table 5

Number of Outliers Eliminated

Group	Original Sample Size	Number of Residents Refusing to Complete Survey	Number of Outliers	Sample Size after Removing Outlier
Affected community	245	243	8	235
Unaffected community	245	245	10	235

Research Question 1 Results

The focus of research question 1 is the well-being of the affected community in comparison to that of the unaffected community. There are villages in the Khong Jiam district and districts located close to the Pak Mun Dam site. The survey for this research was conducted in three main villages that have been heavily affected by the dam. These three villages have been moved to an empty area provided by the government.

Description of Samples

This section presents the differences and similarities between the affected and unaffected communities.

Socioeconomic differences and similarities of affected and unaffected communities can be seen at the table 7 at appendices.

Education. About 65.5% of the residents of the affected community have an education level lower than grade 6, which is considered basic education in Thailand, while 16.6% have an education level of grades 7–9. Only 4.3% have a bachelor's degree.

For the unaffected community, about 51.9% of residents have an education level of lower than grade 6, and 18.7% of this community has an education level of grades 7–9. Approximately 20% of residents of the unaffected community have an average of grade 10–12, a high school year. The percentage of college graduates in this group is 4.7%, which is higher than the affected community at only 4.3%. Moreover, 3.4% of the unaffected community residents have a graduate degree, compared to none of the residents in the affected community. These results show that the unaffected community seems to have a greater number of people with a higher education level.

Income. Approximately 2.6% of the residents of the affected community have an income of less than 500 Baht per month, which is larger than in the unaffected community.

About 13.2% of affected community residents have an income in the range of 500–1,000 Baht per month. Around 14.5% of the affected community residents have an income larger than 10,000 Baht per month, but this number is still lower than in the unaffected community, where 20.0% of the residents earn more than 10,000 Baht per month.

In comparison, only 1.3% of the unaffected community residents earn an income lower than 500 Baht per month, which is half that of the affected community (2.6%). Only 9.4% of residents in the unaffected community earn an income in the range of 500–1,000 Baht, which is significantly lower than in the affected community (13.2%). Approximately 20.0% of unaffected community residents earn more than 10,000 Baht per month, which is larger than that of the affected community residents (14.5%). The unaffected community has a smaller group with low income and a larger group with higher income.

Number of jobs. In the affected community, 53.6% of the residents have one job, 30.2% have two jobs, 10.6% have three jobs, 1.7% have four jobs, 2.6% have five jobs, and 0.4% have to work six jobs to earn enough income.

Results in the unaffected community are quite different: 51.9% of unaffected community residents have only one job, and 31.5% have two jobs. About 11.9% have three jobs, and 2.6% have to work four jobs. Only 0.4% have to work five jobs, and no one works more than five. This shows that unaffected community residents do not have to work as many jobs to earn a sufficient income.

Number of family members. Approximately 13.2% of residents in the affected community have only two persons in their households, which is a much larger percentage than in the unaffected community. In the affected community, the largest number of households generally have four persons (24.7%), while some families have households of

10 people (1.7%), 11 people (0.4%), and 12 people (0.9%). There are not nearly as many large families in the unaffected community.

In the unaffected community, about 23.8% of residents have a family size of four, which is similar to the percentage in the affected community. The percentage of unaffected community residents decreases as the family size increases, to just 0.4% with a family size of 10 people.

Results of comparing well-being dimensions of affected and unaffected communities. The result can be seen in table 9 at appendices. Based on the descriptive output and using independent testing for the differences between the two groups, results show significant differences in the majority of comparisons for items in each dimension. For 31 of 40 items, the unaffected community had a higher mean than the affected community. Furthermore, these 31 items for the unaffected community are larger than the average score of the whole pool combination of both the unaffected and affected communities. Among 40 items, 24 indicate statistically significant differences between the two communities. In general, the study finds that the affected community has lower well-being scores than the unaffected community.

Only one of 40 items is larger for the affected community than for the unaffected, and this is statistically significant at a 99% confidence level. In general, and as expected, the unaffected community showed better well-being.

Eight dimensions were compared between the affected community and the unaffected community. The expectation was that the unaffected community would have a higher mean than the affected community and that it would be significantly different

between these communities for a 95% confidence level. A comparison of both groups, with detailed results of each item in each dimension, follows.

Economic well-being. Among eight items, six are statistically significant for a 95% confidence level, and six had a larger mean for the unaffected community than for the affected community. For the first item, "level of financial stress," results show that the unaffected community has less stress compared to the affected community with means of 6.53 and 5.74, respectively, with a T-value of -2.88.

For the second item, "satisfaction with financial situation," the unaffected community had a mean value of 5.68, while the affected community had a mean of 5.02, with a T-value of -2.61.

For the third item, "feeling about current financial condition," the mean of the unaffected community is 5.92, which is higher than that of the affected community, which had a mean of 5.15 with a T-value of -3.32.

For the fourth item, "worry about living expenses," the unaffected community had a mean value of 4.70, while the affected community had a mean of 4.01, with a T-value of -2.85.

The result for the fifth item, "confidence regarding financial emergency," shows a higher mean of 5.60 for the unaffected community, compared to the affected community's mean value of 4.54, with a T-value of -3.30.

For the last item, "stress about finances in general," the affected community had a lower mean of 4.77, while the unaffected community's mean was 5.41, with a T-value of -2.73.

There is only one item for which the affected community had the same mean as the unaffected community: "cannot afford to go out," with a mean of 6.99, which is not statistically significant for a 95% confidence level.

Community well-being. Among five items, only four are statistically significant for a 99% confidence level for each community. This statistic shows that the four items of these two groups have different means. Furthermore, three of the four statistically significant items show that the unaffected community had a higher mean of social well-being than the affected community. The mean of "community listens to your ideas, advice, or complaints" for the unaffected community was 3.21 on a scale of 5, compared to a mean of 2.94 for the affected community (T-value of -2.89). The mean for "help from other community members" for the unaffected community (mean of 3.76) was also larger than that of the affected community (mean of 3.41, with a T-value of -3.60). The mean for "community safety among members of community" was larger for the unaffected community (4.61) than for the affected community (4.4, with a T-value of -2.96). For "community safety when there are visitors around," the mean of the affected community (3.63) was larger than that for the unaffected community (3.26, with a T-value of 3.247).

Environmental well-being. This is a main issue mentioned in relation to the dam. Of the six items in this dimension, only two are statistically significant for a 95% confidence level.

The two items that are statistically significant have different means across the two groups, showing superior ENWB for the unaffected community. For the first item, "shortage of water," the affected community had the lower mean score of 3.81, while the unaffected community had a high mean of 4.2, with a T-value of -4.05. The level of

satisfaction regarding water quality of the Mun and Mae Khong rivers was higher for the unaffected community, with a mean value of 3.63, than for the affected community (mean of 3.29, with a T-value of -3.81). This shows that the unaffected community was more highly satisfied with the quality of the water.

Political well-being. Among five items, we found that only three have a statistically significant difference across the two groups for a 95% confidence level. For the first item, "trust in the local government," the affected community had quite a low mean of 3.31, while the unaffected community had a mean of 3.48, with a T-value of -2.27. Regarding "overall satisfaction with the local government," the mean value of the unaffected community was also larger (3.38), while the affected community's mean was 3.24, with a T-value of -2.00. Regarding "respect for people's voices by the central government," the unaffected community had the higher mean, with a value of 2.77, and the affected community had a mean of 2.35, with a T-value of -4.56.

Health well-being. There are five items in this dimension, and all are statistically significant for 95% and 99% confidence levels as their means are different from each other. Furthermore, the means for all five items were higher for the unaffected community than for the affected community. For "number of hospital visits last year," the unaffected community's well-being had a higher mean of 2.88, while the affected community had a mean of 2.31, with a T-value of -4.49. For well-being of "stress level," the unaffected community's mean was also higher (3.97) than that of the affected community (3.56, with a T-value of -4.46). For the third item, "feeling full of energy," the unaffected community had a mean of 3.12, compared to a much smaller mean for the affected community (2.86, with a T-value of -2.82).

Regarding sleeping problems, the unaffected community had superior well-being, with a mean of 4.18, compared to the affected community's mean of 3.77, with a T-value of -3.64. For satisfaction level regarding one's own health condition, the unaffected community had a better well-being, with a mean of 3.83. The affected community had a lower mean value of 3.60, with a T-value of -2.73.

Job well-being. There are four items in this dimension, but only two items with a mean statistically significant difference for a 95% confidence level. For the first item, "number of working hours per week," the unaffected community had a higher well-being (mean of 3.02) than the affected community (mean of 2.44 with T-value of -4.3). For the second item, "jobs fit with their skills, knowledge, and experience," the unaffected community had a higher mean (3.92) than the affected community (mean of 3.78, with a T-value of -2.00).

Cultural well-being. Regarding the mean of the affected and unaffected groups, the results for cultural well-being does not show a statistically significant difference for a 95% confidence level.

Family well-being. This dimension has four items, but only two items show a statistically significant difference for a 95% confidence level. "Assistance from family members" had a higher mean for the unaffected community (4.06) than for the affected community (3.92, with a T-value of -2.28). Regarding "family emotional support," the mean value for the unaffected community was larger (4.38) than for the affected community (4.2, with a T-value of -2.68).

Research Question 2 Result

Comparing pre- and post-1994 for affected communities. This section compares similarities and differences in demographic information between affected communities pre-1994 and post-1994. This subset of the community comprises 191 people, or 77.95%, of the sample size (245) of the pre-1994 affected community and 22.05% of the post-1994 affected community. The dam was opened in 1994, marking the introduction of the negative conditions. As shown in table 8 at appendices section, the detail for each socioeconomic characteristics can be explained as follow.

Education. The education level of the post-completion group was quite different, as only 47.2% had finished grade 6, while 70.3% of the pre-1994 residents had finished the same level. Furthermore, 24.5% finished grades 7–9 for post-1994 and only 14.1% of the pre-1994 group completed this level. Additionally, 20.8% had finished grades 10–12, while only 9.7% of the pre-1994 residents had finished this level. Of these residents, 5.7% had earned a bachelor's degree, while only 4.3% of the pre-1994 residents had completed the same level of education.

Income. Only 4% of the post-1994 group earned less than 500 Baht per month, but 6%, 8%, and 18% of these residents earned in the ranges of 9,000–9,500 Baht, 9,500–10,000 Baht, and more than 10,000 Baht, respectively. The percentages of these three high levels of income are higher than for the pre-1994 group (1.1%, 2.2%, and 13.5%, respectively).

Number of jobs. This ranges from one job to a maximum of six jobs; 44% of post-1994 residents hold only one job, while 36% must work two jobs. Only 2.7% and 2.0% of pre-1994 and post-1994 work five or six jobs. In the pre-1994 community, 56.2% of the

residents have one job, 28.6% work two jobs, and 2.7% work four jobs, which is the highest number of jobs for this group.

Number of people in household. Number of people in the household ranges from one to eight in the post-1994 community. Of this group, 30.0% had four household members, which represented the largest number and the same ratio as for the before-1994 residents. Only 8.0% of this group had a household of seven or eight members, respectively, which was considered a large family. While 2.2% of the pre-1994 community residents lived by themselves, 14.6% and 14.6% had two or three people in the household, respectively. Further, 23.2% had four people in the household, and 16.8% and 14.1% had five and six people in the household, respectively. Some of the before-1994 community residents had a large household size: 2.2% had a household size of 10 people, and 1.1% had 12 people in their families.

Number of years settled in the community. This measurement ranged from 1 year to 83 years. About 34% of the post-1994 group had remained in the community for 20 years after the dam's completion, while 17% had stayed there for 19 years, 5.7% arrived there 11 years prior, and approximately 7.6% had settled there in the past 5 years. The pre-1994 residents settled in this community before the dam was built; the length of their residency ranged from 22 years to 83 years. Specifically, 8.4% of these residents had stayed for 22 years, 4.2% had lived in the community for 59 years, and 3.2% had lived here for 68 years, 72 years, and 77 years, respectively.

Based on the output, the results were mixed. The expectation was that there would be differences between the pre- and post-1994 groups. However, only eight items showed

significant differences between the before-1994 and after-1994 communities. Furthermore, among the items with significant differences between the two groups, seven items had higher scores for the pre-1994 community than for the post-1994 community. The post-1994 community had a larger score for just one item. Of the other seven items, there is not any from EWB. Two items are from ComWB, "help from other community members," with a T-value of 5.464, and "community safety among members of community," with a T-value of 2.247. For ENWB, two items are from "short of water," with a T-value of 2.177. Two items are from PWB, which are "trust of the central government," with a T-value of 2.17, and "trust of local government," with a T-value of 2.889. One item is from JWB, which is "numbers of working hours per week," with a T-value of -2.93. The last item is from CWB, which is "they understand the importance of visiting the temple," with a T-value of 1.965. Only one item from EWN has a higher value for the post-1994 group, which is "buying water to consume," with a T-value of -2.94.

Because the results did not show significant differences between the two groups, we combined the pre- and post-1994 groups into one affected group. We expected to see differences and higher scores for all well-being factors in the post-1994 community, but the results were not as expected.

Research Question 3 Results

CFA Result

There are eight dimensions of well-being with 40 items. CFA would help group these items into each dimension based on theory and previous literature reviews.

Table 6. Standardized Regression Weights for original measurement model

	Estimate
EWB →Level of financial stress	0.761

EWB →Satisfaction with financial situation	0.583
EWB → Feeling about the current financial condition	0.703
EWB →Can't afford to go out	0.313
EWB →Living paycheck to paycheck	0.602
EWB →Worry about living expenses	0.774
EWB →Confidence regarding financial emergency	0.377
EWB →Stress about finances in general	0.729
ComWB→Social acceptance	0.371
ComWB→Social integration	0.506
ComWB→Social assistance	0.649
ComWB→Safety of the community	0.206
ComWB→Satisfaction with community well-being	0.391
ENWB→Water purchasing	-0.043
ENWB→Availability of water	0.045
ENWB→Fish quality	0.331
ENWB→Crowdedness	0.264
ENWB→Level of satisfaction with the water quality of the Mun River and Mae Khong River	0.712
ENWB→Level of satisfaction with the fish quality of the Mun River and Mae Khong River	0.722
PWB→Central government commitment to policy	0.493
PWB→Local government commitment to policy	0.801
PWB→Satisfaction with government's services	0.571
PWB→Satisfaction with local government's services	0.801
PWB→Government respect of the voice of the local residents	0.203
HWB→Physical self-health condition	0.153
HWB→Stress and pressure	0.398
HWB→Full of energy	0.485
HWB→Sleep difficulty	0.408
HWB→Health satisfaction	0.506
JWB→Hours of working	0.128
JWB→Proud of current job	0.650
JWB→Job fit	0.900
JWB→Job satisfaction	0.899
CWB→ Children's understanding of local culture	0.732
CWB→Community integration	0.776
CWB→Self-understanding	0.770
FWB→Time spent with family	0.663

FWB→Family help	0.734
FWB→Emotional support	0.735
FWB→Overall family relations	0.705

Table.7 Model fit for original measurement model

Indices		Fit Criteria
RMSEA	0.071	The smaller, the better: a number < 0.05 is a good fit, 0.05–0.08 is a reasonable fit, and > 0.1 is a poor fit.
CFI	0.724	> 0.90 is considered a good fit.
SRMR	0.100	< 0.08 is a good fit (Hu & Bentler, 1999).
CMIN/df	2.03	< 5.00 is a good fit (Marsh & Hocevar, 1985).

Table 8. Table of AVE and CR for original measurement model

Factor	AVE (average variance extracted) should be > 0.5.	CR (composite reliability) should be > 0.7.
EWB	0.605	0.828
ComWB	0.424	0.530
ENWB	0.338	0.462
PWB	0.573	0.726
HWB	0.390	0.477
JWB	0.644	0.773
CWB	0.759	0.803
FWB	0.709	0.802

This result shows that any item that has a loading value lower than 0.7 will be eliminated from the model.

The HWB dimension does not have any item higher than 0.7, so all items do not have high correlation to each other in this dimension, and HWB has been eliminated from the model.

For the other seven dimensions, their loadings are higher than 0.7, but only ComWB has two items that are high but are still lower than 0.7. Since ComWB's loadings are much higher than HWB, these two items have been kept.

EWB has four items that have loadings higher than 0.7, namely, 1A Level of financial stress (0.761), 1C Feeling about the current financial condition (0.703), 1F Worry about living expenses (0.729), and 1H Stress about finances in general (0.744).

For ComWB, the two items that are high but still lower than 0.7 are 2B Community participation (0.506) and 2C Help from their community members (0.649).

For ENWB, there are two items, which are 3E Level of satisfaction with the water quality of the Mun River and Mae Khong River (0.712) and 3F Level of satisfaction with the fish quality in the Mun and Mae Khong Rivers (0.722).

For PWB, there are also two items, which are 4D Trust of the local government (0.801) and 4F Overall satisfaction with the local government (0.810).

JWB has three items, which are 6B Being proud of their job (0.655), 6C Job fitting their skills, knowledge, and experience (0.900), and 6D Satisfaction level of their job (0.899).

For CWB, there are three items in this factor: 7A Their children's understanding of the importance of visiting the temple (0.732), 7B Feeling close to the community (0.776), and 7C Their understanding of the importance of visiting the temple (0.770).

For FWB, there are four items in this dimension: 8A Time spent with family has increased in the past 10 years (0.663), 8B Individuals turn to each other for help when something is troubling them (0.734), 8C Emotional support can be gained from family members when it is needed (0.735), and 8D Overall score of family relationship (0.705). The model did not fit well when all the items were included in the CFA. After the low loadings for each dimension and HWB have been eliminated, the result is a better fit. In some factors, there are only two items, but it is acceptable when they are highly correlated and their loadings are too different from the rest of the items in the same factor (Worthington & Whittaker, 2006, p. 821).

After the low-loading items have been eliminated, a model fit and estimate is performed again. The model fit has improved, and the loading factor has also increased above 0.7 compared with the original CFA result.

Result of loading for modified measurement model

Table 9. Standardized Regression Weights of modified measurement model

	Estimate
EWB →1A Level of financial stress	0.765
EWB→1C Feeling about the current financial condition	0.719
EWB →1F Worry about living expenses	0.694
EWB →1H Stress about finances in general	0.816
ComWB→2B Community participation	0.525
ComWB→2C Help from their community members	0.688
ENWB→3E Level of satisfaction with the water quality of the Mun River and Mae Khong River	0.711

ENWB →3F Level of satisfaction with the fish quality in the Mun and Mae Khong Rivers	0.770
Political→4D Trust of the local government	0.813
Political→4F Overall satisfaction with the local government	0.834
Working→6B Being proud of their job	0.645
Working→6C Job fitting their skills, knowledge, and experience	0.900
Working→6D Satisfaction level of their job	0.901
Culture→7A Their children's understanding of the importance of visiting the temple	0.730
Culture→7B Feeling close to the community	0.775
Culture→7C Their understanding of the importance of visiting the temple	0.774
Family→8A Time spent with family has increased in the past 10 years	0.664
Family→8B Individuals turn to each other for help when something is troubling them	0.742
Family→8C Emotional support can be gained from family members when it is needed	0.732
Family→8D Overall score of family relationship	0.697

Table 10.Model fit for modified measurement model

Indices	Fit Criteria

RMSEA	0.062	The smaller, the better: a number < 0.05 is a good fit, 0.05–0.08 is a reasonable fit, and > 0.1 is a poor fit.
CFI	0.926	> 0.90 is considered a good fit.
SRMR	0.0604	< 0.08 is a good fit (Hu & Bentler, 1999).
CMIN/df	1.797	< 5.00 is a good fit (Marsh & Hocevar, 1985).

Based on the result of the original CFA and adjusted CFA, the model fit has been

different. The model fit of the adjusted model is better for all four measurements, in

which RMSEA is smaller for the adjusted model (0.062) compared with 0.071 for the

original model. The CFI of the adjusted model is 0.926, which is higher than that of the

original model (0.724). The SRMR for the adjusted model is 0.064, which is a good fit,

but the SRMR of the original model is 0.100, which not a good fit. The CMIN/df for the

adjusted model is 1.797, which is much better compared with 2.03 for the original model.

From the original CFA result and after the elimination of loadings, the modified model

has seven latent variables with 20 items with different loading values. EWB has four

items: level of financial stress (0.765), feeling about the current financial condition

(0.719), worry about living expenses (0.694), and stress about finances in general (0.816).

ComWB contains two items: community participation (0.525) and help from their

community members (0.816). For ENWB, there are two items, which are level of

satisfaction with the water quality of the Mun River and Mae Khong River (0.711) and

level of satisfaction with the fish quality in the Mun River and Mae Khong River (0.770).

PWB also has two items, which are trust of the local government (0.813) and overall

satisfaction with the local government (0.834). JWB has three items, which are being

proud of their job (0.645), job fitting their skills, knowledge, and experience (0.900) and

satisfaction level of their job (0.901). CWB also has three items, which are their

children's understanding of the importance of visiting temple (0.730), feeling close to the

community (0.775), and their understanding of the importance of visiting the temple

(0.774). Last, for FWB, there are four items in this factor, which are time spent with

family has increased in the past 10 years (0.664), individual turn to each other for help

when something is troubling them (0.742), emotional support can be gained from a

family member when it is needed (0.732), and overall score of family relationship

(0.697).

After the low-loading items and the factor that contains low loading, which is not

acceptable, have been removed and AVE (average variance extracted) and CR

(composite reliability) have been calculated, it has been found that only the AVE of

ComWB is lower than 0.5 and the CR of ComWB is lower than 0.7, but ComWB is the

important part of social well-being, and their loadings are 0.525 and 0.688, which are

close to 0.7. For many studies, they have found that loading of 0.5–0.7 can be accepted or

the cutoff value for acceptable loading (Truong & McColl, 2011; Hulland, 1999; Chen &

Tsai, 2007). Furthermore, Fornell and Larker(1981) mentioned that convergent validity

would be still adequate even though AVE is smaller than 0.5 but CR is above 0.6 since

CR of ComWB is 0.54 which is close to 0.6 and it is still important factor for SWB then

it has been kept into the model.

Table 11.Table of AVE and CR for modified measurement model

Factor	AVE (average variance extracted) should be > 0.5.	CR (composite reliability) should be > 0.7.
EWB	0.562	0.836
ComWB	0.374***	0.540***
ENWB	0.549	0.708
PWB	0.678	0.808
JWB	0.679	0.861
CWB	0.577	0.803
FWB	0.503	0.801

Table. 12 The result of seven well-being dimensions impacting overall well-being

Model fit

Parameter Values

Parameter		Standardized	SE	T-value
EWB→1C	Feeling about current financial condition	0.722**	0.096	9.951
EWB →1A	Level of financial stress	0.759**	0.105	10.305
EWB →1F	Worry about living expenses	0.603**	0.093	8.411
EWB →1H	Stress about finances in general	0.771	1.000	1.000
ComWB→2B	Community participation	0.535	1.000	1.000
ComWB→2C	Help from their community member	0.662**	0.214	5.046
ENWB→3E	Level of satisfaction with the water quality of Mun River and Mae Khong River.	0.710	1.000	1.000
ENWB →3F	Level of satisfaction with the fish quality in the Mun and Mae Khong Rivers.	0.738	1.000	1.000
Political→4F	Overall satisfaction with local government	0.876	1.000	1.000
Political→4D	Trust of the local government	0.742**	0.120	7.265
Working→6B	Being proud of their job	0.696**	0.055	12.005
Working→6C	Job fits their skills, knowledge, and experience	0.852**	0.063	15.266

Working→6D	Satisfaction level of their job	0.922	1.000	1.000
Culture→7A	Their children's understanding of the importance of visiting the temple	0.646**	0.143	8.357
Culture→7B	Feeling close to the community	0.753	1.000	1.000
Culture→7C	They understand the importance of visiting the temple	0.747**	0.112	9.105
Family→8A	Time spent with family has increased in the past 10 years	0.671**	0.161	7.877
Family→8B	Individuals turn to each other for help when something is troubling them	0.644**	0.133	7.656
Family→8C	Emotional support can be gained from family members when it is needed	0.727**	0.146	8.262
Family→8D	Overall score of family relationship	0.638	1.000	1.000

Note. **Statistically significant at confidence level of 99%; critical t-value of 2.58 used. * statistically significant at confidence level of 95%; critical t-value of 1.96.

Table 13. Second order factor analysis

Since SWB contains five dimensions which are Society, Politic, Working condition, Cultural and Family. These five dimensions are first factor and SWB is the second factor. All five dimensions are statistically significant at confidence level of 99%.

Parameter	Standardized	SE	T-value
SWB→ Society	0.511**	0.274	3.886
SWB→ Politic	0.561**	0.213	5.459
SWB→Working condition	0.517**	0.206	5.416
SWB→ Cultural	0.507**	0.170	4.885
SWB→ Family	0.691	1.000	1.000

Note. **Statistically significant at confidence level of 99%; critical t-value of 2.58 used. * statistically significant at confidence level of 95%; critical t-value of 1.96.

The model fit used to answer research questions 3–5 shows that RMSEA has a mediocre fit with a value of 0.069. CFI index is also a mediocre fit with a value of 0.86. SRMR is a good fit with a value of 0.759. CMIN/df is also a good fit with a value of 2.123. Based on model fit indexes, the model is acceptable when two indexes have good fits and

none have a poor fit. The CFA part of this study began with eight dimensions of well-being consisting of 40 indicators. After CFA was performed, the loadings of health dimensions were low, with all items lower than 0.7, so the whole dimension was eliminated. During CFA, because the loading of HWB was low for all, the HWB dimension was eliminated.

Of the eight dimensions, only seven were included for the structural model. Items that were included in each dimension are as follows; there are 4 items in EWB, 2 items in ComWB, 2 items in ENWB, 2 items in PWB, 3 items in JWB, 3 items in CWB and 4 items in FWB.

Furthermore, CFA modification indices do not recommend any covary for residuals for any dimension. Even though covary for residuals can be allowed to increase the model fit, specific relationships for items in the same construct were needed before residuals could be covaried. Because there was no covary for residuals for each construct, model fit of the CFI index could not be increased to reach a good fit level.

Out of 40 items after CFA, only 20 items were included for seven well-being dimensions. These latent variables (exogenous variables) impact endogenous variables, affecting overall well-being. A structural model would follow the measurement model.

Regarding the measurement component, all items in all well-being constructs were statistically significant at the 99% confidence level. For the EWB, all four items had a standardized factor loading of 0.603 to 0.771. Two items in the ENWB had standardized factor loadings of 0.710 and 0.738, respectively. The two items for ComWB had standardized factor loadings of 0.535 and 0.662. The two items in the PWB construct also had standardized factor loading of 0.742 and 0.876, respectively. The three items in the

JWB construct had standardized factor loadings ranging from 0.696 to 0.922. For the CWB construct, there were three items with standardized factor loadings of 0.646 to 0.753. Finally, the four items for the FWB construct had standardized factor loadings ranging from 0.638 to 0.727, respectively.

Loading for measurement model.

Loading for each item for first order construct. A loading result of approximately 0.7 was acceptable for each item within each dimension. Any item with a lower loading value was eliminated. This process allowed us to include suitable items into the same latent variables (well-being dimensions). The result for this measurement model shows seven latent variables that represent the seven well-being dimensions with appropriate items within these latent variables and they can be shown in table 6:

1) EWB: For the measurement model, the loading for each item ranges from 0.603 to 0.771. The items included in EWB are "feeling about current financial condition", "level of financial stress", "worry about living expense" and "stress about finances in general"

2) ENWB: for the measurement model, the loading for each item is 0.710 and 0.738. The items included in ENWB are:

   "Level of satisfaction with the water quality of Mun River and Mae Khong River"

   "Level of satisfaction with the fish quality in the Mun River and Mae Khong River"

3) ComWB: for the measurement model, the loading for each item is 0.535 and 0.662. The items included in this dimension are:

   "Community participation", and "Help from their community member"

4) PWB: There are two items in this dimension, with loading of 0.742 and 0.876, respectively:

"overall satisfaction with local government" and "trust in the local government"

5) CWB: There are three items for this dimension, with loadings ranging from 0.646 to 0.753:

"their children understand the importance of vising the temple", "feeling close to community" and "they understand the importance of visiting the temple"

6) JWB: For working conditions, there are three items with loadings ranging from 0.696 to 0.922:

"being proud of themselves",

"job fits their skills, knowledge, and experience" and

"satisfaction level of their job"

7) FWB: This last dimension has four items with loadings ranging from 0.638 to 0.727:

"time spent with family has increased in the past 10 years",

"individuals turn to each other for help when something is troubling them",

"emotional support can be gained from family members when it is needed" and

"overall score of family relationship"

The latent HWB variable was eliminated due to low loading and because it was not statistically significant. Furthermore, ENWB had retained only "quality of water," which related to the environment and had the highest loading for ENWB. The social assistant is also the variable with the highest loading for SWB, as it represented the character of the rural community.

Loading for second order factor for SWB. From Table 7, there is a second order factor for SWB. There are five loadings of first factors of ComWB, PWB, JWB, CWB,

and FWB. The model was based on the sustainable livelihood development, which focuses on the three main areas of economic, social, and environmental well-being. Social well-being dimension is considered a broad area and combines those five areas.

Based on results, all five first order constructs have significant loading to SWB because all T-values are all above 2.58, which is statistically significant at a confidence level of 99%. T-values for the five first order factors range from 3.886 to 5.459. The standardized estimate from SWB to ComWB is 0.511. Standardized estimate from SWB to PWB is 0.561. The standardized estimate from SWB to JWB is 0.517. The standardized estimate from SWB to CWB is 0.507. The standardized estimate from SWB to FWB is 0.691. These first order constructs would provide enough information for latent second order constructs of SWB. This second order construct would be one of three main independent variables that would be used for a structural model with OWB as the dependent variable.

Hypothesis testing and structural model. Turning to structural components, there are six exogenous (independent) variables and one endogenous (dependent) variable. Among the seven independent variables, not all hypothesized direct effects on the dependent variable, overall well-being, were statistically significant at the 99% confidence level. As mentioned earlier in methodology chapter regarding nonnormality for this data, the bootstrapping method was used to address this problem. Results show the confidence interval (CI) for upper and lower level and P-value.

To answer research question 3, the three dimensions of EWB, SWB, and ENWB were independent variables having an impact on OWB.

Only two hypothesized direct effects were statistically significant with 99% confidence: EWB and SWB. EWB had a standardized direct effect of 0.306 with a P-value of 0.011 and CI in between 0.102 to 0.524 for lower bound and upper bound. Because zero was not in between CI, and P-value is lower than 0.05, it is statistically significant. This means that if the standard deviation of economic well-being increased by one, it would predict an increase in the standard deviation of overall well-being by 0.306. The standardized direct effect for the SWB construct was 0.921with a P-value of 0.002 and CI in between 0.581 to 1.908 for lower and upper bounds. Zero was not in between this CI and the P-value is lower than 0.05, so it is statistically significant. This means that once the standard deviation of SWB increased by one, it would reflect an increase in the standard deviation of overall well-being of 0.921. Results showed that these two dimensions and their positive impacts on OWB were statistically significant at the 99% confidence level while many others were not even statistically significant at a 95% confidence level.

Finally, ENWB has the standardized estimate of -0.198, CI range from -0.612 to 0.059, and a P-value of 0.108, which is not statistically significant. This means there is not enough information to determine that ENWB affected OWB.

Research Question 4 Results

MRS. Based on results, only two dimensions showed a statistically significant impact on OWB, which are EWB and SWB. The standardized estimate would show the impact to OWB, but the ratio of the standardized estimate would show the relationship between each well-being dimension. The result showed that local affected residents were willing to give up more of their EWB to gain more SWB.

$$MRS_{ES} = \frac{MU_E}{MU_S} \text{, when E} = \text{EWB and S} = \text{SWB}$$

MU_E = Marginal utility of EWB

MU_S = Marginal utility of SWB

yzgiven up to gain more EWB.

$MRS_{ES} = \frac{MU_E}{MUS} = \frac{dy/de}{dy/dS}$, y = OWB. And $\frac{dy}{de}$ = the standardized estimate of EWB to

OWB, and $\frac{dy}{dS}$ = the standardized estimate of SWB to OWB.

$MRS_{ES} = -\frac{0.306}{0.921}$ = - 0.332

From this result, SWB must give up 0.332 to gain one unit of EWB; however, EWB

has to give up three units to gain only one unit of SWB.

This means that affected residents were willing to give up more EWB to regain

their SWB. The result showed a relationship between EWB and SWB, where one can be

substituted for the other, as mentioned in the literature review for the SLF framework

(DFID, 1999). This means that gaining one well-being dimension requires lowering

another dimension, which shows that residents considered SWB more important than

EWB. This information was used to understand how each dimension would rank in

importance based on the limitation of resources.

Research Question 5 Results

The result shows impact of government intervention on overall well-being through

the mediators of economic well-being and social well-being, a combination of family well-

being, social assistance, working conditions, and cultural well-being. This model tests the

hypothesis of a relationship of government services provision, government training, and

residents' satisfaction with government solutions to Pak Mun Dam to OWB through EWB,

ENWB and SWB. Based on SLF, government plays and important role in providing capital

through many of their policies. These policies are based on the relationship of each dimension with the government. Table 15, the structural model result in appendices shows the supportive result for this research question.

Mediator. The mediators for this model will be EWB, SWB, and ENWB. Independent variables are government services, government training, and residents' satisfaction with government solutions to the Pak Mun Dam. The dependent variable is OWB.

Result of EWB as mediator.

1) Government services→EWB→OWB

   In this case, there is an indirect effect, but no direct effect, of government services on OWB. Indirect effect = (.091) x (.306) = .027 with a P-value of .167 and CI is- .011 and .083. The direct effect is -.095 with a P-value of .379, and CI is -.426 and .083, which is not statistically significant for a direct effect. The total effect can be calculated from summation of indirect effect and direct effect which is .027 + (-.095) = -.068. The total effect can also be found from the bootstrapping method. Results show that for every increase in standard deviation of government services, there will be a .068 decrease of standard deviation in OWB through SWB, but there is no mediator for this case because there is no statistical significance for either a direct or indirect effect. Furthermore, government's services do not show a statistically significant impact on the OWB.

2) Government training → EWB → OWB

   In this case, there is an indirect effect, but no direct effect, of government training on OWB. Indirect effect = (-.025) x (.306) = -.007 which has a P-value of .646 and

CI is -.0069 to .038. Direct effect is -.253 with a P-value of .157 and CI between -1.199 and .073. The total effect is the summation of indirect and direct effects, which is (-.007) + (-.253) = -.260, which is also shown from the bootstrapping results. This means that for every increase in standard deviation for government training, there will be a .260 decrease in standard deviation for OWB through SWB. Because both direct and indirect effects are not statistically significant, it does not show any mediation for this case.

3) Satisfaction level for Pak Mun Dam solution → EWB → OWB

In this case, indirect effect, which can be calculated from (.153x.306) = .0468 with a P-value of .036 and CI between .003 and .108, is statistically significant. Bootstrapping results show that direct effect has a standardized estimate of -.0460 with a P-value of .681 and CI of -.130 to .153, which is not statistically significant. In the case that indirect effect is statistically significant but direct effect is not statistically significant, and there is full mediation. There must be an increase of satisfaction level to OWB through EWB.

Result of SWB as mediator

1) Government services → SWB → OWB

In this case, there is an indirect effect, but no direct effect, of government services on OWB. Indirect effect = (.256) x (.921) = .235 with a P-value of .002 and CI is .068 and .518, which is statistically significant. The direct effect is -.095 with a P-value of .379 and CI is -.426 and .083. The total effect can be calculated from a summation of indirect effect and direct effect, which is .235 + (-.095) = .140. Total effect can also be found from the bootstrapping method. Results show that for

every increase in standard deviation of government services, there will be a .140 increase of standard deviation in OWB through SWB, and there is a full mediator. This means that government services will have a positive impact on OWB only through SWB, not from government services directly to OWB.

2) Government training $\rightarrow$ SWB $\rightarrow$ OWB

In this case, there is an indirect effect, but no direct effect, of government training on OWB. Indirect effect = (0.641) x (0.921) = 0.590 which has a P-value of 0.001, and CI is 0.234 to 1.401. For direct effect, the standardized estimate is -.253 with the P-value of .157 and CI between -1.199 and .073. The total effect is summation of indirect effect and direct which is (-.253) + .590 = .337, which is also shown in the bootstrapping results. This means that for every increase in standard deviation for government training, there will be a .337 increase in the standard deviation for OWB through SWB. There is a full mediator for this case. This means that government training will positively impact OWB only though SWB, and not directly from government training itself to OWB.

3) Satisfaction level for Pak Mun Dam solution $\rightarrow$ SWB $\rightarrow$ OWB

Indirect effect can be calculated by (-.921) x (-.054) = -.0049 with a P-value of .579 with CI of -.217 to .211, which is not statistically significant for indirect effect. For direct effect of satisfaction level to OWB, bootstrapping results show that direct effect has a standardized estimate of -.046 with CI of -.306 to .173 and a P-value of .681. From this, direct effect is not statistically significant. The total effect is equal to summation of -.0049 and -.046, which is -.095. Based on this result, both

effects would not be able to show the mediation from government's satisfaction level of the Pak Mun Dam solution to OWB through SWB.

Result of ENWB as mediator

1) Government services $\rightarrow$ ENWB $\rightarrow$ OWB

In this case, there is an indirect effect, but no direct effect, of government services on OWB. Indirect effect = (-.043) x (-.198) = .008 with a P-value of .344, and CI is -.014 and .080, which is not statistically significant for an indirect effect. For a direct effect, the standardized estimate is -.095 with P-value of .379, and CI is -.426 and .083, which is also not statistically significant. The total effect can be calculated from the summation of indirect and direct effects, which is .008 + (-.095) = -.087. The total effect can also be found from the bootstrapping method. Results show that for every increase in standard deviation of government services, there will be a .087 decrease of standard deviation in OWB through ENWB. Because both direct and indirect effects are not statistically significant, there is no mediator for this case.

2) Government training $\rightarrow$ ENWB $\rightarrow$ OWB

In this case, there is an indirect effect, but no direct effect, of government training on OWB. Indirect effect = (.319) x (-.198) = -.063 with a P-value of .068, and CI is -.255 to .006. The direct effect is -.253 with a P-value of .157 and a CI between -1.199 and .073. The total effect is a summation of indirect and direct effects, which is (-.063) + (-.253) = -.316, which is also shown in the bootstrapping results. This means that for every increase in standard deviation for government training, there will be a .316 decrease in standard deviation for OWB through ENWB. Because

there is not a statistically significant finding for both effects, there is no mediator for this case.

3) Satisfaction level for Pak Mun Dam solution → ENWB → OWB

The indirect effect can be calculated by (.206) x (-.198) = -.040, with a P-value of .077. CI for lower and upper are -.167 and .005. From this, indirect effect is not statistically significant. Bootstrapping results show that the direct effect has a standardized estimate of -.046 with a P-value of .681 and a CI of -.306 and .173. The total effect is (-.040) + (-.046) = -.086. This means that for every increase in standard deviation for satisfaction level, there will be a .173 decrease in standard deviation for OWB through ENWB. Neither effect is statistically significant, so there is no mediator for this case.

Post hoc power analysis for the model. For this study, the model has OWB as the dependent variable and six variables of EWB, SWB, ENWB, Services, Training, and Satisfaction. Post hoc power can be calculated online at https://www.danielsoper.com/statcalc/calculator.aspx?id=9.(Citation) The observed $R^2 = 0.59$ and with probability level of 0.05, the sample size for this model is 235 after outliers are eliminated.

The observed statistical power is calculated to 1.0, which is higher than 0.8. From this, it shows that with a different sample size, the model will still reach power of 0.8.

Chapter 5: Discussion

This research aimed to contribute to understanding the relationship of eight well-being dimensions supported in the literature review and theory. The OWB of the affected local community was therefore explored through different well-being measurements in the context of a multiple dimension model and a sustainable model (Brundtland, 1987). Understanding the factors counted within each dimension would improve solutions for the current affected community and for the future of affected residents near other dams along the Mae Khong River.

Data from the community affected by the Pak Mun Dam in Khong Jiam district were used to investigate the following research questions:

1) How are the components of well-being different between the control group and the study group?

2) How different are the well-being constructs of the old community and the late-settled residents in the study group?

3) What is the statistical significance of the well-being dimensions for OWB?

4) What is the marginal rate of substitution (MRS) between economic, environmental, and social well-being dimensions for the affected community?

5) How do the government's actions (institute and structure) affect each well-being dimension and the OWB construct?

The remainder of this chapter discusses the results of this research and highlights how these results inform each research question. This is followed by the strengths and limitations of this study and, finally, suggestions for future studies.

The troubled history of the Pak Mun Dam issue continues. Through this quantitative study, we can provide new information to decision makers for the

proposed dam along the Mae Khong River. Understanding the community and providing better policies to change or improve the quality of well-being of these people might lead to the end of conflict. Furthermore, the importance of training provided by the government can be stressed to improve well-being.

Eight Well-Being Dimensions and OWB Between the Affected and Unaffected Communities

Research question 1 is: "How is the well-being different between the control group and the study group?" The control group is the unaffected community and the study group is the affected community. The eight well-being dimensions were developed in the previous literature along with sustainable concepts.

The general well-being for the Khong Jiam district improved after the dam was completed because of tourism and infrastructure built by the government to improve the electricity supply and water supply. However, many residents of affected communities who were placed in other villages are still suffering and hope for the government to improve their situation.

Based on the information of the affected and unaffected communities and the eight dimensions of well-being, the results showed, as expected, that the average well-being of the affected community was much lower than the average well-being of the unaffected community. Among 40 items within the eight well-being dimensions, 31 were lower for the affected community than for the unaffected community. Furthermore, 24 of the 31 items for these eight dimensions were statistically significant, and these results support the expectation that the unaffected community would be quite different from the affected community. These quantitative outcomes, based on eight dimensions, show that their

livelihood is negatively impacted by the dam; this supports the qualitative results that have been mentioned in many earlier studies. The subjective well-being of EWB shows that they have worries and concerns regarding their financial condition, as they lose their income from fishing—which is their main income—and they also have to buy fish for their own consumption. Furthermore, the income dimension shows that the difference of their income from that of the non-affected community with lower income is statistically significant. The EWB, one of three main pillars of SLF, shows that the quality of water and the water supply have been worse compared to the non-affected community.

SWB-related dimensions also show the negative outcomes for the affected community. PWB shows that, of the three items within these factors, both the local government and the central government have negative impacts on local residents: local residents have low trust in the local government, are not satisfied with their local government, and have a low level of satisfaction regarding whether the central government has listened to their voices. This could be explained by the fact that the government's solution involved the wrong training and the decision not to open the dam's gates for as long as the residents have requested. During my interviews, I found that residents complained that many of the government's interventions and policies have not been discussed with the local residents.

For HWB, all five items that relate to personal health show that they all have a lower mean in comparison to those of the non-affected community. Many studies have shown the negative health impacts caused by the large dam, which mainly resulted from changes in the water and in food security. Malnutrition would be a significant issue for this community, as fish is their main food source; a decreased amount of fish and a lowered

income would cause a food supply shortage (Scudder, 1999). For JWB, the result shows that two items have a lower mean: the number of working hours per week and the number of jobs that fit with their skills, knowledge, and experience. These items show that this affected community have fewer jobs to work. This is one of the main issues; they lose their fishing jobs and cannot work in other jobs for which they lack expertise and skills. Although the central government tried to introduce new job opportunities with training provisions for them, it became too hard for them because of their lack of skills and experience. This outcome also supports the results of Kiguchi (2016).

CWB is one of the concerns that the local residents have regarding the livelihood that they have lost as a result of by the dam. They claimed the loss of identity and tradition, as they could not continue holding their spiritual ceremony and Thai New Year event along the Mun River. However, the results do not indicate a statistically significant difference in the means between these two communities.

Finally, there are two subjective well-being items of FWB that have negative effects on the local community. This result shows that family well-being has changed because of the dam: young people have to move to Bangkok or other big cities in order to find jobs to support their families. As a result, a lot of young children and the elderly population stay in the community.

The OWB of the unaffected community was also better than that of the affected community. Once the construction of the dam was completed, there were benefits that were provided to many people in the Khong Jiam district. The unaffected community did not suffer a negative impact from the dam; indeed, those residents gained benefits from the dam, as it provides them with a steady water supply, low electricity prices, a basic

infrastructure, and, as the government later claimed, irrigation for farming around the area. The affected community, however, did not receive these benefits, since farming is not its primary source of income and their livelihood has been, instead, drastically changed.

Even though the unaffected community gained the aforementioned benefits, the affected residents suffered losses regarding their land, jobs, families, health, livelihoods, environmental conditions, incomes, and way of life, which led to decreases in all of the well-being dimensions as well as a lower OWB. The livelihood of the affected community needs to return, but there are benefits to surrounding communities, so improving their level of livelihood to be close to the previous one would be ideal.

Eight Well-Being Dimensions and OWB of the Affected Communities of Pre- and Post-1994 Settlers

Research question 2 is: "How different are the well-being domains between the old community and the late-settled residents in the study group?" In the beginning of the study, it was expected that the OWB of pre-1994 settlers would reflect a negative impact through today because the residents still protest for help. However, the residents who moved in after 1994 were expected to feel less affected because they were not able to compare the way of life in the area before and after the dam's completion. Using the test of differences of mean, we found that these two groups are not too different from each other; only eight of 40 items had statistically significant difference between them for a 95% confidence level. Furthermore, five items that were statistically significant show that the pre-1994 community was better when compared to the post-1994 community. These five items are shown below.

ComWB:"Help from other community member" (T-value = 5.464) and "community safety among members of community" (T-value = 2.247) ,

ENWB**:** "buying water to consume" (T-value = -2.49) and "short of water" (T-value = 2.177), PWB: "trust in the local government" (T-value = 2.889) and "trust of the central government" (T-value = 2.17),

CWB: "they understand the importance of visiting the temple" (T-value = 1.965)

On the other hand, ENWB's "buying water to consume"(T-value=-2.49) and JWB: "numbers of working hours per week" (T-value = -2.93), for post-1994 community are better compares to pre-1994.

These five items show that only items that relate to time would have higher means, such as CWB, ComWB, and PWB, which increase based on residents' time of settlement. Over time, residents feel a part of a community, have a better understanding of the local culture, and have strong feelings about the local government that has dealt with the Pak Mun Dam problem with them for a while. These connections might not have strong ties to the newcomers.

From the results, we do not have enough information to support the expectation that the pre-1994 community's well-being has been worse compared to that of the post-1994 community, because only seven of 40 items are statistically significantly different between these communities.

Seven Well-Being Dimensions and Their Impact on OWB

This section discusses research question 3 regarding the impact of each well-being dimension on OWB. The model used in this model is based on SLF and includes economic, environmental, and social dimensions.

As seen in both the literature and news reports, residents have claimed that the changes caused by the Pak Mun Dam have significantly and negatively altered their livelihood. Negative effects include economic, environmental, cultural, working conditions, and family changes. The descriptive results show a significant difference between the affected community and the unaffected community. In general, and as expected, the affected community showed lower well-being for each well-being dimension than the unaffected community. The well-being dimensions that have significantly affected OWB are found in the structural model results based on the multi-regression.

The structural model has multiple dimensions of sustainable livelihood that combines PWB, FWB, JWB, ComWB, and CWB into SWB; and SWB is one of main three pillars of SLF along with EWB and ENWB. The results of this model provide the greatest level of detail for the benefit of government decision makers.

Based on this model, the coefficient for each independent variable of the multiple regression model provides a measurement of the impact of each dimension of OWB, but the ratio of coefficients among them represent MRS. Results show that EWB is statistically significant and has a positive impact on OWB. SWB is also significant for the model. The MRS result of this model assisted us in better understanding the importance of these two dimensions to OWB.

SLF model result. The results show that only two dimensions (economic and social) have a statistically significant impact on OWB.

Economic. The EWB dimension is important for sustainable development, based on previous news for this affected community.   The affected community residents mentioned loss of income as one of their main concerns. They requested more financial support from the government to substitute for their loss in the form of monetary compensation and land.

The EWB dimension is a latent variable that also has a positive correlation to four items: "the feeling about current financial condition," "level of financial stress," "worry about living expenses," and "stress about finances in general." These four items are important for EWB in this study; among these four items, "worry about living expenses" and "stress about finances in general" are lower for the affected community than the unaffected community in regards to mean value as mentioned in the result.

Osberg and Sharpe (2003) noted that the feeling of economic insecurity would lower EWB. All items in EWB are SubWB, which reflects lower EWB; the study of Hansan (2007) and Wilmarth (2012) also uses personal financial wellness to support this. These subjective well-beings through EWB show that they had been worried about their financial condition because of the dam's completion. The significant change would have to affect their livelihood so that they do not have sufficient income to support their families. Without a permanently open dam, they do not seem to be able to earn sufficient income or have enough food. This has resulted in the young generation's having to move to cities to find jobs. These changes eventually had an impact on their SWB, which is one of three pillars of SLF.

SWB. SWB is an important factor, in that the affected community claimed that their livelihood had been changed after the completion of Pak Mun Dam.

SLF could be achieved through three goals of economic, social, and environmental improvements. SWB combines all social-related dimensions, including FWB, ComWB, CWB, JWB, and PWB. SWB dimension is the second order factor that combines the first order factors of CWB, ComWB, FWB, PWB, and JWB. The standardized estimate or loading are all statistically significant loaded to SWB. Results show that SWB has a positive impact on OWB, with a loading of each subfactor ranging from 0.507 to 0.691. FWB still has the highest loading of 0.691 followed by PWB which is 0.561, JWB of 0.517, ComWB of 0.511 and 0.507. Based on the positive standardized estimate of SWB and EWB, to increase the OWB, it is important to increase the capital of first order factors for SWB, which means it is also important to increase all capital for items within each first order factor for CWB, ComWB, PWB, JWB, FWB, and the items within EWB. As mentioned in the results, there were 14 items within these first order factors of SWB and four items within EWB that could be beneficial to policy makers and government to plan their policy and strategy to eventually resolve this issue. Results regarding loading of all 14 items for SWB could be beneficial for future projects, revealing issues and concerns that can be addressed to improve conditions for future affected communities.

Based on 14 items within five dimensions of SWB, the following is a summary of how each item relates to their current situation:

For ComWB, community participation and help from other community members play important roles in ComWB. Results show that these two items' means for affected communities are less compared to the unaffected community. The communities were separated from the original community because the land was distributed by the government. Furthermore, their income was much lower than before and was one of the

important concerns and reason for the change of their livelihood socially and environmentally. Individual concerns for each family regarding economic hardship could be one of the weaknesses of the community, as evidenced by difficulty assisting each other in the community.

For CWB, based on the results, understanding their culture, tradition, and meaning of their traditional activities played an important role in their CWB. Many traditions for these communities relate to the river, such as the Thai New Year, and this area was considered the sacred area of Chao Mae Praprue for this community (Phongam, 2006). Although none of the three items for this well-being is statistically significantly different from unaffected and affected communities' means, they are important items to represent CWB. Policy makers should consider the importance of these factors before enacting policies because these three items have high loading to CWB, and CWB is statistically significant loading of the second factor of SWB.

Regarding PWB, trust and satisfaction of the local government were important items for this subfactor because the local government was very close to the community. The local government would be the first point of contact for the affected community because of close ties and the fact that that the government had been with them since the beginning of the problem. Local government officials knew all about the communities, community members, and background. Results showed that PWB has a positive impact on SWB. Local government would be the mediator for affected communities and central government, and should understand the local communities' issues.

The mean value of these two items of affected communities were smaller compare to unaffected communities. During interviews, we found that many local governments did

not provide sufficient assistance to the communities, or no assistance was provided at all. Although some local governments provided training for jobs in affected communities, there was still a lack of help in many villages.

FWB relates to family relationships. Younger generations had to move to cities to find better jobs, negatively impacting families, who spent less time together and received less help and emotional support than families in unaffected communities. The overall score of their family relationship is also lower than the unaffected community. The loading of all four items had a high loading to FWB, and FWB also has the statistically significant loading to second order factors of SWB. Family was an issue that affected communities mentioned regarding the effect of Pak Mun Dam on their livelihood.

The three items of JWB are related to job pride, skills, and satisfaction. The value of these items for affected communities are much smaller than for unaffected communities. It shows that they are not satisfied with their current work situations, as their current jobs do not relate to fishing, which was their previous livelihood. Community members also claimed that the career changes resulted in a loss of culture in the community.

The estimated coefficient for the structural model helped us to understand the importance of EWB and SWB in relation to OWB. Results also revealed important information regarding the items within these significant well-being dimensions. The standardized estimate of SWB is higher than EWB's standardized estimates, where SWB had greater impacts on OWB. Furthermore, as mentioned in the methodology, the estimated coefficient for the structural model could be used to calculate a community well-being index, which represents the real correlate to OWB through an estimated coefficient from regression analysis. This is another benefit of the estimated coefficient for these

models. From this, the ratio of SWB should be higher when compared to EWB for the well-being index. Regarding sustainable livelihood, ENWB should be a significant dimension. Even though ENWB is not statistically significant for this model, but it is still important. ENWB is an important dimension for sustainable livelihood, and thus is important to consider, because its factors used to compare unaffected and affected communities show that the unaffected community has better well-being. The items within the EWB and SWB dimensions showed that these items have a larger mean for the unaffected community than for the affected community, which means in general the items within these well-being dimensions are higher and better for unaffected communities. This shows how the affected communities' well-being has been changed negatively compared to unaffected communities. Furthermore, items within these five dimensions are statistically significantly impacting SWB and eventually impacting OWB. To be able to gain SWB and EWB and eventually increase OWB, it is important to gain the capital through these items. Stakeholders, including central and local government, must consider these as important factors to be able to solve the right issue with the right solution.

MRS discussion. The concept of MRS demonstrates that a person will trade or give up one thing of consumption to consume another thing to maintain the same utility (satisfaction). This study's results have proved that EWB may not be the only factor that concerns the affected community; residents are willing to trade EWB for other dimensions of well-being.

The coefficient of SWB is larger than the coefficient of EWB. The affected community would trade their EWB to gain more in other nonfinancial dimensions, which is SWB. For 20 years, residents have been asking the government for financial

compensation and to open the gate of the dam to return their sustainable livelihood (Manroot & Hall, 2009). Not only does EWB need to be achieved, social and environmental aspects are necessary as well. The qualitative work has been done, but quantitative work regarding the relationship between OWB and other dimensions of well-being has not yet been achieved. The coefficient of each dimension to OWB would show the relationship between it and each dimension, but the relationship between the dimensions themselves must use MRS.

MRS shows how important SWB is and how it compares to EWB. This information would support policy and future projects to help the affected community improve their social conditions, especially SWB and EWB, for which they have requested assistance. The model shows that residents are willing to trade by lowering their EWB to gain more SWB. Based on the MRS concept of trading among objects to maintain satisfaction, there must be combinations of these two well-beings to reach an optimal solution.

Results show that residents would like to gain more SWB and decrease their EWB to maintain the same satisfaction level. It also indicates that SWB had been lacking in the past because the residents were willing to decrease their EWB to gain one more unit of SWB. This could be explained using the concept of opportunity cost: to gain more resources in lesser supply, other, more plentiful resources would need to be given up. This supports previous qualitative work that showed SWB had been lacking because they existed in smaller amounts or because they were less readily available than EWB. EWB was not provided at a sufficient level, either, but SWB was still much lower. Furthermore, this benefit would support the quantity information that was not provided for studying over time for SWB and EWB. This quantitative work has provided many benefits to and a better

understanding of this community regarding livelihood development. How can this information be used? SLF recommended that an institute or structure can play a key role in sustainable development. SLF shows that an institute can collect all capitals for each dimension to create a more sustainable livelihood.

To support qualitative work, quantitative results have shown many dimensions of these communities' well-being through many dimensions. This research provided the important results comparing the affected and unaffected communities by comparing the different means for each dimension of each community. If the mean value of the item of each factor were statistically significantly different from each other, they can be discussed the differences of each item between affected and unaffected community. Furthermore, regression analysis has provided us with which factor statistically significantly impacts OWB, which would give us the information about how the affected community considers which factor (dimension) is important in their decision. This quantitative result provided the solid work to be able to determine better policies to achieve the SLF goal for these communities. Moreover, understanding MRS and usage of it would help us to understand the process of trading based on the limitation of resources.

This study resulted in the crucial conclusion that it is important to maintain economic, social, and environmental well-being dimensions if a sustainable livelihood is to be achieved. Even though the models did not completely support this because the environmental dimension is not statistically significant, this may be because the model and data may not suit each other well. There are still positive impacts of EWB and SWB on OWB. MRS of EWB to SWB has confirmed that, with limited resources, there is a tradeoff among dimensions to maintain the same satisfaction in a person's livelihood.

Today, because many rural areas in developing countries offer better education and information from many sources, the result supports the idea that SWB has a positive impact and has gained a more important role in sustainable livelihood development. Affected residents were willing to give up their EWB to gain more SWB. This quantitative result from this study supports previous qualitative research that residents found EWB and SWB important for their livelihood, and increasing both capitals would positively impact OWB as a whole.

In addition to the relationship between the well-being dimensions and OWB, this study focused on the model of sustainable livelihood development that concerns the importance of structure (institute) on OWB and well-being dimensions. By increasing the capital for each well-being dimension, structure (institute) could eventually increase sustainable livelihood. In this study, the impact of structure or government intervention through providing public services and job training, and the satisfaction level of solving the Pak Mun Dam problem, would be important to study to understand how government intervention (institute or structure) can impact each well-being dimension and OWB. This part of the discussion focused on the government intervention impact on OWB through EWB and SWB as mediator.

Government Intervention (Institute and Structure) on All Well-Being Dimensions

Based on SLF, an institute (structure) can increase the capital of well-being dimensions through many methods to achieve better livelihood. Methods include creating and enforcing legislation, policies, norms, market stability, and rule of law that allows people to access well-being capitals and creates resilient projects to secure them. The

following projects provided by the government (institute and structure; World Rivers Review, 2014) are expected to influence and improve well-being:

1) Public services provided after the completion of the dam;

2) Quality of training and extension programs; and

3) Satisfaction of solving the Pak Mun Dam issue.

In this section, the results will be used to answer research question 4. The discussion focuses on the well-being dimensions that are statistically significant, which are EWB and SWB.

Economic well-being and government intervention. In this model, EWB is one of the two most important dimensions that impact OWB. Government intervention is expected to improve quality of life. For all three interventions, only the case of satisfaction level on the Pak Mun Dam has significant mediation.

The government solution satisfaction level is related to issues of compensation, opening the dam gate, and land provisions. Higher satisfaction generated by receiving these provisions from the government would directly translate to financial security for affected residents. One main responsibility of the government is to lower the poverty level to improve the welfare of the people. Opening the dam for residents would allow them to fish to earn a sufficient income and maintain an adequate food supply. Providing them the land of 15 Rais as promised and compensation for income lost during the construction period would also increase their economic status. This action would be supported by Kenworth (1999) and Lobao and Hooks (2003) because the provisions would generate economic capital and thus increase the ability to access more economic capital. In this study, government intervention has full mediation, which means that structure changes (the

change of institute) would have to be developed to increase EWB, as satisfaction in government solutions does not have a direct effect on OWB. An increase in EWB capital would improve the SubWB of affected residents' satisfaction with their financial situation, lower their worries about living expenses, increase confidence regarding financial emergencies, and lower stress about finances in general, which would eventually have a positive impact on OWB. The previously mentioned SubWB items related to EWB show that the mean value of the unaffected community is much higher than that of the affected community.

Social well-being and government intervention. SWB which is a second-order factor that combines all social aspect dimensions, including family well-being, social assistance, working conditions, and cultural well-being. As mentioned in results, even though loading for first-order factor toward SWB is not high, it is necessary to include all subfactors based on the theory. Moreover, all items within first order factors are statistically significant.

Results show that two interventions of government, job training and government services, would increase OWB through SWB only. Government services would increase the social perspective and improve the welfare of the society. Services would increase the affected community's basic infrastructure, education, health care, clean water, and electricity and would bring the community closer together. Government services would provide the community's basic needs, and this, in turn, would increase the capital for each social dimension (including electricity, water supply, education, health care, and infrastructure). Social dimension in this model includes CWB, FWB, PWB, JWB, and ComWB.

Regarding CWB, the model showed that government services would help the community to come together easily to participate in local cultural activities such as fishing and religious activities. Educational services would provide the affected community with the knowledge, training, and practices to interpret their own culture for the younger generation. Waitangi Tribunal (1985) supported the idea that government can foster CWB in many ways, such as by protecting, conserving, and promoting the dam site. Government can help preserve the way of life for fishing, conserve the river and the community's culture, and preserve the location along the Mae Khong River for religious uses.

Regarding FWB, basic services such as health care and education would enrich the quality of well-being. If educational services were provided in affected communities, children would not have to commute to town for a basic education. This would provide an additional FWB benefit. Because many rural areas do not have high schools in their communities, it is common for students to travel to town or drop out of school. Moreover, education improves the knowledge and understanding of the roles of family members, including how to behave and treat each other, especially seniors, at home. Education would encourage family closeness because parents would need to become more involved with their children's education (Van Voorhis, Maier, Epstein, & Lloyd, 2013). This result shows that government public provisions could improve FWB through increased family relations, emotional support, family satisfaction level, and time spent together as a family. The results of research show that the affected community had a lower mean for these items than did the unaffected community. These items are crucial factors that structures or institutes should consider to increase FWB capital. In the case of Pak Mun Dam, schools in the areas had been closed because young people had moved to cities to earn income to

support their families. Even though basic education was provided for a community, it did not increase FWB capital because the lack of EWB.

Regarding JWB, basic government services, especially infrastructure, could help businesses to access the market. Electricity and water supplies are important in workplace operations. Educational services would provide training to prepare residents for the labor market. These government and educational services would increase the elements within JWB, thus improving the ability of affected residents to be proud of their jobs, to fit their skills to their work, and to eventually improve the overall satisfaction level of their jobs. It is important to consider these improvements, as these three items within JWB had a lower mean for the affected community in comparison to the unaffected community.

In this case of PWB, basic government services should be provided equally to all communities in a society. This would lead to a stronger community, a decrease in the gap between urban and rural areas, and an increase in equity between poor and rich, as supported by the study of Feero and Lentini (2008). Trust in and satisfaction with a local government's services are items in this dimension. Results show that they had a lower mean for the affected community than for the unaffected community. Education also helps people understand their role in society and their political right to secure their liberties, which is easily ignored by governments in many developing areas.

Regarding community, government investment in infrastructure would increase social capital in many areas, such as bringing the community closer, improving communication among residents, and strengthening the community. Educational services prepare affected residents to be part of the community, and social inclusion during training would improve residents' ability to spend time with and help each other. Social assistance is important in

rural areas where people are more willing to care for and help each other. Farooq (2012) supported the idea that rural areas foster strong relationships and interactions and that rural people share happiness and help each other when in distress. Moreover, basic needs would strengthen the well-being of the community, such as electricity, health care, and clean water. These three basics would increase the quality of life in this community.

The other government intervention (institute or structure) is job training. As mentioned previously, this was one intervention provided by government after the dam's completion. Job training by the government would have full mediation to OWB, which means that OWB will not be increased if it does not impact SWB. Job training can increase SWB because it involves group activities that the government promoted to the community: learning new jobs together, spending time together during training, learning and sharing understanding, and assisting each other. Jayaratne, Bradley, and Driscoll (2009) found that educational extension programs could help integrate the community. Additionally, collaboration and a combination of efforts among many partners could solve many community issues.

The following discussion relates each dimension within the SWB latent variable and the government's (institute) intervention for OWB.

Job training would relate positively to CWB because training would be based on the local culture and its abilities. In this fishing community, job training should be related to fishing, so that residents can teach future generations to fish. This is part of a way of life for their community.

The second construct is ComWB. Job training and ComWB can be explained similarly to education. Job training would allow the local community to get together, to be

trained together, to spend time together, and to help each other and share their knowledge, experience, and opportunities to improve quality of life. This is one way for a community to create social capital.

The third construct is JWB. Job training would allow residents to access jobs, to express their knowledge, to learn new skills, and to gain sufficient knowledge to earn the income to support family that relates to their fishing. However, the government provided job training in farming, barbering, baking, and mechanical work, but none of these are related to skills possessed by residents. The residents found this difficult, and, in reality, did not benefit from it (Wattanaputh, 2000). JWB is based on the suitability of a job as determined by a person's skills, satisfaction level, and pride in the job, which would be appropriate to gain social capital through JWB. Studies by Cooper, Davidson, and Robinson (1982) and Lehmkuhl (1999) support the idea that residents should have good working conditions and positive job experiences. Schaufeli and Enzmann (1998) also supported the notion that working satisfaction is a key factor of JWB. Training can also be a factor of JWB if it helps residents to achieve more efficiency in performing jobs (Karasek, 1989). Based on the literature and the results, job training by the government should relate to pride, skills, and satisfaction. The skills that provide job satisfaction for these residents are related to river fishing, which should be realized by the government. Based on items within JWB, the mean of job pride, job satisfaction, and alignment of job skills is much lower for the affected community than for the unaffected community.

In the past, the government provided farming-related job training to the affected communities. It was difficult for these communities to adjust because the residents did not have any experience with this profession, were not proud of the profession, and did not

consider farming as a way of life. As a result, JWB was not increased to gain any of SWB and EWB.

 For the fourth construct, FWB, job training would allow residents to be trained together. Children often work to help their parents during their free time. During the survey period, people were making brooms to sell, and we saw family members working together in many houses. The FWB items related to the literature and family relations had a higher mean value in the unaffected community than in the affected community.

Regarding the political aspect, the job training provided by the government should allow the community to support itself financially and should be based on the community's specialized skills. Listening to the needs of the community and asking for the community's opinion to achieve satisfaction with the government would be important for achieving political well-being. The descriptive results show that trust in and satisfaction with local government was much lower for the affected community than for the unaffected community. Job training that increased trust and met the needs of the affected community would increase both SubWB and ObjWB. Job training was recommended by the government without considering the needs of residents, which did not show the concern of government to the affected community.

The sixth construct is ComWB. As mentioned in the literature, the government should create strong social capital and improve community well-being. Social capital is found within a social network of individuals who share the same norms and help each other to achieve their goals (Cote & Healy, 2001). Good government policy would promote social interaction, which would, in turn, improve well-being (Friedli & Watson, 2004). Job training or extension programs would create the strength of community and social

assistance. During the survey, we noticed residents making brooms together. Groups of four to five people worked together to make brooms for sale. The results support previous literature that notes that government intervention through training and extension programs would improve social assistance and social integration. Social assistance for the affected community had a lower mean value than for the unaffected community, which means that government should consider this item as important for improving or gaining capital to achieve higher SWB.

Based on the discussion above, the SEM was used to understand the community's well-being. This was the first time the SEM was used to test the well-being of Pak Mun Dam's affected communities, and this also represents the first quantitative study of this case. This study supported the qualitative works to prove that SWB played an important role for a community's sustainable livelihood, not only EWB.

Not all important economic, social, and environmental well-being dimensions were achieved in this study for the SLF in term of achieving their satisfaction level of well-being. The study did, however, find that SWB, in addition to EWB, are important in achieving a sustainable livelihood community. The estimated coefficient of each construct to OWB shows the relationship of each well-being dimension to OWB and offers information to understand which items are significant within each well-being construct. The estimated coefficient can also be beneficial for calculating the well-being index.

The MRS concept provided support and helped us to understand the relationships of each construct (dimension) within the model and how they could be traded off to achieve sustainable livelihood based on limited capital or resources. MRS can also be used to explain the level of a community's sustainability based on the relationships of economic,

social, and environmental well-being. This information for MRS would help to allocate resources more efficiently to reach the goal of SLF and is based on information regarding a real understanding of SLF for the local community.

The SLF approach and structure changes show that changes to structure or institutes can impact well-being capital for each dimension with the purpose of eventually improving livelihood, especially EWB and SWB. Results support the importance of government and its direct impact on SWB and EWB, which function as full mediators between government and OWB. The institute and structure changes in the forms of positive policy, project, or other positive changes would expect to increase the capital of each well-being dimension and eventually lead to improvement in sustainable livelihood. The positive changes for institute and structure should be based on the items within each model's statistically significant construct. Without careful consideration of significant items, this could lead to inappropriate or inefficient policy and eventually would not improve the livelihood of the community.

Manorom (2009) noted that multi-stakeholder committees could work with government to solve the problem. These could include the academic or local agencies, provincial or local administrative organizations, EGATs, and NGOs. Stakeholders would be able to increase capital for each well-being dimension through many methods, such as policies and projects and training. This should be considered for future research, as only government intervention was included in this study, and thus only government policy and projects were analyzed.

EWB can be traded for more SWB. In years past, local communities would be able to access information from many resources, such as NGOs and news, to understand

livelihood development. Government (structure and institute) interventions related to social capital would impact SWB dimensions positively through ComWB, PWB, JWB, CWB, and FWB. Government interventions that would increase social capital include services and job training. Institute interventions related to the economy, however, would have more impact on OWB. The government's solution for community satisfaction as it relates to income from fishing once the dam is opened also includes compensation and 15 Rais of land.

ENWB (satisfaction of water quality and satisfaction of fish quality). Based on model, there are no statistically significant relationships between government intervention and OWB or between ENWB and OWB. Even though, ENWB is one of three dimensions linked to a sustainable community outcome for affected local communities but no mediation in this model through ENWB. Moreover, NGOs have claimed that there has been a negative impact on environmental, economic, and social factors in the affected communities. In this study, the research does not show enough statistically significant results to support NGO's claims regarding ENWB impacts on OWB. The results are, however, statistically significant for two of six ENWB elements, shortness of water, and satisfaction with water quality, that are worse for affected communities than for unaffected communities.

Regarding government intervention results, government training and the satisfaction level with the Pak Mun Dam solution positively affected ENWB. Even though ENWB does not significantly impact OWB, this does not mean that ENWB is not important. It simply means that it does not fit well with the model.

CHAPTER 6

Recommendations, limitation, strength of the research, contributions and implications for the literature, suggestions for future research and conclusion

Recommendations

Based on the first research question, results showed that affected communities have significant differences in well-being when compared to unaffected communities. More than 20 years after Pak Mun Dam's construction, the central government, local government, and EGAT have not provided an efficient solution to improve the quality of life for these people. The research has yielded some recommendations.

Based on the model and previous news related to the compensation of affected residents, we found arguments that affected residents are looking for compensation, not other improvements for other dimensions. The results have proved that EWB alone is not enough to achieve pre-dam livelihood for residents. Providing financial support might not achieve the SLF, but it cannot be denied that EWB is still the main key to achieving a better SLF.

More than 20 years after the dam's opening, the issue regarding the affected community's livelihood has never been satisfactorily addressed. The government can use information from this research to provide assistance in improving the problem. Other dams that have been built or are proposed to be built along the Mae Khong River can also benefit from this information.

SWB contains multiple dimensions and is a key factor in affected community concerns. SWB is critical for their livelihood. Furthermore, the result of mediation shows that increasing capital for EWB and SWB would increase the OWB and SWB, which is a second order factor and is necessary to increase capital for each dimension within SWB. Moreover, full mediation for the case of EWB and SWB shows that government

interventions enacted after the completion of the dam can increase OWB only when they increase the EWB and SWB.

The model of government intervention's impact on OWB through each dimension as a full mediator has provided much information to aid the government in finding a better solution for this problem. These interventions are needed to increase the capital of each dimension. The government's interventions play an important role in increasing overall well-being but can only be explained by EWB and SWB. Increasing capital through these two well-being dimensions plays an important role in OWB of the affected community. Government intervention has three methods, public services, training, and solution satisfaction for the Pak Mun Dam, which can increase capital of each well-being as follow:

EWB

This is a key dimension through which residents gain their well-being. Government intervention should be required to achieve this, which would have positive impacts on OWB through EWB. This study recommends that government should intervene in the form of solving the Pak Mun Dam issue, as this will create more EWB by providing compensation, as requested, for residents' yearly loss and through a land provision of 15 Rais, as promised to them. The gate of the dam should be opened for a longer time so that fish can lay eggs and increase numbers in the river for harvesting. This satisfaction level of solving the problem shows the increase in capital of EWB and the eventual positive impact on OWB.

The SWB would gain more capital by increasing capital for each first factor through FWB, ComWB, PWB, JWB, and CWB. To increase the capital of each social aspect within

SWB, it is necessary to consider the increase in each item within each of the first order factors of FWB, ComWB, PWB, JWB, and CWB, as follow:

FWB

All three government interventions would greatly affect FWB and OWB. The foundation facilities would increase the quality of life for families, and the living conditions would be better than before. The training provided would offer choices of other sources of income so that residents could spend time together at work and at home. In addition, these affected residents would not have to move to cities to find jobs to support their families. Currently, many affected residents are youth and seniors who must stay in the communities and wait for income from their family members who work in the cities.

CWB

Government job training should be related to the local culture and should make the community feel close. Jobs should relate to the residents' previous jobs because fishing is a way of life from generation to generation. Furthermore, training should be offered to bring the community together and should relate to the culture and identity of the community, such as ecotourism and fishery.

Government's public services would increase CWB capital because it allows them to commute to sacred places, such as temple, much easier and more securely. Furthermore, education services will school generations to come regarding their basic academic knowledge as well as local culture and tradition.

JWB

Job well-being should relate to job pride, fit, and satisfaction. Because most of the affected communities fished before the dam was constructed and have experience with

fishery, they are satisfied with this job. If government training is offered, it should be related to fishery. Because the dam's gate is not open long enough for fish to lay eggs, the government should offer training and provide an initial investment and facilities to these affected residents for fish farming (aquaculture). As mentioned in the working conditions session, these residents have spent time performing other jobs, such as broom making and basketwork, which are funded by EGAT. These jobs do not fit with their previous skills. The residents do not have pride in these current jobs, and they are not satisfied with them. Government services would allow them to more easily commute to workplaces to deliver their products to market. Training would allow them to gain more knowledge regarding their profession.

ComWB

Government services and job training have an indirect impact on OWB through SWB (socially assisting one another). Government services cause the community to be closer, and job training would improve economic conditions so that residents feel more secure with their financial status and are more willing to help each other. Group training would increase the residents' financial condition and would generate more SWB and OWB. During the survey, we saw that many affected community members got together and worked at each other's houses.

PWB

Based on results, government services and training have a positive impact on PWB. This study recommends that training and policies used to generate more PWB should be based on the residents' needs and requests and that information should come directly from the affected communities. Residents' PWB can be improved if they are listened to by the

government, trust in the government, and believe in the efficiency and willingness of the government to solve the problem.

In this case, the best option to improve the community's livelihood is to open the dam permanently to increase capital in all well-being dimensions. This could be very difficult for the government, however, because opening the dam would represent the failure of their development project. A combination of choices to try to optimize their solution would be more appropriate. The concept of MRS had been recommended for options. MRS results revealed that affected communities will give up EWB to gain more SWB. Therefore, the government has more choices to offer these people. Instead of opening the dam gate and providing financial compensation and land reform, the government could choose to offer training and public services. A tradeoff analysis would use the information from this study. The government budget is limited, and the capital gained from opening the dam's gate can vary, but if the budget is adequate to provide capital for all well-being dimensions, this would increase the SLF. The choices of government training and public service provisions can be offered to improve other SWB factors. These interventions can also improve EWB. The combinations of choices based on well-being and government intervention could be used as tradeoff analyses for SLF services.

Tradeoff analysis can use this information to create combinations of choices that can help policy makers or government agents in making their decisions. Many governments use tradeoff analysis for ecosystem services (Matzdorf & Muller, 2010), and MRS analysis provides good answers to support how one well-being factor can be traded for another. Possible options that the government can use to assist in this issue include the following:

First, in the case of opening the gate for a longer period, SWB and EWB will be increased through higher use of their capital and eventually increase in OWB. As the gate remains open, the fewer public funds will be needed to support the community through SWB and EWB. In the case that the government would not allow the gate to remain open permanently, the compensation and expenditure of capital of SWB and EWB will increase. Results show that to be able to maintain the sustainable livelihood, the government can negotiate to pay less compensation to locals if they would create more impact to increase SWB.

Second, in the case that government will not allow the gate of dam to be opened permanently or only for a short period of time, the capital of SWB and EWB will decrease. To maintain the same level of sustainable livelihood, the government had to spend much more than in the first case to increase the capital of SWB and EWB. It is important to consider increasing capital in SWB based on MRS. In this case, it must be more than the first case.

Third, in the case that capital was not increased by opening the dam's gate and if the budget was limited, the government must consider other choices, such as much higher compensation to trade with lower SWB or using different combinations of government intervention, as mentioned in the discussion section. However, in this case, the compensation must be much higher than in the first two cases.

A final concern is that even though ENWB does not have a statistically significant effect on OWB for the affected communities, sustainable development still includes ENWB as one of its three main elements. Furthermore, among six items within ENWB, four items' mean for unaffected community are higher than affected community. The government

should still consider ENWB factors within their combination bundle choices for tradeoff analysis. In the case that ENWB is statistically significant, this study will better show the relationship of each well-being to each other and to OWB. The expectation of this well-being to have the higher estimated coefficient and MRS between ENWB and EWB would support the idea that EWB can be much lower to gain one more unit of ENWB. This can be explained that ENWB had been much lower in the past compared to EWB so that ENWB would be considered a scarcity resource. This would support the importance of ENWB as one of three pillars of SLF. More concern should be taken to maintain SLF.

The last recommendation is that, hopefully, other governments, local governments, EGATs, and NGOs in the southeast Asian region will consider the results from this research for their service analyses to provide improvement for all affected communities, not just those affected by the dam along the Mae Khong River. What was learned from this study was that many impacts were not carefully considered before the dam was built. The possible outcomes were underestimated, and many projects and policies that would have prevented a decrease in capital for each well-being dimension were not implemented. The change of capital, especially all three pillars of sustainability, lacked study as well. Many operations, such as a fish ladder to preserve environmental capital, were not carefully studied (Piesse, 2016). However, this does not mean that nothing can be done to improve conditions for the affected communities. This research shows what can be done to improve residents' livelihood. It also provides numerous ideas to maintain livelihood for many communities along the Mae Khong River while the dam still exists.

Limitations and Strength of Research

The current research contains some limitations that should be kept in mind while drawing conclusions. ENWB, which is one of three important well-being dimensions, was not statistically significant in relation to OWB, so this research cannot explain much about ENWB and policies that relate to it.

The EWB dimension did not contain ObjWB and would have included more detail if ObjWB had been added. Finally, because the outliers were eliminated from the data, the number of data points were decreased, but the data used for statistical analysis still had a power of more than 0.8.

Despite the limitations encountered in the current research, there are several strengths that enhance the overall validity of this research.

This research is a quantitative work that studies the well-being of the community affected by the Pak Mun Dam.

First, the current study covers multiple dimensions of a sustainable concept that includes economic, social, environmental, and human well-being indexes.

The study compares the well-being factors of each dimension for both the affected and the unaffected communities to understand the differences based on the impact of the Pak Mun Dam.

Second, the current research studies the impact of government intervention on EWB and SWB to OWB by setting these well-being dimensions as mediators. It studies government impact on EWB and SWB (combining items related to SWB, such as ComWB, FWB, JWB, CWB, and PWB) to OWB by setting these well-being dimensions as mediators. This provides valuable information on how government intervention would impact both directly

and indirectly on OWB. The government can adopt this information to formulate more efficient policies to improve the well-being of the affected communities. This policy will have the impact on capital through all well-beings. The budget amount to be added must be based on the length of the dam gate's opening.

Third, using the MRS concept to determine the relationship between well-being dimensions provides another point of view regarding the willingness to trade one type of well-being for another. This can be used to conduct tradeoff analyses for many SLF projects. It helps us to understand the relationship of each well-being in SLF much better. Last, the final strength is that the estimated coefficient, which shows the impact of each well-being dimension on OWB via the structural model, can be used to create a well-being index that represents the real relationship between each well-being dimension and OWB instead of using the equal ratio for each type of well-being.

Contributions and Implications for the Literature

This research is the first quantitative work that combines all well-being dimensions based on the human well-being index and sustainable concepts into one study by comparing the differences of affected and unaffected communities.

First, this is the first study that uses SEM to explore the relationship between well-being dimensions and OWB for which qualitative—but not quantitative—work had been done in the past.

Second, this research calculates for an estimated coefficient to support the outcome that SWB is an important factor for sustainable livelihood; it could be more appropriate to use the research to calculate for a well-being index that represents the real relationship between each well-being dimension and OWB.

Third, the study calculates the MRS to understand the relationship among well-being dimensions that can be used to inform tradeoff analyses for many SLF or ecosystem projects. Furthermore, estimated coefficient of each well-being to OWB and MRS will benefit to government to provide better policies.

Fourth, this study is beneficial to stakeholders in both the public and private sectors in that the models provide concrete factors and indicators for all well-being dimensions that impact OWB in the community affected by Pak Mun Dam.

The last, finally, government intervention (structure and institute) in many forms (such as policy and project) plays a key role in achieving rural sustainable livelihood. It does so by increasing well-being capital to improve higher social livelihood, but this is not limited to government intervention. Other structures (stakeholders) can work to gain capital in each well-being dimension to improve SLF while working closely with government.

Suggestions for Future Research

Focus on environmental questions: Because this research does not have a statistically significant result for ENWB, which is one of three main factors in sustainable livelihood, this study cannot calculate for MRS between economic and ENWB factors. ENWB can be recreated and retested for proposed dam cases along the Mae Khong River.

First, increased objective well-being for EWB tradeoffs: All items in the EWB dimension are also in the SubWB dimension. This can provide a more complete picture, especially because OWB and SWB have a positive relationship.

Second, choices of solutions in detail: Because the request to open the dam gate is ongoing, compensation and other solutions to improve the affected residents' well-being require further discussion. A combination of government services, compensation to residents,

budgets for other programs to improve social perspective well-being, and benefits of environmental loss and gain, can and should be studied in more detail to determine the number of possible choices.

Third, the cooperation of government management and many stakeholders, such as NGOs, local administrative officers, and residents, should occur to determine how to use this information for a better development project for communities.

The last, more structure changes to impact EWB, SWB, and ENWB can be added for more depth.

Conclusions

This research is the first quantitative work to study the well-being of the community affected by the Pak Mun Dam to achieve a sustainable livelihood framework. Results show statistically significant differences between the affected community and the unaffected community. Among 40 total items, 31 are statistically significantly different between the affected and unaffected communities, and 24 of the 40 items have a larger mean for the unaffected community than for the affected one. SEM results show EWB and SWB are important dimensions that impact OWB, and the information regarding SEM results will be beneficial for central government, local government, EGAT, and practitioners in improving the affected community to achieve higher SLF. This information can be used for many dam projects along the Mae Khong River. MRS results from SEM can explain the relationship of each well-being dimension and assist us to understand the impact of each dimension to OWB along with estimated coefficients of each dimension to OWB. Furthermore, items that have a high loading for each dimension also help us understand important factors to each well-being dimension and OWB.

These results also show that residents would trade EWB for SWB, and this would help during decision making in tradeoff analyses conducted for many SLF or ecosystem projects. Changes in structure or institute, as in the cases of government helping to create sustainable livelihood by increasing capital for each well-being dimension, government public services, and job training, would increase SWB. Government development of a satisfactory solution to the Pak Mun Dam problem would increase EWB and eventually increase OWB, though in this model, well-being dimensions are mediators. This information can be important when the government conducts tradeoff analyses, because funding is limited. Even though this study did not achieve the three goals of SLF because ENWB was not significant, government (institution and structure) should still take this research into consideration, because the affected community's mean ENWB was much smaller than that of the unaffected community in four items. Even though Pak Mun Dam still exists, future dams along the Mae Khong River can use this information to maintain the most sustainable livelihood possible for residents along the river.

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Appendix

Path diagram 1:
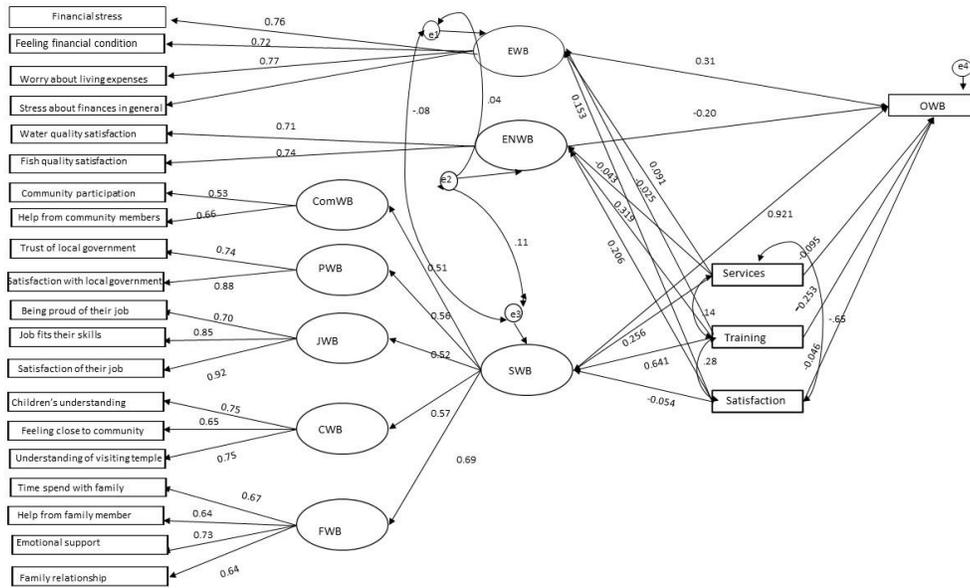
Table 14. Power and degree of freedom table

$\varepsilon_1 = .02$

df	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	.99
						π					
5	926	1025	1131	1248	1379	1529	1707	1930	2234	2734	3829
10	569	625	685	750	821	902	997	1115	1273	1530	2086
15	433	474	518	565	616	674	741	823	934	1111	1491
20	358	392	427	464	505	551	604	669	756	893	1185
25	311	339	369	401	435	474	518	572	644	758	997
30	277	302	328	356	386	420	458	505	567	665	869
35	251	274	297	322	349	379	414	455	510	596	775
40	231	252	273	296	321	348	379	417	466	544	704
45	215	234	254	275	297	322	351	386	431	501	647
50	202	220	238	258	278	302	328	360	402	467	600
55	191	207	225	243	262	284	309	339	377	438	562
60	181	197	213	230	249	269	292	320	357	413	529
65	173	188	203	219	237	256	278	304	339	392	501
70	165	179	194	210	226	245	266	291	323	374	476
75	159	172	186	201	217	234	254	278	309	357	454
80	153	166	179	193	209	225	245	267	297	343	435
85	148	160	173	187	201	217	236	257	286	330	418
90	143	155	167	180	194	210	228	249	276	318	403
95	138	150	162	175	188	203	220	240	267	307	389
100	134	146	157	169	183	197	213	233	258	297	376
110	127	138	149	160	173	186	202	220	244	280	353
120	121	131	141	152	164	177	191	209	231	265	334
130	116	125	135	145	157	169	183	199	220	253	317
140	111	120	129	139	150	162	175	190	211	241	303
150	107	115	124	134	144	155	168	183	202	232	290
160	103	111	120	129	139	150	162	176	194	223	279
170	99	108	116	125	134	144	156	170	188	215	268
180	96	104	112	121	130	140	151	164	181	207	259
190	93	101	109	117	126	135	146	159	176	201	251
200	91	98	106	114	122	132	142	154	170	195	243
225	85	92	99	107	114	123	133	144	159	182	226
250	80	87	94	100	108	116	125	136	150	171	212

Table 15. Demographic Characteristics of Sample for Impacted and Non-impacted Communities

	Pooled Sample (N = 470)	Impacted Community Sample (N = 235)	Non-impacted Community Sample (N = 235)
Variable	Mean (SE)	Mean (SE)	Mean (SE)
Income (Baht/month)	%	%	%
<500	1.9	2.6	1.3
500-1,000	11.3	13.2	9.4
1,000-1,500	7.7	6.4	8.9
1,500-2,000	5.7	7.7	3.8
2,000-2,500	2.8	2.1	3.4
2,500-3,000	5.3	5.5	5.1
3,000-3,500	3.2	3.4	3.0
3,500-4,000	3.2	3.0	3.4
4,000-4,500	2.1	1.3	3.0
4,500-5,000	6.6	8.9	4.3
5,000-5,500	3.6	4.7	2.6
5,500-6,000	8.7	8.1	9.4
6,000-6,500	3.2	2.6	3.8
6,500-7,000	2.8	2.1	3.4
7,000-7,500	2.3	2.6	2.1
7,500-8,000	3.4	2.6	4.3
8,000-8,500			

8,500-9,000	2.6	2.1	3.0
9,000-9,500	1.3	1.3	1.3
9,500-10,000	1.3	2.1	0.4
>10,000	3.8	3.4	4.3
	17.2	14.5	20.0
	100.0	100.0	100.0
Education	%	%	%
<Grade 6			
Grade 7-9	58.7	65.5	51.9
Grade 10-12	17.7	16.6	18.7
2-year degree	16.0	11.9	20.0
Bachelor degree	1.3	1.7	0.9
Graduate work or advanced/professional degree	4.5	4.3	4.7
	1.9	0.0	3.4
	100.0	100.0	100.0
Number of jobs	%	%	%
0	1.3	0.9	1.7
1	52.8	53.6	51.9
2	30.9	30.2	31.5
3	11.3	10.6	11.9
4	2.1	1.7	2.6
5	1.5	2.6	0.4

6	*0.2*	*0.4*	*0.0*
7	*0.0*	*0.0*	*0.0*
8	*0.0*	*0.0*	*0.0*
	100.0	*100.0*	*100.0*
Number of people in household	*%*	*%*	*%*
1	*3.0*	*3.0*	*3.0*
2	*10.9*	*13.2*	*8.5*
3	*15.3*	*13.2*	*17.4*
4	*24.3*	*24.7*	*23.8*
4.3	*6.4*	*0.0*	*12.8*
5	*15.7*	*16.2*	*15.3*
6	*12.8*	*14.9*	*10.6*
7	*5.7*	*6.8*	*4.7*
8	*3.4*	*4.7*	*2.1*
9	*0.9*	*0.4*	*1.3*
10	*1.1*	*1.7*	*0.4*
11	*0.2*	*0.4*	*0.0*
12	*0.4*	*0.9*	*0.0*
	100.0	*100.0*	*100.0*

Table 16. Demographic Characteristics of Before/After 1994 Samples

	Pooled Sample (N = 235)	Before 1994 Sample (N = 191)	After 1994 Sample (N = 52)
Variable	Frequency (%)	Frequency (%)	Frequency (%)

Income (Baht/month)

< 500	2.6	2.2	4.0
500-1,000	13.2	15.7	4.0
1,000-1,500	6.4	5.4	10.0
1,500-2,000	7.7	7.6	8.0
2,000-2,500	2.1	2.7	0.0
2,500-3,000	5.5	5.9	4.0
3,000-3,500	3.4	2.7	6.0
3,500-4,000	3.0	2.7	4.0
4,000-4,500	1.3	1.6	0.0
4,500-5,000	8.9	10.8	2.0
5,000-5,500	4.7	5.9	0.0
5,500-6,000	8.1	7.6	10.0
6,000-6,500	2.6	1.6	6.0
6,500-7,000	2.1	2.2	2.0
7,000-7,500	2.6	2.7	2.0
7,500-8,000	2.6	2.2	4.0
8,000-8,500	2.1	2.2	2.0
8,500-9,000	1.3	1.6	0.0

9,000-9,500	*2.1*	*1.1*	*6.0*
9,500-10,000	*3.4*	*2.2*	*8.0*
>10,000	*14.5*	*13.5*	*18.0*
	100.00	*100.0*	*100.0*

Education

< Grade 6			
	65.5	*70.3*	*47.2*
Grade 7-9			
	16.6	*14.1*	*24.5*
Grade 10-12			
	11.9	*9.7*	*20.8*
2-year degree			
	1.7	*1.6*	*1.9*
Bachelor degree			
	4.3	*4.3*	*5.7*
Graduate work or advanced/professional degree	*0.0*	*0.0*	*0.0*
	100.0	*100.0*	*100.0*

Number of jobs

0	*0.9*	*1.1*	*0.0*
1	*53.6*	*56.2*	*44.0*
2	*30.2*	*28.6*	*36.0*
3	*10.6*	*10.3*	*12.0*
4	*1.7*	*1.1*	*4.0*
5	*2.6*	*2.7*	*2.0*
6	*0.4*	*0.0*	*2.0*
7	*0.0*	*0.0*	*0.0*
8	*0.0*	*0.0*	*0.0*
	100.0	*100.0*	*100.0*

Number of people in household

1	*3.0*	*2.2*	*6.0*
2	*13.2*	*14.6*	*8.0*
3	*13.2*	*14.6*	*8.0*
4	*24.7*	*23.2*	*30.0*
5	*16.2*	*16.8*	*14.0*
6	*14.9*	*14.1*	*18.0*
7	*6.8*	*6.5*	*8.0*
8	*4.7*	*3.8*	*8.0*
9	*0.4*	*0.5*	*0.0*
10	*1.7*	*2.2*	*0.0*
11	*0.4*	*0.5*	*0.0*
12	*0.9*	*1.1*	*0.0*
	100.0	*100.0*	*100.0*

Table 17. Normality Testing Result for Non-Impacted and Impacted Communities (Combination of Both Before- And After-1994 Communities)

Variable	Non- impacted community		Impacted community	
	Skewness	Kurtosis	Skewness	Kurtosis

Economic well-being				
- Level of financial stress	*-0.372*	*-0.859*	*-0.159*	*-0.574*
- Satisfaction with financial situation	*0.124*	*-0.627*	*0.192*	*-0.664*
- Feeling about current financial condition	*-0.259*	*0.176*	*-0.117*	*-0.503*
- Can't afford to go out				
- Living paycheck to paycheck	*-0.610*	*-1.119*	*-0.650*	*-1.068*
- Worry about living expenses	*0.764*	*-0.208*	*0.834*	*-0.127*
- Confidence regarding financial emergency (finding 1,000 Baht)	*0.531*	*-0.176*	*0.622*	*0.140*
- Stress about finances in general	*0.127*	*-1.451*	*0.549*	*-1.086*
	0.386	*-0.224*	*0.585*	*0.279*
Social well-being				
- Community listens to your idea, advice, or complaints	-0.116	-0.847	0.195	-0.827
- Community participation	-0.312	-1.136	-0.289	-1.304
	-0.368	-0.647	-0.270	-0.850

- Help from other community members				
- Community safe among members of community	-1.549	2.443	-1.655	2.201
- Community safe when there are visitors	-0.240	-0.950	-0.336	-1.068
ENWB				
- Buying water to consume	0.198	-1.660	0.607	-1.323
- Short of water	-1.000	0.560	-0.767	-0.297
- Taste of local fish?	-1.368	3.632	1.277	10.370
- The population of the community is about the right amount for the community	-0.673	0.634	-0.493	0.687
- Level of satisfaction with water quality of Mun River and MaKhong River	-0.590	0.518	-0.346	-0.363
- Level of satisfaction with fish quality in Mun River and Makhong River	-0.575	0.407	-0.628	0.035
PWB				
- Trust of the central government	-0.363	0.556	0.233	0.183
- Trust of the local government	-0.620	0.843	0.119	-0.044
- Overall satisfaction with				

the central government	-0.454	0.201	-0.255	0.241
- Overall satisfaction with the local government	-0.066	0.973	-0.296	0.924
- Central government respect the local people's voices	0.193	-0.105	0.459	-0.248
HWB				
- Number of hospital visits last year	0.093	-1.243	0.509	-0.847
- Current stress level	-0.523	-0.163	-0.238	-0.328
- Feeling full of energy	-0.001	-0.205	0.026	0.093
- Sleeping problem	-1.158	0.295	-0.634	-0.953
- Satisfaction level of their own health condition	-0.986	1.146	-0.401	-0.420
JWB				

	-0.056	-1.365	0.706	-0.771
- Numbers of working hours per week				
- Being proud of their job	-0.128	0.140	-0.140	-0.271
- Job fits their skills, knowledge and experience	-0.550	0.704	-0.338	-0.042
- Satisfaction level of their job	-0.331	0.302	-0.393	0.016
CWB				
- Their children's understanding the important of visiting the temple	-0.625	0.046	-0.615	-0.169
- Feeling close to the community	-0.859	0.769	-0.888	-0.110
- They understand the important of visiting the temple	-0.832	1.003	-0.847	0.279
FWB				
- Time spending with family has increased in the past 10 years	-0.766	0.845	-0.394	-0.225
- Individual turn to each other for help when something is troubling them	-0.211	0.088	-0.270	0.090
- Emotional support can be gained from family's members when it is needed	-0.744	-0.194	-0.494	0.699
- Overall score of family relationship				

	-0.635	-0.590	-0.641	-0.510

Table 18. Well-being Score and Items

Economic well-being

Economic well-being

Variable	Pooled Sample (N = 470) Mean (SE)	Impacted Sample (N = 235) Mean (SE)	Non-impacted Sample (N = 235) Mean (SE)	T-value
1) Level of financial stress	6.13(0.138)	*5.74(0.180)*	*6.53(0.206)*	*-2.88****
2) Satisfaction with financial situation	5.35(0.125)	*5.02(0.174)*	*5.68(0.183)*	*-2.61****
3) Feeling about current financial condition	5.53(0.117)	*5.15(0.167)*	*5.92(0.159)*	*-3.32****

4) Can't afford to go out	*6.99(0.156)*	*6.99(0.215)*	*6.99(0.228)*	*-0.19*
5) Living paycheck to paycheck	*3.64(0.125)*	*3.57(0.169)*	*3.72(0.183)*	*-0.609*
6) Worry about living expenses	*4.36(0.122)*	*4.01(0.164)*	*4.70(0.178)*	*-2.85****
7) Confidence regarding financial emergency (finding 1,000 Baht)	*5.07(0.161)*	*4.54(0.219)*	*5.60(0.232)*	*-3.30****
8) Stress about finances in general	*5.09(0.118)*	*4.77(0.164)*	*5.41(0.168)*	*-2.73****

Community well-being

	Pooled Sample (N = 488)	Impacted Sample (N = 243)	Non-impacted Sample (N = 245)	T-value
Variable	Mean (SE)	Mean (SE)	Mean (SE)	
1) Community listens to your idea, advice, or complaints	*3.081(0.048)*	*2.94(0.068)*	*3.21(0.068)*	*-2.89****
2) Community participation	*3.52(0.057)*	*3.45(0.084)*	*3.59(0.077)*	*-1.25*

3) Help from other community members	*3.59(0.05)*	*3.41(0.073)*	*3.76(0.065)*	*-3.60****
4) Community safety among members of community	*4.51(0.035)*	*4.40(0.057)*	*4.61(0.041)*	*-2.96****
5) Community safety when there are visitors	*3.45(0.057)*	*3.63(0.077)*	*3.26(0.082)*	*3.247****

ENWB

Variable	Pooled Sample (N = 470) Mean (SE)	Impacted Sample (N = 235) Mean (SE)	Non-impacted Sample (N = 235) Mean (SE)	T-value
1) Buying water to consume	*2.62(0.076)*	*2.53(0.107)*	*2.71(0.108)*	*-1.16*
2) Short of water	*4.01(0.049)*	*3.81(0.075)*	*4.2(0.059)*	*-4.05****
3) Taste of local fish	*4.05(0.038)*	*4.10(0.058)*	*4.00(0.05)*	*1.28*
4) The population of the community is about the right amount for the community	*3.810(0.036)*	*3.84(0.050)*	*3.77(0.051)*	*0.914*

	Pooled Sample (N = 470)	Impacted Sample (N = 235)	Non-impacted Sample (N = 235)	T-value
5) Level of satisfaction with the water quality of the Mun River and the MaKhong River	*3.46(0.044)*	*3.29(0.069)*	*3.63(0.054)*	*-3.81****
6) Level of satisfaction with the fish quality in the Mun River and the Makhong River	*3.70(0.043)*	*3.62(0.065)*	*3.78(0.056)*	*-1.81*

PWB

	Pooled Sample (N = 470)	Impacted Sample (N = 235)	Non-impacted Sample (N = 235)	T-value
Variable	Mean (SE)	Mean (SE)	Mean (SE)	
1) Trust of the central government	*3.31(0.039)*	*3.33(0.051)*	*3.30(0.058)*	*0.460*
2) Trust of the local government	*3.4(0.039)*	*3.31(0.053)*	*3.48(0.056)*	*-2.27***
3) Overall satisfaction with the central government	*3.63(0.04)*	*3.64(0.054)*	*3.62(0.058)*	*0.267*

4) Overall satisfaction with the local government	*3.31(0.036)*	*3.24(0.051)*	*3.38(0.049)*	*-2.00***
5)Central government respects the local people's voices	*2.56(0.047)*	*2.35(0.067)*	*2.77(0.063)*	*-4.56****

HWB

	Pooled Sample (N = 470)	Impacted Sample (N = 235)	Non-impacted Sample (N = 235)	T-value
Variable	Mean (SE)	Mean (SE)	Mean (SE)	
1) Number of hospital visits last year	*2.59(0.065)*	*2.31(0.083)*	*2.88(0.096)*	*-4.49****
2) Current stress level	*3.77(0.047)*	*3.56(0.064)*	*3.97(0.066)*	*-4.46****
3) Feeling full of energy	*2.99(0.047)*	*2.86(0.063)*	*3.12(0.068)*	*-2.82****
4) Sleeping problems	*3.97(0.057)*	*3.77(0.084)*	*4.18(0.075)*	*-3.64****
5) Satisfaction level of their own health condition	*3.72(0.043)*	*3.60(0.064)*	*3.83(0.057)*	*-2.73****

JWB

Variable	Pooled Sample (N = 470) Mean (SE)	Impact Sample (N = 235) Mean (SE)	Non-impacted Sample (N = 235) Mean (SE)	
1) Numbers of working hours per week	2.73(0.068)	2.44(0.092)	3.02(0.096)	-4.3***
2) Being proud of their job	4.000(0.029)	3.97(0.044)	4.03(0.038)	-1.18
3) Job fits their skills, knowledge, and experience	3.85(0.034)	3.780(0.053)	3.92(0.044)	-2.00**
4) Satisfaction level of their job	3.91(0.033)	3.86(0.051)	3.95(0.041)	-1.41

CWB

Variable	Pooled Sample (N = 470) Mean (SE)	Impacted Sample (N = 235) Mean (SE)	Non-impacted Sample (N = 235) Mean (SE)	T-value
1) Their children's understanding of the importance of visiting the temple	3.83(0.046)	3.82(0.065)	3.83(0.064)	-0.187

	4.32(0.034)	4.34(0.047)	4.30(0.049)	0.564
2) Feeling close to the community	*4.32(0.034)*	*4.34(0.047)*	*4.30(0.049)*	*0.564*
3) They understand the importance of visiting the temple	*4.27(0.034)*	*4.32(0.048)*	*4.22(0.047)*	*1.476*

FWB

Variable	Pooled Sample (N = 470) Mean (SE)	Impacted Sample (N = 235) Mean (SE)	Non-impacted Sample (N = 235) Mean (SE)	T-value
1) Time spent with family has increased in the past 10 years	*3.88(0.039)*	*3.82(0.059)*	*3.94(0.051)*	*-1.53***
2) Individuals turn to each other for help when something is troubling them	*3.99(0.032)*	*3.92(0.049)*	*4.06(0.04)*	*-2.28****
3) Emotional support can be gained from family members when it is needed	*4.29(0.034)*	*4.2(0.052)*	*4.38(0.043)*	*-2.68****

4) Overall score of family relationship	*4.32(0.033)*	*4.29(0.049)*	*4.36(0.044)*	*-1.11*

Note. A t-test was used to test for differences between the two samples. $* p \leq .10.$ $** p \leq .05.$ $*** p \leq .01$

Table 19. Eight Domains of Well-being Scores and Items

Economic well-being

Variable	Pooled Sample (N = 235) Mean (SE)	Before 1994 Sample (N = 185) Mean (SE)	After 1994 Sample (N = 50) Mean (SE)	T-value
1) Level of financial stress	*5.74(0.180)*	*5.71(0.207)*	*5.86(0.363)*	*-0.345*
2) Satisfaction with financial situation	*5.02(0.174)*	*5.12(0.205)*	*4.64(0.297)*	*1.128*
3) Feeling about current financial condition	*5.15(0.167)*	*5.24(0.195)*	*4.81(0.304)*	*1.088*
4) Can't afford to go out	*6.99(0.215)*	*7.08(0.249)*	*6.64(0.411)*	*0.839*
5) Living paycheck to paycheck	*3.57(0.169)*	*3.54(0.194)*	*3.68(0.339)*	*-0.343*
6) Worry about living expenses	*4.01(0.164)*	*3.96(0.188)*	*4.22(0.335)*	*-0.655*

7) Confidence regarding financial emergency (finding 1,000 Baht)	*4.54(0.219)*	*4.48(0.250)*	*4.78(0.459)*	*-0.562*
8) Stress about finances in general	*4.77(0.164)*	*4.78(0.185)*	*4.70(0.359)*	*0.206*

Community's well-being

Variable	Pooled Sample (N = 235)	Before 1994 Sample (N = 185)	After 1994 Sample (N = 50)	T-value
	Mean (SE)	Mean (SE)	Mean (SE)	
1) Community listens to your idea, advice, or complaints	*2.94(0.068)*	*2.97(0.080)*	*2.82(0.127)*	*0.885*
2) Community participation	*3.45(0.084)*	*3.47(0.096)*	*3.36(0.173)*	*0.536*
3) Help from other community members	*3.41(0.073)*	*3.61(0.076)*	*2.68(0.163)*	*5.464****
4) Community safety among members of community	*4.40(0.057)*	*4.47(0.063)*	*4.16(0.129)*	*2.247***
5) Community safety when there are visitors	*3.63(0.077)*	*3.66(0.087)*	*3.52(0.167)*	*0.737*

ENWB

Variable	Pooled Sample (N = 235)	Before 1994 Sample (N =185)	After 1994 Sample (N = 50)	T-value
	Mean (SE)	Mean (SE)	Mean (SE)	
1) Buying water to consume	*2.53(0.107)*	*2.39(0.119)*	*3.04(0.232)*	*-2.49****
2) Short of water	*3.81(0.075)*	*3.90(0.083)*	*3.50(0.172)*	*2.177***

3) Taste of local fish	*4.10(0.058)*	*4.15(0.064)*	*3.90(0.132)*	*1.797**
4) The population of the community is about right amount for the community	*3.84(0.050)*	*3.87(0.055)*	*3.72(0.121)*	*0.1221*
5) Level of satisfaction with the water quality of the Mun River and the MaKhong River	*3.29(0.069)*	*3.28(0.079)*	*3.34(0.142)*	*-0.340*
19) Level of satisfaction with the fish quality in the Mun River and the Makhong River	*3.62(0.065)*	*3.58(0.076)*	*3.78(0.119)*	*-1.26*

PWB

Variable	Pooled Sample (N = 235) Mean (SE)	Before 1994 Sample (N = 185) Mean (SE)	After 1994 Sample (N = 50) Mean (SE)	T-value
1) Trust of the central government	*3.33(0.053)*	*3.39(0.56)*	*3.12(0.117)*	*2.17***
2) Trust of the local government	*3.31(0.053)*	*3.39(0.058)*	*3.02(0.112)*	*2.889****
3)Overall satisfaction with the central government	*3.64(0.054)*	*3.63(0.063)*	*3.66(0.101)*	*-0.224*
4)Overall satisfaction with the local government	*3.24(0.051)*	*3.28(0.057)*	*3.06(0.112)*	*1.794*
5)Central government respect the local people' s voices	*2.35(0.067)*	*2.34(0.076)*	*2.38(0.137)*	*-0.231*

HWB

Variable	Pooled Sample (N = 235) Mean (SE)	Before 1994 Sample (N = 185) Mean (SE)	After 1994 Sample (N = 50) Mean (SE)	T-value
1) Number of hospital visits last year	2.31(0.083)	2.26(0.093)	2.48(0.181)	-1.08
2) Current stress level	3.56(0.064)	3.58(0.075)	3.52(0.119)	0.355
3) Feeling full of energy	2.86(0.063)	2.84(0.073)	2.94(0.126)	-0.671
4) Sleeping problems	3.77(0.084)	3.74(0.098)	3.86(0.162)	-0.558
5) Satisfaction level of their own health condition	3.60(0.064)	3.58(0.074)	3.67(0.126)	-0.584

JWB

Variable	Pooled Sample (N = 235) Mean (SE)	Before 1994 Sample (N = 185) Mean (SE)	After 1994 Sample (N = 50) Mean (SE)	T-value
1) Numbers of working hours per week	2.44(0.092)	2.30(0.100)	2.95(0.211)	-2.93***
2) Being proud of their job	3.97(0.044)	3.95(0.05)	4.04(0.095)	-0.853
3) Job fits their skills, knowledge, and experience	3.78(0.053)	3.79(0.055)	3.74(0.139)	0.424
4) Satisfaction level of their job	3.86(0.051)	3.87(0.056)	3.82(0.120)	0.406

CWB

	Pooled Sample (N = 235)	Before 1994 sample	After 1994 Sample (N = 50)	T-value

Variable			(N = 185) Mean (SE)	Mean (SE)	Mean (SE)	
	1)	Their children's understanding of the importance of visiting the temple	*3.82(0.065)*	*3.88(0.073)*	*3.58(0.143)*	*1.903**
	2)	Feeling close to the community	*4.34(0.047)*	*4.38(0.053)*	*4.18(0.098)*	*1.7426**
	3)	They understand the importance of visiting the temple	*4.32(0.048)*	*4.37(0.051)*	*4.14(0.121)*	*1.965***

FWB

Variable			Pooled Sample (N = 235) Mean (SE)	Before 1994 Sample (N = 185) Mean (SE)	After 1994 Sample (N = 50) Mean (SE)	T-value
	1)	Time spent with family has increased in the past 10 years	*3.82(0.059)*	*3.84(0.064)*	*3.74(0.145)*	*0.710*
	2)	Individuals turn to each other for help when something is troubling them	*3.92(0.049)*	*3.9(0.056)*	*4.00(0.103)*	*-0.853*
	3)	Emotional support can be gained from family members when it is needed	*4.20(0.052)*	*4.19(0.057)*	*4.22(0.125)*	*0.200*
	4)	Overall score of family relationship	*4.29(0.049)*	*4.31(0.053)*	*4.18(0.120)*	*1.116*

Table 20. Testing result for differences in means for government intervention between the impacted community and the non-impacted community

Variable	Pooled Sample (N = 243) Mean (SE)	Before 1994 Sample (N=190) Mean (SE)	After 1994 Sample (N = 53) Mean (SE)	T-value
1) Reaching government services	*4.41(0.06)*	*4.45(0.068)*	*4.28(0.128)*	*1.158*
2) Quality of job training and extension services of the government	*2.99(0.06)*	*3.08(0.065)*	*2.66(0.133)*	*2.932****
3) Satisfaction level with central government's performance on the Pak Mun Dam issue	*2.80(0.062)*	*2.79(0.067)*	*2.84(0.155)*	*-0.342*

*Note: A t-test was used to test for the differences between the samples, and * $p \leq .10$. ** $p \leq .05$.*** $p \leq .01$*

Table 21.The Structural Model Result

Direct effect

Parameter	Standardized	SE	Lower	Upper	P-value
Economic→Overall Well-being	0.306**	0.113	0.102	0.524	0.011

Social→Overall Well-being	0.921**	0.507	0.581	1.908	0.002
Environmental→ Overall Well-being	-0.198	0.186	0.612	0.059	0.108
Government services→Overall Well-being	-0.095	0.175	0.426	0.083	0.379
Training→ Overall Well-being	-0.253	0.420	1.199	0.073	0.157
Satisfaction →Overall Well-being	-0.046	0.126	0.306	0.173	0.681

Note. **Statistically significant at confidence level of 99%; critical t-value of 2.58 used.

* Statistically significant at confidence level of 95%; critical t-value of 1.96 used.

Parameter	Standardized	SE	Lower	Upper	P-value
Services→ EWB	0.091	0.076	-0.060	0.239	0.241
Training→ EWB	-0.025	0.086	-.201	1.320	0.705
Satisfaction→ EWB	0.153	0.079	-0.008	0.303	0.062
Services→ SWB	0.256**	0.074	0.114	0.400	0.001
Training→ SWB	0.641**	0.110	0.385	0.807	0.001
Satisfaction→SWB	-0.054	0.110	-0.257	0.164	0.557
Services→ENWB	-0.043	0.068	-0.178	0.090	0.545
Training→ENWB	0.319**	0.097	0.120	0.502	0.001
Satisfaction→ENWB	0.206**	0.088	0.034	0.382	0.016

Note. **Statistically significant at confidence level of 99%; critical t-value of 2.58 used. * statistically significant at confidence level of 95%; critical t-value of 1.96.

Indirect effect

Parameter	Standardized	SE	Lower	Upper	P-value
Service→EWB→Overall Well-being	0.027	0.023	-0.011	0.083	0.167
Service→SWB→Overall Well-being	0.235**	0.153	0.068	0.518	0.002
Service→ ENWB Overall Well-being	0.008	0.021	-0.014	0.080	0.344
Training→EWB→Overall Well-being	-0.007	0.026	-0.069	0.038	0.646
Training→SWB→ Overall Well-being	0.590**	0.401	0.234	1.401	0.001
Training →ENWB→Overall Well-being	-0.063	0.065	-0.255	0.006	0.068

Satisfaction→ EWB→Overall Well-being	0.0468*	0.026	0.003	0.108	0.036
Satisfaction→SWB→Overall Well-being	-0.049	0.119	-0.217	0.211	0.579
Satisfaction→ENWB→Overall Well-being	-0.040	0.043	-0.167	0.005	0.077

Note. **Statistically significant at confidence level of 99%; critical t-value of 2.58 used. * statistically significant at confidence level of 95%; critical t-value of 1.96.

Total effect

Parameter	Indirect effect	Direct effect	Total effect
Service→EWB→Overall Well-being	0.027	-0.095	-0.068
Service→SWB→Overall Well-being	0.235	-0.095	0.140
Service→ ENWB→ Overall Well-being	0.008	-0.095	-0.087
Training→EWB→Overall Well-being	-0.007	-0.253	-0.260
Training→SWB→ Overall Well-being	0.590	-0.253	0.337
Training →ENWB→Overall Well-being	-0.063	-0.253	-0.316
Satisfaction→ EWB→Overall Well-being	0.0468	-0.046	0.0008
Satisfaction→SWB→Overall Well-being	-0.049	-0.046	-0.095
Satisfaction→ENWB→Overall Well-being	-0.040	-0.046	-0.086

Table 22. Type of mediation

Parameter	Indirect effect	Direct effect	Type of mediation
Service→EWB→Overall Well-being	Not significant	Not significant	No mediation

Training→EWB→Overall Well-being	Not significant	Not significant	No mediation
Satisfaction→ EWB→ Overall Well-being	significant	Not significant	Full mediation
Service→ SWB →Overall Well-being	significant	Not significant	Full mediation
Training→ SWB → Overall Well-being	Significant	Not significant	Full mediation
Satisfaction→SWB →Overall Well-being	Not significant	Not significant	No mediation
Service→ ENWB →Overall Well-being	No Significant	Not significant	No mediation
Training→ ENWB →Overall Well-being	Not significant	Not significant	No mediation
Satisfaction→ ENWB →Overall Well-being	Not significant	Not significant	No mediation

Table 22. Model fit for structural model

Index	Value	Indication of Fit	Suggested Cut-off Values
RMSEA	0.069	Mediocre fit	0.01 or less (excellent fit), 0.05 or less (good fit), and 0.08 (mediocre fit) (MacCallum, Brownne, & Sugawara, 1996)
CFI	0.86	Mediocre fit	>0.9 good fit
SRMR	0.759	Good fit	<0.08 good fit (Hu & Bentler, 1999)
CMIN/df	2.123	Good fit	<5.00 good fit(Marsh and Hocevar, 1985)

Informed Consent Documents for survey(Thai)

เอกสารชี้แจงข้อมูล/คำแนะนำแก่ผู้เข้าร่วมการวิจัย(Participant Information Sheet)

ชื่อโครงการ วิเคราะห์ผลกระทบต่อวิถีชีวิตของชาวบ้านจากเขื่อนปากมูล(Analyze this: The impact of a Thailand dam on the well-being of local residents, the case of Pak Mun Dam)

คุณถูกเชิญให้เข้าร่วมงานวิจัยเรื่องวิเคราะห์ผลกระทบต่อวิถีชีวิตของชาวบ้านจากเขื่อนปากมูล เนื่องจากว่าคุณอาศัยอยู่ในเนื่องจากคุณอาศัยอยู่ในหมู่บ้านที่ได้ผลกระทบโดยตรงจากเขื่อนปากมูล ทางเราขอให้คุณอ่านกฎและรายละเอียดด้านล่างก่อนที่จะตัดสินใจเข้าร่วมงานวิจัยนี้

งานวิจัยนี้ดำเนินงานวิจัยโดยนายพรชัย ไชยมาศ นักศึกษาปริญญาเอก การบริหารทรัพยากรธรรมชาติ มหาวิทยาลัยแห่งมินเนโซต้า สหรัฐอเมริกา โดยมี Prof. William Gartner เป็นอาจารย์ที่ปรึกษาโครงการ

<u>รายละเอียดที่จะปฏิบัติต่อผู้เข้าร่วมการวิจัย</u>

ถ้าคุณตัดสินใจที่จะเข้าร่วมงานวิจัยนี้ ทางเราจะขอความร่วมมือจากคุณดังต่อไปนี้

คุณจะต้องตอบคำถามเกี่ยวข้อมูลของท่านเกี่ยวกับภาวะทางเศรษฐกิจและสังคม เราจะมีคำถามเกี่ยวกับสภาพความเป็นอยู่ของท่านพร้อมด้วยตัวเลือกต่างๆ คุณจะต้องเลือกคำตอบที่สะท้อนสภาพของคุณมากที่สุด ระยะเวลาในการเข้าร่วมงานวิจัยจะใช้เวลาประมาณ 15 นาทีในการสิ้นสุดโครงการ ในกรณีที่ท่าน ไม่สามารถอ่านแบบสอบถามได้ พนักงานสอบถามจะอ่านแบบสอบถามให้ท่าน

<u>การเก็บข้อมูลเป็นความลับของผู้เข้าร่วมโครงการ</u>

ข้อมูลที่ได้รับจากท่านจะถูกเก็บเป็นอย่างดี ในกรณีที่ได้มีการตีพิมพ์ทางวิชาการต่อสาธารณะ ข้อมูลส่วนบุคคลหรือคำตอบของท่านจะ ไม่ถูกเปิดเผยหรือระบุว่าเป็นข้อมูลของท่าน จะมีเพียงผู้ดำเนินงานวิจัยนี้เท่านั้นที่จะสามารถเข้าถึงข้อมูลเหล่านี้ได้ ข้อมูลจะถูกเก็บไว้ในคอมพิวเตอร์ ข้อมูลในรูปแบบเอกสารจะ ไม่ถูกเก็บไว้

<u>ความสมัครใจในการเข้าร่วมการวิจัย</u>

การเข้าร่วมงานวิจัยนี้ถือเป็นความสมัครใจของท่าน และการเข้าร่วมวิจัยนี้ของท่าน ไม่ส่งผลใดๆต่อความสัมพันธ์ของท่านและมหาวิทยาลัยแห่งรัฐมินเนโซต้า และมหาวิทยาลัยราชภัฏอุบลราชธานีและอาจารย์ เสรี สมชอบ ถ้าท่านตัดสินใจในการเข้าร่วมในงานวิจัยนี้ คุณมีสิทธิ์ที่จะ ไม่ตอบคำถามใดก็ได้หรือจะหยุดการตอบแบบสอบถามเมื่อใดก็ได้โดยจะ ไม่ส่งต่อความสัมพันธ์ใดๆของท่านและมหาวิทยาลัยทั้งสองแต่อย่างใด

<u>บุคคลและวิธีการติดต่อเมื่อมีปัญหาหรือข้อสงสัยที่เกี่ยวข้องกับการวิจัย</u>

นายพรชัย ไชยมาศ บ้านเลขที่ 99/1 หมู่บ้านสาริน 1 อำเภอเมือง จังหวัดอุบลราชธานี 34000

ภาควิชาการบริหารการทรัพยากรธรรมชาติ ตึก มหาวิทยาลัยแห่งรัฐมินเนโซต้า เมืองเซ็นต์ปอล
รัฐมินเนโซต้า ประเทศสหรัฐอเมริกา 55404

โทรศัพท์ 01-612-239-8235 อีเมลล์ chai0019@umn.edu

หรือติดต่ออาจารย์ที่ปรึกษา(Dr. William Gartner)ภาควิชาเศรษฐศาสตร์ประยุกต์
มหาวิทยาลัยแห่งรัฐมินเนโซต้า เมืองเซ็นต์ปอล ประเทศสหรัฐอเมริกา เบอร์โทรศัพท์ 612 -625-5248
ที่อีเมลล์ wcg@umn.edu.
ในกรณีที่ท่านมีข้อสงสัยและปรารถนาจะพูดคุยกับบุคคลอื่นนอกเหนือจากนักวิจัยในโครงการของเรา
ท่านสามารถติดต่อไปยัง Research Subject's Advocate Line, D528 Mayo, 420 Delaware St.
Southeast, Minneapolis, Minnesota 55455 เบอร์โทรศัพท์ (612) 625-1650.

ท่านสามารถเก็บเอกสารนี้ไว้เป็นบันทึกของท่านได้

INFORMATION SHEET FOR RESEARCH

Analyze this: The impact of a Thailand dam on the well-being of local residents, the case of Pak Mun Dam

You are invited to be in a research study of dam's impact on the local resident's well being]. You were selected as a possible participant because you live in the impacted villages based on the previous study. We ask that you read this form and ask any questions you may have before agreeing to be in the study.

This study is being conducted by: Mr. Pornchai Chaiyamart, PI, PhD candidate in natural resources science and management , University of Minnesota, USA under the supervision of Prof. William Gartner as the academic advisor.

Location   : Natural resources science management program, University of Minnesota, St Paul, MN, USA.
.

Procedures:

If you agree to be in this study, we would ask you to do the following things:
You will be asked to answer the questionnaire which contains the personal socio-economic information and select the answer from provided choices. The questionnaire should take about 15 minutes to complete. During the survey, if you can not read the questionnaire, the research staff would read the question for you to choose.

Confidentiality:

The records of this study will be kept private. In any sort of report we might publish, we will not include any information that will make it possible to identify a subject. Research records will be stored securely and only researchers will have access to the records. The questionnaires will be kept and scured, the hard copy will be destroyed after complete the dissertation and only digital data is kept.

Voluntary Nature of the Study:

Participation in this study is voluntary. Your decision whether or not to participate will not affect your current or future relations with the University of Minnesota or, UBRU,Ubon Ratchathani Rajabaht University, Dr. Seri Somchob]. If you decide to participate, you are free to not answer any question or withdraw at any time without affecting those relationships.

Contacts and Questions:

The researcher(s) conducting this study is (are): Pornchai Chaiyamart and   . You may ask any questions you have now. If you have questions later, **you are encouraged** to contact them at [2211 S 9th Street , Minneapolis, MN, USA or natural resources science program, University of Minnesota, St Paul, USA, [612-239-8235], [chai0019@umn.edu]. [Dr. William Gartner, department of applied economics, University of Minnesota, wcg@umn.edu, tel:612-625-5248.

If you have any questions or concerns regarding this study and would like to talk to someone other than the researcher(s), **you are encouraged** to contact the Research Subjects' Advocate Line, D528 Mayo, 420 Delaware St. Southeast, Minneapolis, Minnesota 55455; (612) 625-1650.

You will be given a copy of this information to keep for your records.

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ชื่อโครงการ วิเคราะห์ผลกระทบต่อยวิถีชีวิตของชาวบ้านจากเขื่อนปากมูล(Analyze this: The impact of a Thailand dam on the well-being of local residents, the case of Pak Mun Dam)

<u>ดำเนินการวิจัยโดย</u>

นายพรชัย ไชยมาศ นักศึกษาปริญญาเอก ภาควิชาการบริหารทรัพยากรธรรมชาติ มหาวิทยาลัยแห่งมินเนโซต้า สหรัฐอเมริกา

<u>แบบสอบถาม</u>

ขอขอบคุณในการช่วยกรอกแบบสอบถาม เรื่องชีวิตความเป็นอยู่หลังจากการสร้างเขื่อนปากมูลในช่วงปัจจุบัน แบบสอบถามจะใช้เวลาประมาณ 10-15 นาที ในการกรอกข้อมูลทั้งหมด ข้อมูลของท่านจะถูกเก็บเป็นความลับและ ใช้ในการวิจัยเท่านั้น

แบบสอบถามนี้ถูกทำขึ้นประโยชน์ทางงานวิจัยไม่ได้มีส่วนได้ส่วนเสียจากากโครงการ หรือเป็นตัวแทนจากภาครัฐบาลแต่อย่างใด

หากท่านไม่แน่ใจคำตอบของคำถามข้อใด ท่านสามารถสอบถามบุคคลากรที่ดำเนินงานสอบถามท่านได้โดยตรง
โปรดพิจารณาให้คำตอบที่ท่านเห็นว่าเหมาะสมที่สุดเท่าที่ท่านจะทำ ได้ เพื่อเป็นการขอบคุณที่ท่านสละเวลาของท่านในการเข้าร่วมในงานวิจัยนี้
ท่านจะ ได้รับสิ่งตอบแทนเป็นสิ่งของใช้ประจำบ้านหลังจากที่ท่านเสร็จการกรอกแบบสอบถาม

ส่วนที่หนึ่ง ข้อมูลทั่วไปเกี่ยวกับตัวท่านและครอบครัว

กรุณากากบาทในช่องสี่เหลี่ยมหน้าตัวเลือกที่เป็นคำตอบของท่าน ท่านมีตัวเลือก 1 ถึง 5 ในแต่ละคำถาม

ส่วนที่สองเกี่ยวกับความเป็นอยู่ในด้านต่างๆ

1) ส่วนที่หนึ่งผลทางด้านสถานะภาพทางเศรษฐกิจ

คำตอบ	1	2	3	4	5	6	7	8	9	10
1A)คุณรู้สึกเครียดต่อสภาพทางการเงินของท่านในวันนี้หรือไม่	ไม่เลย				ปานกลาง					เครียดมาก
1B) คุณมีความพอใจต่อสภาพทางการเงินของท่านหรือไม่	ไม่พอใจ				ปานกลาง					พอใจอย่างมาก
1C) คุณมีความรู้สึกเช่นไรต่อสภาพทางการเงินในปัจจุบัน	สบาย				ปานกลาง					กังวลเป็นอย่างมาก
1D) เหตุการณ์นี้เกิดขึ้นกับท่านมากน้อยแค่ไหนต้องการไปกินข้างนอกบ้านไปดูหนังหรือสันทนาการนอกบ้านแต่ไม่ได้ไปเพราะว่าไม่สามารถจ่ายได้	เกิดขึ้นเสมอ				ปานกลาง					ไม่เคยเกิดขึ้น
1E) บ่อยแค่ไหนที่รายได้ของท่านชนรายจ่ายเดือนต่อเดือน	ตลอดเวลา				ปานกลาง					ไม่เคยเกิดขึ้น
1F) บ่อยแค่ไหนที่ท่านกังวลเกี่ยวกับค่าใช้จ่ายในชีวิตรประจำวัน	ตลอดเวลา				ปานกลาง					ไม่เคยเกิดขึ้น
1G) ท่านมีความมั่นใจแค่ไหนในการหาเงิน1,000 บาท ในยามฉุกเฉิน	ไม่มั่นใจเลย				ปานกลาง					มั่นใจมาก

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1H) คุณรู้สึกเครียดต่อสภาพทางการเงินของท่านโดยรวมหรือไม่	เครียดมาก		ปานกลาง		ไม่เครียดเลย

2) ทางด้านสังคม

คำถาม	1	2	3	4	5
2A) คุณคิดว่าชุมชนที่คุณอยู่ยอมรับและเว็บฟังความคิดเห็นของคุณมากแค่ไหน	ไม่เลย	ยอมรับบ้าง	ปานกลาง	ค่อนข้างยอมรับ	ยอมรับมาก
2B) คุณเข้าร่วมกิจกรรมของชุมชนบ่อยแค่ไหน	ไม่เลย	บางครั้ง	ปานกลาง	ค่อนข้างบ่อย	ทุกครั้ง
2C) คนในชุมชนมีความช่วยเหลือซึ่งกันและกันมากหรือน้อยเพียงใด เช่นเรื่องหาหมากวัดกิน เก็บของ และการงาน	ไม่เลย	บางครั้ง	ปานกลาง	ค่อนข้างบ่อย	ตลอดเวลา
2D) คุณรู้สึกปลอดภัยมากน้อยแค่ไหนขณะเดินตามลำพังในชุมชนของท่าน ขณะที่มีคนในชุมชนอยู่เวลากลางวันด้วย	ไม่รู้สึกปลอดภัยเลย	ไม่รู้สึกปลอดภัยเลย	ปานกลาง	ค่อนข้างปลอดภัยมาก	รู้สึกปลอดภัยอย่างมาก
2E) คุณรู้สึกปลอดภัยมากน้อยแค่ไหนขณะเดินตามลำพังในชุมชนของท่าน เมื่อไม่มีคนในชุมชนอยู่เวลากลางคืนด้วย	ไม่รู้สึกปลอดภัยเลย	ไม่รู้สึกปลอดภัยเลย	ปานกลาง	ค่อนข้างปลอดภัยมาก	รู้สึกปลอดภัยอย่างมาก

3) ทางด้านสิ่งแวดล้อม

คำถาม	1	2	3	4	5
3A) คุณ ได้รับน้ำมาใช้และบริโภคในครัวเรือนหรือไม่	ไม่เลย	บางครั้ง	ปานกลาง	บ่อยครั้ง	ตลอดเวลา
3B) ในช่วง 12 เดือนที่ผ่านมาคุณขาดแคลนน้ำจากแหล่งน้ำเพื่อการบริโภคดื่มกินและการซักล้างหรือไม่	ขาดแคลนอย่างยิ่ง	ขาดแคลน	ปานกลาง	ไม่ขาดแคลน	ไม่ขาดแคลนเลย
3C) คุณน้ำงบประมาณได้ของปล่อยจากแหล่งน้ำมากน้อยแค่ไหน	ไม่ชอบอย่างยิ่ง	ไม่ชอบ	ชอบปานกลาง	ชอบมาก	ชอบอย่างยิ่ง
3D) คุณคิดว่าจำนวนประชาชนในชุมชนมีขนาดที่เหมาะสมกับชุมชน	ไม่เหมาะสมอย่างยิ่ง	ไม่เหมาะสม	ปานกลาง	เหมาะสม	เหมาะสมอย่างยิ่ง
3E) คุณพอใจคุณภาพของแม่น้ำลูกหรือไม่	ไม่พอใจอย่างยิ่ง	ไม่พอใจ	ปานกลาง	พอใจมาก	พอใจอย่างยิ่ง
3F) คุณพอใจคุณภาพของปลาจากแม่น้ำหรือไม่	ไม่พอใจอย่างยิ่ง	ไม่พอใจ	ปานกลาง	พอใจมาก	พอใจอย่างยิ่ง

4) ทางด้านสิทธิและการเมือง

คำถาม	1	2	3	4	5

4A)คุณได้รับบริการอะไรบ้างจากภาครัฐ จากตัวเลือกข้างล่าง - ไฟฟ้า - การศึกษาขั้นพื้นฐาน - ถนนหนทาง - สาธารณสุข - น้ำประปา	ได้รับ 1 บริการ	ได้รับ 2 บริการ	ได้รับ 3 บริการ	ได้รับ 4 บริการ	ได้รับ 5 บริการ
4B)คุณคิดว่าคุณภาพของการอบรมส่งเสริมพื้นฟูอาชีพจากรัฐบาลเป็นอย่างไร	ต่ำที่สุด	ต่ำ	ปานกลาง	สูง	สูงที่สุด
4C)คุณมีความเชื่อมั่นต่อรัฐบาลมากน้อยขนาดไหน	ไม่เชื่อมั่นอย่างยิ่ง	ไม่เชื่อมั่น	ปานกลาง	เชื่อมั่น	เชื่อมั่นอย่างยิ่ง
4D)คุณมีความเชื่อมั่นต่อองค์กรบริหารงานท้องถิ่นมากน้อยแต่ ไหน	ไม่เชื่อมั่นอย่างยิ่ง	ไม่เชื่อมั่น	ปานกลาง	เชื่อมั่น	เชื่อมั่นอย่างยิ่ง
4E) คุณมีความพอใจต่อการบริการขั้นพื้นฐาน เช่นภาว ไฟฟ้า การสาธารณสุข การศึกษา ถนนหนทาง การประปา	ไม่พอใจอย่างยิ่ง	ไม่พอใจ	ปานกลาง	พอใจมาก	พอใจอย่างยิ่ง
4F)คุณมีความพอใจต่อการบริหารงานของงองค์กรบริหารงานท้องถิ่นหรือ ไม่	ไม่พอใจอย่างยิ่ง	ไม่พอใจ	ปานกลาง	พอใจมาก	พอใจอย่างยิ่ง
4G)คุณพอใจต่อการดำเนินการแก้ไขปัญหาเนื่องเขื่อนปากมูลของรัฐบาลหรือ ไม่	ไม่พอใจอย่างยิ่ง	ไม่พอใจ	ปานกลาง	พอใจมาก	พอใจอย่างยิ่ง
4H)คุณคิดว่ารัฐบาลรับฟังความคิดเห็นและข้อร้องเรียนจากคุณหรือ ไม่	ไม่เคยรับฟังเลย	บางครั้ง	ปานกลาง	ค่อนข้างมาก	มากที่สุด

5) ทางด้านสุขภาพ

คำถาม	1	2	3	4	5
5A) คุณไ ไปโรงพยาบาล คลินิก สถานือนามัยบ่อยแค่ ไหนในช่วง 12 เดือนที่ผ่านมา	มากกว่า 5 ครั้ง	5 ครั้ง	2-3ครั้ง	1 ครั้ง	ไม่เคย
5B)คุณมีความเครียดอยู่ในระดับใด ในขณะนี้	เครียดอย่างมาก	เครียดมาก	ปานกลาง	เครียดเล็กน้อย	ไม่เครียดเลย
5C)คุณคิดว่าคุณรู้สึกกระปี้กระเปร่าหรือ ไม่ ในช่วงนี้	ไม่อย่างยิ่ง	บางครั้ง	ปานกลาง	มาก	มากที่สุด
5D) คุณมีปัญหาในเรื่องการนอนยากหรือไม่	มากที่สุด	มาก	ปานกลาง	นิดหน่อย	ไม่มี

6) ทางด้านการงานและอาชีพ

คำถาม	1	2	3	4	5
6A) คุณทำงานกี่ชั่วโมงต่อสัปดาห์	น้อยกว่า 20 ชั่วโมงต่อสัปดา	20-39 ชั่วโมงต่อสั	40 ชั่วโมงต่อสั	41-60 ชั่วโมงต่อสั	มากกว่า 60ชั่วโมงต่อสั

4

	์	ปัดาห์	ปัดาห์	ปัดาห์	ปัดาห์
6B) คุณภูมิใจในงานที่คุณทำหรือไม่	ไม่ภูมิใจอย่างยิ่ง	ไม่ภูมิใจ	ปานกลาง	ภูมิใจ	ภูมิใจอย่างยิ่ง
6C) คุณภูมิใจในงานที่คุณทำหรือไม่	ไม่ภูมิใจอย่างยิ่ง	ไม่ภูมิใจ	ปานกลาง	ภูมิใจ	ภูมิใจอย่างยิ่ง
6D) คุณคิดว่าความรู้ความสามารถของคุณเหมาะสมกับงานที่คุณทำอยู่ในปัจจุบันหรือไม่	ไม่เหมาะสมอย่างยิ่ง	ไม่เหมาะสม	ปานกลาง	เหมาะสมมาก	เหมาะสมอย่างยิ่ง

1) ทางด้านวัฒนธรรม

คำถาม	1	2	3	4	5
7A) คุณคิดลูกหลานของท่านเข้าใจความสำคัญของการไปวัดหรือไม่	ไม่เลย	น้อย	ปานกลาง	มาก	มากที่สุด
7B) **คุณคิดว่างานบุญต่างๆทำให้คุณได้ใกล้ชิดกับเพื่อนบ้านในชุมชนเพิ่มมากยิ่งขึ้นหรือไม่**	ไม่เลย	น้อย	ปานกลาง	มาก	**มากที่สุด**
7C) คุณเข้าใจความสำคัญของการไปวัดหรือไม่	ไม่เลย	น้อย	ปานกลาง	มาก	มากที่สุด

2) ทางด้านครอบครัว

คำถาม	1	2	3	4	5
8A) คุณได้ใช้เวลาร่วมกันกับครอบครัวมากขึ้นหรือไม่ในช่วงสิ้นปีที่ผ่านมา	น้อยลงมาก	น้อยลง	ปานกลาง	มากขึ้น	มากขึ้นอย่างยิ่ง
8B) ถ้ามีปัญหาเกิดขึ้น, ทุกคนในครอบครัวทุกคนพร้อมจะพูดคุยกันเพื่อเข้าไปปัญหาหรือไม่	ไม่เลย	ไม่พอใด	ปานกลาง	พอใจมาก	พอใจอย่างยิ่ง
8C) คุณคิดว่าการใช้เวลาร่วมกันของคนในครอบครัวมีความสำคัญหรือไม่	ไม่มีความสำคัญเลย	มีความสำคัญเล็กน้อย	ปานกลาง	มีความสำคัญมาก	มีความสำคัญอย่างยิ่ง
8D) ในช่วงเวลาที่คุณเผชิญปัญหาในชีวิต, ครอบครัวของคุณได้ให้กำลังใจหรือไม่	ไม่เคยได้รับกำลังใจเลย	ได้รับเพียงเล็กน้อย	ปานกลาง	ค่อนข้างมาก	ตลอดเวลา
8E) คุณคิดว่าความสัมพันธ์ของสมาชิกในครอบครัวของคุณเป็นอย่างไร	แย่มาก	ค่อนข้างแย่	ปานกลาง	ค่อนข้างดี	ดีมาก

ส่วนที่สอง ข้อมูลทั่วไปเกี่ยวกับตัวท่านและครอบครัว

1) ครอบครัวมีรายได้ต่อเดือนอยู่ในช่วงใด

5

1) น้อยกว่า500 บาท

2) 500-1000 บาท

3) 1000-1500 บาท

4)1500- 2000บาท

5) 2000- 2500บาท

6) 2500- 3000บาท

7)3000- 3500บาท

8)3500- 4000บาท

9)4000- 4500บาท

10)4500- 5000บาท

11)5000- 5500บาท

12)5500- 6000บาท

13)6000- 6500บาท

14)6500- 7000บาท

15)7000- 7500บาท

16)7500- 8000บาท

17)8000- 8500บาท

18)8500- 9000บาท

19)9000- 9500บาท

20)9500- 10000บาท

21)มากกว่า 10,000 บาท

2) การศึกษา
1) ___ต่ำกว่าประถมชั้นปีที่หก
2) ___ม 1-3
3) ___ม 4-6 ปวช
4) อนุปริญญา ปวส
5) ปริญญาตรี
6) สูงกว่าปริญญาตรี

3) อาชีพ(ถ้าท่านทำงานมากกว่าหนึ่งอาชีพ ท่านสามารถเลือกได้มากกว่าหนึ่งอาชีพ)
1) ___ทำไร่,ทำนา
2) ___ประมงจับปลา
3) ___หาของป่า

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4) __ ค้าขาย

5) __ รับจ้างทั่วไป

6) __ ทำงานบริษัทเอกชน

7) __ รับราชการ

8) __ อื่นๆ กรุณาระบุอาชีพ_____

4) ท่านมีบุตรกี่คน____

ส่วนที่สาม ความคิดเห็นเกี่ยวกับชีวิตโดยรวม

5) ท่านคิดว่าชีวิต โดยรวมของท่านเป็นอย่างไร

1) __ แย่มาก

2) __ ค่อนข้างแย่

3) __ ปานกลาง

4) __ ค่อนข้างดี

5) __ ดีมาก

ผู้วิจัยขอขอบพระคุณท่านเป็นอย่างสูงที่ได้กรุณาสละเวลาในการตอบแบบสอบถามนี้

คำตอบของคุณมีค่าอย่างยิ่งต่อการพัฒนาแหล่งชุมชนที่ได้รับผลกระทบจากเขื่อนในที่ตั้งตลอดแนวของแม่น้ำโขง ทั้งที่ได้สร้างแล้ว

กำลังก่อสร้าง และเขื่อนที่มีแผนที่จะก่อสร้างในอนาคต ผลกระทบที่ครอบคลุมในทุกภาคส่วนจะถูกพิจารณาและวิเคราะห์อย่างละเอียด

แล้วจะถูกนำไปปรับปรุงใช้ในการพัฒนาแบบยั่งยืนเพื่อจะต้องอยู่เคียงข้างไปกับชุมชน

หากท่านมีความเห็นเพิ่มเติมในเรื่องใด ท่านสามารถแสดงความคิดเห็นเพิ่มเติมได้ในช่องว่างด้านล่าง

_____

_____

_____

_____

1

Survey (English version)

Note: There are 8 pages in Thai and 7 pages in English. Each page's contents may not exactly match between the two versions.

Analyze this: The impact of a Thailand dam on the well-being of local residents, the case of Pak Mun Dam

Conducted by

Pornchai Chaiyamart

PhD student in natural resources science and management

University of Minnesota, USA

2014

Thank you for your interest for this study. This questionnaire is designed to evaluate the impact from the Pak Mun Dam to the local impact the question will take 10- 15 minutes to complete the questionnaire. Your information will be kept confidentially only for this study.

The benefit of this study is for academic purpose, and we are not representing government.

If you are not sure for certain questions, please feel free to ask one of our staffs who can explain it for you. Furthermore, please provide the most appropriate answer to the best of you ability. To express your appreciation, we will provide the compensation of your time after you complete the questionnaire as household products.

What year did you move into this community?_____

Section 1: Well being dimension information

Please select one answer among choices of 1-5 which answer each question.

1) Economic well being

Questions	1	2	3	4	5	6	7	8	9	10
1A.How is your current financial stress?	Overwhelming				Medium					No stress at all

1B.Are you satisfied with your financial situation?	Completely dissatisfied			Medium				Completely satisfied
1C.How do you feel about your current financial condition?	Overwhelmed			Medium				Feeling comfortable
1D.How often do these situations happen to you? - Can't eat out, enjoy going out because can't effort.	All the time			Medium				Never
1E.How often do you live paycheck to pay check?	All the time			Medium				Never
1FHow often do you feel worrying about living expenses?	All the time			Medium				Never
1G.Do you feel confidence regarding financial emergency(finding Baht 1,000)?	No confidence			Medium				High confidence
1H.Do you feel stress about finances in general?	Overwhelming stress			Medium				No stress at all

2) Social well being

Questions	1	2	3	4	5
2A) Do you think the community has listened to your ideas, advice, or complaints for any issue in the community?	Not at all	Sometimes	Medium	Most of the time	Always listen to me
2B) How often do you participate in the community	Never	Sometimes	Medium	Often	All the time

meeting to discuss an issue?					
2C) Do community members frequently help other community members in need of food, money, or work?	Never	Sometimes	Medium	Often	Always
2D) How safe do you feel about walking alone at night time among members of your own community?	Lowest feeling of safety	Low	Medium	High	Highest feeling of safety
2E) How safe do you feel about walking alone at night when there are visitors in the area?	Lowest feeling of safety	Low	Medium	High	Highest feeling of safety

3) Environmental well being

	1	2	3	4	5
3A) Do you buy water to consume within your household?	Never	Sometimes	Medium	Most of the time	Always
3B) Have you been short of any Water for consumption and cleaning?	The whole year	Most of the year	Half year	Several months	Never
3C) How much do you like the taste of the local fish?	Lowest	Low	Medium	High	Highest
3D) Do you think the population of the community is about right?	Strongly disagree	Disagree	Medium	Agree	Strongly agree
3E) What is your level of satisfaction with the water quality of the Mun River and Mae Kong River?	Lowest	Low	Medium	High	Highest
3F) "What is your level of satisfaction with the fish quality in the Mun River and Makong River?	Lowest	Low	Medium	High	Highest

4) Political well being

Questions	1	2	3	4	5
4A) Have you	1 service	2 services	3 services	4 services	5 services

4

been able to reach these services from government? -Electricity - Basic education - Street -Health care services - Water supply					
4B) How do you grade the quality of job training and extension services provided by the government?	Lowest	Low	Medium	High	Highest
4C) How much do you trust the central government?,"	Lowest of trust	Low	Medium	High	Highest of trust
4D) How much do you trust the local government?	Lowest of trust	Low	Medium	High	Highest of trust
4E) What is your overall level of satisfaction with central government services, including education, health care services, infrastructure, electricity, and clean water supply?	Lowest	Low	Medium	High	Highest
4F) What is your overall level of satisfaction with local government's services?"	Lowest	Low	Medium	High	Highest
4G) What is your satisfaction level with the central government's performance on the Pak Mun Dam issue?,"	Lowest	Low	Medium	High	Highest
4H) How much do you think the central government respect your voice?	Lowest	Low	Medium	High	Highest

5) Health well being

Questions	1	2	3	4	5
5A) How often	More than 5	5 times a	Few times a	1 time	Never

	1	2	3		
have you visited the hospital, clinic for the last 12 months?	times a year	year	year		
5B) How is your current stress level?,"	Lowest	Low	Medium	High	Highest
5C) Have you recently been feeling full of energy	Not at all	Sometimes	Medium	Most of the time	All the time
5D) Do you have any difficulties with sleeping?"	All the times	Most of the times	Medium	Sometimes	Never

6) Work/Job well being

Questions	1	2	3	4	5
6A) How many hours do you work for living per week?	Less than 10 hours a week	10-20 hours a week	20-30 hours a week	30-40 hours a week	More than 40 hours a week
6B) Are you proud of your job?	Lowest	Low	Medium	High	Highest
6C) Please score this statement "The job fits my skill, knowledge and experience very well"	Strongly disagree	Disagree	Medium	Agree	Strongly agree
6D) Are you satisfy with your job?	Lowest	Low	Medium	High	Highest

7) Cultural well being

Questions	1	2	3	4	5
7A) Do you think your children understand the goal of going to temple?	Never	Low	Medium	understand	Extremely understand
7B) Do you feel close to community when attending the local ceremonies?	Not at all	some	Medium	agree	Strongly agree
7C) Do you understand the important of going to temple?	Not at all	some	Medium	understand	Really understand

8) Family well being

6

Questions	1	2	3	4	5
8A) Has amount of time you spend with your family changed increasingly over the last 10 years?	Not at all	Little	Medium	Quite a lot	A lot
8B) Do you think individuals would turn to each other for help when something is troubling them?	Strongly disagree	Disagree	Medium	Agree	Strongly agree
8D) How much emotional support can you gain from your family's members when it is needed?	Lowest	Low	Medium	High	Highest
8E) How much is the overall score for family relationship?	Lowest	Low	Medium	High	Highest

Section II Personal socio economic information

1) Your income
   1. Less than 500 Baht
   2. 500-1000
   3. 1000-1500
   4. 1500-2000
   5. 2000-2500
   6. 2500-3000
   7. 3000-3500
   8. 3500-4000
   9. 4000-4500
   10. 4500-5000
   11. 5000-5500
   12. 5500-6000
   13. 6000-6500
   14. 6500-7000
   15. 7000-7500
   16. 7500-8000
   17. 8000-8500
   18. 8500-9000
   19. 9000-9500
   20. 9500-10000
   21. More than 10,000

2) Your education level
    1)__ Lower than grade 6
    2)__ Grade 7-9
    3)__Grade 10-12
    4)__ AS/AA
    5)__ Bachelor's degree
    6)__Higher than bachelor's degree

3) Job (Please select more than one if they are applied to you)
    1)___Farming
    2)___Fishing
    3)___Hunting and forest goods gathering
    4)___small entrepreneur
    5)___General contractor
    6)___Working for private firm
    7)___Government job
    8)___Other, please specify_____

4) How many children do you have? ___

Section III Overall well being

5) How would you rate your life as a whole?
    1)__Very bad
    2) __Bad
    3)__Medium
    4)__Good
    5)__Very good

Thank you so much for your time to complete this survey, this information will be benefit the most to understand the well being of impacted communities from dams especially the ones along the Mae Khong River. The information will be carefully analyzed and used to improve sustainable development of the impacted communities.

If you would like to provide more commend, please commend on the provided below area;

_____

_____
_____
_____