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# Well-being capital and government's intervention to Dam's affected residents: Pak Mun Dam, Thailand

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### ABSTRACT

Government plays an important role as a well-being capital provider through policies, strategies, or even direct provision to local residents to improve their livelihoods. Pak Mun Dam is one of the most controversial dams in Thailand, and government intervention is needed to solve the issues the dam has created. This study tests the premise that government intervention will impact overall well-being only through structural means by providing strategy and policies related to social and economic well-being. Government training programs and government services will impact over all well-being through social well-being. A satisfactory solution to the Pak Mun Dam situation will impact overall well-being through economic well-being. In this study a number of items, related to different well-being dimensions, were examined. The findings suggest that appropriate policy must address the four significant items which surfaced in the economic well-being measure and ten items in the social well-being dimension.

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## Introduction

After 26 years, Pak Mun Dam has remained one of the most controversial dams in Thailand. The main issue is that community residents experienced a negative effect on their livelihood, as their economic well-being declined because of lower income from fishing production (Manorom, 2006). Similarly, social well-being issues surfaced, as some affected communities have been separated because of relocation, and their cultural events and ceremonies had been canceled (Amornsakchai et al., 2000). Furthermore, younger generations had to move to cities to find better jobs to support their families (Kiguchi, 2016). The jobs provided by the government, in response to the economic disruption caused by the dam construction, did not suit the residents' skills and experience. As a consequence, residents felt a loss of identity and pride in their culture (Kiguchi, 2016). Moreover, environmental well-being has been negatively impacted because of the decline in the number of fish species in Mae Khong River and Mun River (Manorom, 2006). Furthermore, according to 24 of 40 items on well-being, the affected community was worse off compared with those unaffected by the dam (Chaiyamart et al., 2021a). Moreover, social well-being and economic well-being play important factor for their well-being (Chaiyamart et al., 2021b). Additionally, local people felt a loss of control, as many decisions affecting their lives were made by the government without their involvement or concurrence.

One of the main and recurring requests by residents was for the government to reopen the dam for a longer period or to permanently remove it. Opening the gate for a longer period would allow fish to come back and the livelihood of the community to return. This request has been consistently ignored.

To understand this community, a deeper understanding of how their well-being has been affected by the initial construction of the dam and its continued presence is necessary. For example, the marginal rate of substituting one well-being dimension (e.g., economic

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versus another (e.g., social) would provide information regarding their decision-making process and eventually be used to understand what trade-offs can be made to improve their overall well-being. Furthermore, information regarding government intervention through each well-being dimension would provide a better solution and understanding of which actions (i.e., trade-offs) are more effective in achieving a sustainable livelihood framework.

## Literature Review

### Well-being

The concept of measuring well-being is based on Sen's capability approach (CA). Sen's approach focuses directly on quality of life through the functioning and capacity of an individual. The CA asserts that a high quality of life depends on multiple functions, but many researchers have questions as to which functions are relevant for a quality-of-life evaluation. Gasper (2002) has criticized Sen, saying that instead of identifying basic needs, physical matters, and social aspects to achieve high satisfaction, it is important to consider emotional and psychological aspects as parts of quality of life. Well-being consists of two areas: objective well-being and subjective well-being. Objective well-being (ObjWB) focuses on the material conditions that affect a person's life or the external factors that impact life itself. Meanwhile, subjective well-being (SubWB) is a more internal, intangible well-being that can be further classified based on Kahneman's (2002) inclusion of emotional well-being, or the emotional quality of a person's everyday experience. Diener, Oishi, and Lucas (1999) also included how individuals are satisfied with their life. Waldron (2010) measured subjective well-being using one's happiness level. Moreover, Crisp (2006) included positive and negative feelings toward subjective well-being such as happiness, sadness, anxiety, excitement, and others. To measure well-being, it is necessary to use multiple dimensions with both objective and subjective well-being as important factors.

**Economic well-being.** This is a crucial dimension that represents the well-being of a community. Higher economic status will bring a better quality of life through higher income and increased consumption. Furthermore, Osberg and Sharpe (2003) recommended economic security, such as less savings and debt, as a good example of objective well-being. Moreover, Cahyat, Gonner, and Haug (2007) also added any stock of wealth and physical capital such as buildings and equipment produce goods into objective well-being for the economy. Besides objective well-being, Prawitz et al. (2006) added subjective well-being into economic well-being, which consists of emotions, feelings, or worries regarding a person's or a household's economic condition.

**Community well-being.** Human well-being is the process of public and private production. Being part of society and accepted by the community is crucial for humans to achieve their basic social needs. Cahyat, Gonner, and Haug (2007) mentioned that social relationship, which refers to the feeling of being part of the community and being supported by society, is a crucial factor as well as social cohesion. Moreover, Knight and Gunatilaka (2012) added social participation into community well-being, as this would increase social capital through contact with other people and being part of the community through local activities. Gaining trust within the community is an important indicator that creates social trust, and feeling safe in the community plays an important role in community well-being (Rahman, Mittelhammer, & Wandschneider, 2003).

**Environmental well-being.** This is one of three main pillars for sustainable livelihood. The environment affects human well-being significantly because it fulfills basic needs such as water, air, and food, and changes in the ecological system would have negative impacts and could be harmful for humans and production. Quality of environment is also important for environmental well-being, which includes quality of land (Murphy, 2010), quality of water (Cahyat, Gonner, & Haug, 2007), and air pollution (Rishi & Khuntia, 2012).

**Political well-being.** People should be able to rule, control and protect their own rights and trust in the government's promises (Heuvel, 2009). People have the capacity to assert freedom and equal treatment (Deueulin & McGregor, 2010). Furthermore, Smith and Ummers (2011) claimed that civil liberties and justice are indicators of political well-being.

**Health well-being.** Good-quality human capital would lead to higher production. The good health status of human capital shows the condition of well-being. Health well-being encompasses both good physical and mental health status. Normal health checks by physicians would provide information regarding objective well-being in terms of health. Besides physical health checks, depression and mood disorders are other measurements for subjective well-being (Keyes, 2006).

**Job well-being.** Having a job provides many positive mental impacts by increasing self-esteem and self-worth. Furthermore, working conditions and work satisfaction are also important indicators, and many well-being indices such as those of the International Labour Organization (ILO), the United Nations Economic Commission of Europe (UNECE) have used working hours, security of employment, training, and safety of the work environment as important indicators of job well-being.

**Cultural well-being.** Culture represents the identity of a community. It is their everyday life that is not limited to music, art, and literature but is also the collection of behaviors, values, and beliefs that characterize a group of people. Culture has been developed over generations—it is the way of life, the core, or norm that a whole community has followed, indicating their identity and pride (Collier, Sadao, Otto, & Polloi, 1997).

**Family well-being.** Family is the smallest but most important unit in society; it provides a strong foundation for the community. Family well-being can be based on the relationship among family members and how they arrange the environment and conditions

within the home. Family provides basic knowledge regarding the role of society's members, basic rights to their own benefit, laws and regulations, and religion. Furthermore, there are main theories that measure family well-being. The circumplex model of marital and family systems (Olson, 1999) consists of three main areas of family cohesion: emotional bonding, family flexibility, and family communication. McMaster's model of family function shares similarities among family members such as communication, affective responsiveness, and affective involvement. Besides these two theories, interactions among family members, caring for one another, helping one another when facing problems, spending more time together, and showing affection to one another contribute to higher family well-being.

### **Sustainable livelihood framework (SLF)**

Sustainability has gained importance, and the community has been concerned with and realized the significance of economic, social, and environmental dimensions which affect the sustainability of the community. Within this framework, the intervention of public and private stakeholders can increase well-being capital and eventually improve sustainable livelihood.

### **Government intervention and well-being**

This study adopted the sustainable livelihood framework (SLF) concept (British Department for International Development, 2000). The SLF uses five dimensions that constitute the basis for designing the study reported in this paper, which adds more social dimensions. By doing so, greater insights into issues affecting local affected residents were obtained. This modified framework allows us to understand how institutes use SLF to achieve livelihood outcomes; access, such as ownership rights; or the influencing rate of asset accumulation, such as taxation or policies that affect a return to different strategies.

Based on this framework, a negative vulnerability context and negative changes in structures and processes through policy would lower positive livelihood outcomes. Meanwhile, efficient policy and commitment to dealing with identified issues would produce a more sustainable community (Chamber & Conway, 1992).

### **The Relationship among Framework Components**

The SLF framework makes it easy to understand how trade-offs can occur and increase overall well-being for residents. The government, a major contributor or detractor to well-being, can get involved to increase well-being capital through asset manipulation. Assets (capital) are the result of government policy, private entrepreneurship, and local conditions including unexpected exogenous shocks (e.g., pandemics). For this study, the construction of the Pak Mun Dam led to an asset reallocation. Because one of the main outputs from the dam was electricity, assets increased for those who need additional power to grow their business or provide for their families. Similarly, irrigation output increased assets for farmers, who were the recipients of additional water. However, local people who fished for a living saw their assets decline, as their occupation became increasingly difficult because of the reduction of preferred fish stocks. A more comprehensive way of looking at this is that governments create asset classes through the provision of physical infrastructure, technological development, or policies that work to increase social capital. The government has the authority to provide access to capital through such things as licensing authorities or designate a special class of residents to receive certain benefits. Tax policy that increases assets for one group (e.g., tax reduction) also has a significant effect on asset growth and allocation. These are some of the ways that government affects asset accumulation for citizens.

- 1) Determination of assets: This provides the authorization to access capital, such as licensing, rights, etc.
- 2) Influence of asset accumulation: Regarding financial capital, a government can institute a taxation policy to increase financial capital.

The government can then affect the well-being of people both objectively (e.g., monetary asset accumulation through directed policy) or subjectively by granting or taking away perceived "rights." Lobao and Hooks (2003) noted that a government could decrease societal poverty and inequality to increase human well-being. 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 social well-being factors. A government can also intervene in the form of projects, laws and regulations, or fiscal policy. Public services (infrastructure); health care; social status; education; environmental improvement and protection; and economic, cultural, and working dimensions are ways through which government spending and social welfare can improve quality of life or decrease it for someone who belongs to a class whose asset accumulation has been reduced by policies.

## **Research and Method**

To accomplish this objective, a standardized estimate for each of the three main well-being dimensions in the SLF must be estimated. This can be achieved through structural equation modeling (SEM). Since latent variables are not measured directly from this study's survey, SEM would be an appropriate method to estimate the standardized coefficient for this study. Since latent variables cannot be represented by only one factor, SEM would allow us to combine measured items into the same latent variables.

### **Measurement model and structural model**

SEM has two parts: the measurement model and the structural model. The measurement model is the process of confirmatory factor analysis (CFA), which is used to measure the direct impact of unobserved variables of each well-being dimension based on their

observed indicators. Non-statistically significant indicators based on the evaluation of the component and model fit for each model were eliminated in this measurement model. Furthermore, the model fit measurements used in this study are the comparative fit index (CFI) with a cut-off value of 0.9, which is considered good fit; standardized root mean square residual (SRMR), in which values lower than 0.08 would indicate good fit (Hu & Bentler, 1999); minimum discrepancy divided by degree of freedom (CIM/df), in which values lower than 5.00 would indicate good fit (Marsh and Hoceyar, 1985), and root mean square error of approximation (RMSEA), in which values lower than 0.05 would indicate good fit (MacCallum, Browne, & Sugawara, 1996).

Besides the goodness of fit of the model, average variance extracted (AVE) and composite reliability (CR) were used to test how well variance is shared within the same factor.

After the measurement model was modified, the structural model was applied. This model represents the correlation of each latent variable of unobserved variables (well-being dimensions) with the observed dependent variable of overall well-being. The estimated coefficient from this structural model process reveals the impact of each domain on overall well-being. The process of testing for the goodness of fit of the model is similar to that of the measurement model, which uses goodness-of-fit indices.

The questionnaire used a Likert scale with answers ranging from 1 (lowest agreement) to 5 (highest agreement). The questions were related to well-being dimensions (see Table 1), which includes 40 well-being items contained within 8 latent variables. To ensure the collected data was consistent with what needed to be gathered, a pretest was conducted. This pilot test involved 30 personal interviews with residents in villages deemed to be directly affected by the construction of Pak Mun Dam.

There are eight latent variables, but these are only first-order factors. Since this study focuses on sustainable livelihood, all social well-being dimensions will be used to estimate second-order factors, which are community well-being, political well-being, health well-being, job well-being, cultural well-being, and family well-being. The entire model that represents both the measurement and structural models is shown in Diagram 2.

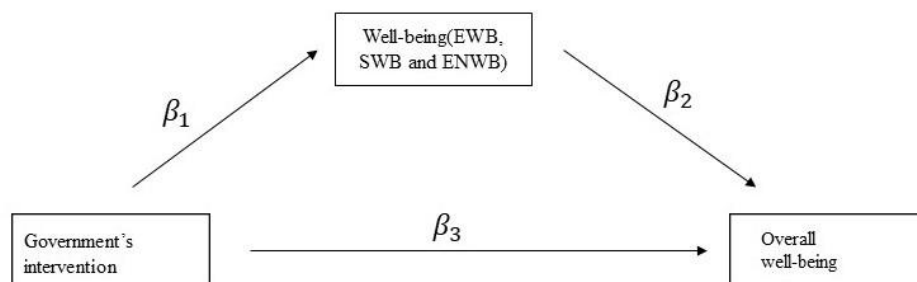
*Mediation analysis*

For this study, three main well-being dimensions—economic well-being, social well-being, and environmental well-being—are mediators, while the independent variables are government’s interventions and the dependent variable is overall well-being. The mediation model seeks the relation between independent variables and dependent variables through mediator variables. The effect from the independent to the dependent variable can be explained using two effects: first is the direct effect from the independent variable to the dependent variable, and second is the indirect effect from the independent variable to the dependent variable through the mediator. The indirect effect can be calculated by multiplying  $\beta_1$  and  $\beta_2$ , and the total effect is the summation of the direct effect ( $\beta_3$ ) and the indirect effect ( $\beta_1 \times \beta_2$ ).

Total effect = indirect effect + direct effect

$$\text{Total effect} = (\beta_1 \times \beta_2) + \beta_3$$

In the case that indirect effect and direct effect are both statistically significant at  $p < 0.05$ , the model will have partial mediation which means the relationship of independent variable and dependent variable can be explained directly from independent variable and mediator. On the other hand, in the case that indirect effect is statistically significant at  $p < 0.05$ , but direct effect is not statistically significant, this mediator will have full mediation which means the effect of independent variable to dependent variable have to be explained through mediator alone.



**Figure 1:** The path diagram of mediation analysis

**Data**

Two villages were selected for this study in Khong Jiam district: Hua Hew and Hua Hai. These two villages were severely affected by the dam (Phongam, 2005). Two hundred and fifty residents were interviewed.

**Table 1:** Well-being dimensions with their items(Chaiyamart, 2021)

| Well-being Dimension            | Items   |
|---------------------------------|---|
| Economic well-being (EWB)       | 1) Level of financial stress<br>2) Satisfaction with financial situation<br>3) Feeling about the current financial condition<br>4) Cannot afford to go out<br>5) Living paycheck to paycheck<br>6) Worry about living expenses<br>7) Confidence regarding financial emergency (finding baht 1,000)<br>8) Stress about finances in general |
| Community well-being (ComWB)    | 1) Social acceptance<br>2) Social integration<br>3) Social assistance<br>4) Safety of the community<br>5) Satisfaction with community well-being  |
| Environmental well-being (ENWB) | 1) Water purchasing<br>2) Availability of water<br>3) Fish quality (taste)<br>4) Crowdedness<br>5) Environmental satisfaction based on water quality<br>6) Environmental satisfaction based on fish quality   |
| Political well-being (PWB)      | 1) Trust in central government<br>2) Trust in local government<br>3) Satisfaction with government services<br>4) Satisfaction with local government services<br>5) Government respect for the voice of local residents  |
| Health well-being (HWB)         | 1) Number of hospital visits<br>2) Stress and pressure<br>3) Full of energy<br>4) Sleeping difficulty<br>5) Health satisfaction   |
| Job well-being (JWB)            | 1) Working hours (workload)<br>2) Proud of current job<br>3) Job fit<br>4) Job satisfaction   |
| Cultural well-being (CWB)       | 1) Children's understanding of local culture<br>2) Community integration<br>3) Self-understanding   |
| Family well-being (FWB)         | 1) Time spent with family<br>2) Family help<br>3) Emotional support<br>4) Overall family relations  |

There are three government assistance program that affect overall well-being and asset accumulation of affected residents. They are:

- i. *Direct Government services:* government services provided included education, health care, and basic services (e.g infrastructure).
- ii. *Training quality:* Education is a government direct service but the quality of training is an indirect service. The goal of training was providing opportunity to gain more income to substitute the loss of their fishing income. The training that was provided was mostly in the field of agriculture and was intended to move people away from their traditional occupation of fishing which was significantly reduced when the dam started to operate. In the survey affected residents were asked to rate the quality of the government training they received.
- iii. *Satisfaction level for the government's Pak Mun Dam solution:* Satisfaction with the government's performance was measured through one question on the survey question "What is your satisfaction level with the government's performance on the Pak Mun Dam issue?" This one question sums up all the well-being dimensions with respect to government intervention regarding construction and operation of the Pak Mun Dam.

These three government interventions will have a direct impact on overall well-being through the well-being dimensions of the SLF, which encompass EWB, SWB and ENWB as indirect effects. These three main well-being dimensions will act as a mediator for the structural model part. To understand the impact of government interventions on overall well-being (OWB), the effect, which is the summation of direct and indirect effects, must be calculated.

## Result

The results from the Structural Equation Analysis are shown in Table 2. The 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 moderate reliability, which the alpha for CWB is close to at 0.7 (0.639). That means the questionnaire is a reliable instrument to use for this research.

**Table 2:** 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            |

### Measurement model result

The result from table 3 shows that AVE and CR had been improved by eliminating HWB from the measurement model, the result from measurement model are the first order factors but later on, five dimensions which are ComWB, PWB, JWB, CWB and FWB had been used to estimate Social well-being dimension which is second order factor in structural model.

**Table 3:** AVE and CR values for each factor in the original and modified measurement models.

| Factor | Measurement Model |       |          |       |
|--------|-------------------|-------|----------|-------|
|        | Original          |       | Modified |       |
|        | AVE*              | CR*   | AVE*     | CR*   |
| EWB    | 0.605             | 0.828 | 0.562    | 0.836 |
| ComWB  | 0.424             | 0.530 | 0.374    | 0.540 |
| ENWB   | 0.338             | 0.462 | 0.549    | 0.708 |
| PWB    | 0.573             | 0.726 | 0.678    | 0.808 |
| HWB    | 0.390             | 0.477 | –        | –     |
| JWB    | 0.644             | 0.773 | 0.679    | 0.861 |
| CWB    | 0.759             | 0.803 | 0.577    | 0.803 |
| FWB    | 0.709             | 0.802 | 0.503    | 0.801 |

\* AVE = average variance extracted; CR = composite reliability

**Table 4:** Model fit indices for original and modified measurement models

| Index   | Measurement Model |          |
|---------|-------------------|----------|
|         | Original          | Modified |
| RMSEA   | 0.071             | 0.062    |
| CFI     | 0.724             | 0.926    |
| SRMR    | 0.100             | 0.060    |
| CMIN/df | 2.030             | 1.797    |

The CFA model consisted of 20 items grouped into seven well-being dimensions. The results for the measurement model are shown in Table 5. All standardized factor loadings are greater than 0.6 with the exception of the Community participation indicator for ComWB. All of the factor loadings that were free to vary had statistically significant loadings on their respective well-being

dimension. The t-value of 1.00 for some items were set to 1 in order to identify the model. Table 5 reports results for the measurement model that treated the first-order factors of ComWB, PWB, JWB, CWB, and FWB as indicators of the second-order factor of social well-being (SWB). The standardized variance of FWB was set to 1 to define the model. All of the second-order factors that were free to vary had statistically significant loadings on SWB.

**Table 5:** Result of Seven Well-Being Dimensions Impacting Overall Well-Being(Chaiyamart, 2021).

| Parameter  | Standardized | SE    | T-value |
|--|--------------|-------|---------|
| EWB → Feeling about current financial condition                                      | 0.722**      | 0.096 | 9.951   |
| EWB → Level of financial stress  | 0.759**      | 0.105 | 10.305  |
| EWB → Worry about living expenses  | 0.603**      | 0.093 | 8.411   |
| EWB → Stress about finances in general   | 0.771        | 1.000 | 1.000   |
| ComWB → Community participation  | 0.535        | 1.000 | 1.000   |
| ComWB → Help from their community members  | 0.662**      | 0.214 | 5.046   |
| ENWB → Level of satisfaction with the water quality of Mun River and Mae Khong River | 0.710        | 1.000 | 1.000   |
| ENWB → Level of satisfaction with the fish quality in the Mun and Mae Khong Rivers   | 0.738        | 1.000 | 1.000   |
| Political → Overall satisfaction with local government                               | 0.876        | 1.000 | 1.000   |
| Political → Trust in the local government  | 0.742**      | 0.120 | 7.265   |
| Working → Being proud of their job   | 0.696**      | 0.055 | 12.005  |
| Working → Job fits their skills, knowledge, and experience                           | 0.852**      | 0.063 | 15.266  |
| Working → Level of satisfaction with their job                                       | 0.922        | 1.000 | 1.000   |
| Culture → Their children’s understanding of the importance of visiting the temple    | 0.646**      | 0.143 | 8.357   |
| Culture → Feeling close to the community   | 0.753        | 1.000 | 1.000   |
| Culture → They understand the importance of visiting the temple                      | 0.747**      | 0.112 | 9.105   |
| Family → Time spent with family has increased in the past 10 years                   | 0.671**      | 0.161 | 7.877   |
| Family → Individuals turn to each other for help when something is troubling them    | 0.644**      | 0.133 | 7.656   |
| Family → Emotional support can be gained from family members when it is needed       | 0.727**      | 0.146 | 8.262   |
| Family → Overall score of family relationship  | 0.638        | 1.000 | 1.000   |

Note. \*\*Statistically significant at  $p < 0.01$ ; critical t-value of 2.58 used. \*Statistically significant at  $p < 0.05$ ; critical t-value of 1.96.

**Second order factor analysis**

Social well-being (SWB) contains five dimensions: Society, Political, Working condition, Cultural, and Family. These five dimensions are first factor and SWB is the second factor. All five dimensions are statistically significant at  $\rho < 0.01$ .

**Table 6:** Second Order Factor and Its First Order Factor’s Loadings(Chaiyamart, 2021).

| Parameter               | Standardized | SE    | T-value |
|-------------------------|--------------|-------|---------|
| SWB → Society           | 0.511**      | 0.274 | 3.886   |
| SWB → Political         | 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  $p < 0.01$ ; critical t-value of 2.58 used. \*Statistically significant at  $p < 0.05$ ; critical t-value of 1.96.

**Structural model result**

**Effect of government intervention on OWB through EWB and SWB as 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 issue. The dependent variable is OWB. The result of direct effect, indirect effect, total effect and type of mediation can be seen in Tables 7, 8, 9, and 10. Only full or partial mediation is reported; no mediation was dropped from this result.

**Result of EWB as mediator**

*Satisfaction level for Pak Mun Dam solution → EWB → OWB*

In this case, indirect effect, which can be calculated as  $(0.153 \times 0.306) = 0.0468$  with a p-value of 0.036 and confidence interval (CI) between 0.003 and 0.108, is statistically significant. Bootstrapping results show that direct effect has a standardized estimate of -0.0460 with a p-value of 0.681 and CI of -0.130 to 0.153, 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**

*Government services → SWB → OWB*

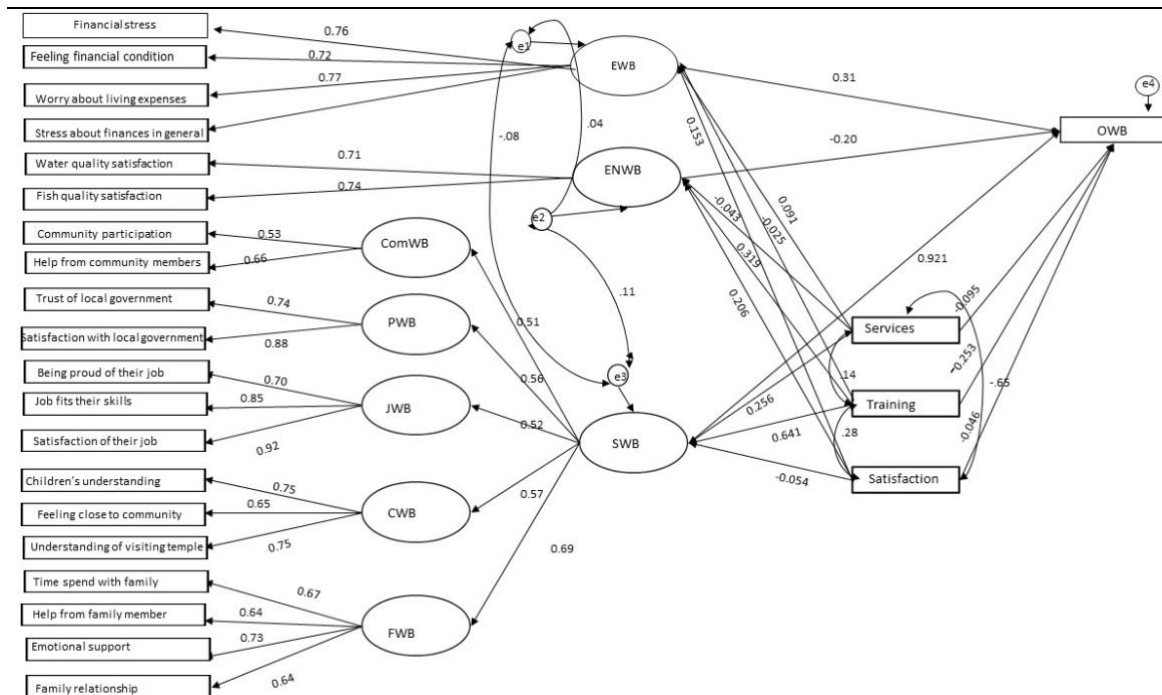
In this case, there is an indirect effect, but no direct effect, of government services on OWB. Indirect effect =  $(0.256) \times (0.921) = 0.235$  with a p-value of 0.002 and CI of 0.068 and 0.518, which is statistically significant. The direct effect is -0.095 with a p-value of 0.379 and CI of -0.426 and 0.083. The total effect can be calculated from a summation of indirect effect and direct effect, which is  $0.235 + (-0.095) = 0.140$ . Total effect can also be found from the bootstrapping method. The results show that for every increase in standard deviation of government services, there will be a 0.140 increase in 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 (i.e. not directly to OWB).

*Government training → SWB → OWB*

In this case, there is an indirect effect, but no direct effect, of government training on OWB. Indirect effect =  $(0.641) \times (0.921) = 0.590$  with a p-value of 0.001 and CI of 0.234 to 1.401. For direct effect, the standardized estimate is -0.253 with a p-value of 0.157 and CI between -1.199 and 0.073. The total effect is a summation of indirect and direct effect which is  $(-0.253) + 0.590 = 0.337$ , which is also shown in the bootstrapping results. This means that for every increase in standard deviation for government training, there will be a 0.337 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 through SWB (i.e. not directly to OWB).

**Table 7:** Standardized Estimated Result of Three Pillar Well-Being Dimensions of SLF to Overall Well-Being.

| Parameter                                | Standardized | SE    | Lower | Upper | P-value |
|--|--------------|-------|-------|-------|---------|
| <b>Economic→Overall Well-being</b>       | 0.306**      | 0.113 | 0.102 | 0.524 | 0.011   |
| <b>Social→Overall Well-being</b>         | 0.921**      | 0.507 | 0.581 | 1.908 | 0.002   |
| <b>Environmental→ Overall Well-being</b> | -0.198       | 0.186 | 0.612 | 0.059 | 0.108   |



**Figure 2:** Path diagram showing measurement and structural model (Chaiyamart, 2021).



**Table 8:** Direct Effect

| Parameter                              | Standardized | SE    | Lower | Upper | P-value |
|--|--------------|-------|-------|-------|---------|
| 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   |

**Table 9:** 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   |

**Table 10:** 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 11:** 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 12:** 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, Browne, & 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)   |

## Discussion

### Government intervention

Based on the SLF, an institute (structure) can increase the capital of well-being dimensions through many methods to achieve a better livelihood. Methods include creating and enforcing legislation, policies, norms, market stability, and rule of law to allow people to access well-being capitals and create resilient projects to secure them. The following projects provided by the government (institute and structure) are expected to influence and improve well-being:

- i. *Public services provided after completion of the dam*
- ii. *Quality of training and extension programs; and*
- iii. *Satisfaction of solving the Pak Mun Dam issue.*

The discussion focuses on the well-being dimensions that are statistically significant, which are EWB and SWB.

### Economic well-being and government intervention

#### *Satisfaction of solving the Pak Mun Dam issue*

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 land of 15 rais(5.93 acres) as promised and compensation for income lost during the construction period would also increase their economic status. This action would be supported by 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 (change of institute) would have to be developed to increase EWB, as satisfaction with government solutions does not have a direct effect on OWB. An increase in EWB capital would improve the subjective well-being 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 subjective well-being (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

#### *Public services provided after completion of the dam*

SWB 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 the 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.

The results show that two government interventions – 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). The social dimensions in this model include CWB, FWB, PWB, JWB, and ComWB.

Regarding CWB, the model showed that government services would help the community 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. The 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 offer 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. 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 the 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 surrounding areas were 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 of the lack of EWB.

Regarding JWB, basic government services, especially infrastructure, could help businesses 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, thereby 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. Trust in and satisfaction with a local government's services are items in this dimension. The 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.

With respect to 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. 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.

#### *Job training intervention*

As mentioned previously, job training was one intervention that the government provided 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.

The following discussion relates each dimension within the SWB latent variable and the government (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 the way of life of 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, be trained together, spend time together, and 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, express their knowledge, learn new skills, and gain sufficient knowledge related to fishing to earn income to support their families. However, the government provided job training in farming, barbering, baking, and mechanical work, none of which related to skills already possessed by the residents. The residents found this difficult, and they did not actually benefit from it. 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. Training can also be a factor of JWB if it helps residents achieve more efficiency in performing jobs. 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 acknowledged 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 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 households. 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, job training provided by the government should enable the community to support itself financially and it 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 government concern about 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 achieve their goals. Job training or extension programs would create strength of community and social assistance. During the survey, we noticed groups of four to five residents working together to make brooms for sale. These results support previous literature noting 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 work to prove that SWB played an important role in a community's sustainable livelihood, not just EWB.

Not all important economic, social, and environmental well-being dimensions were achieved in this study for the SLF in terms of their well-being satisfaction level. The study did, however, find that SWB, in addition to EWB, is important in achieving a community's sustainable livelihood. 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 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. The 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 academic or local agencies, provincial or local administrative organizations, Electricity Generating Authority of Thailand (EGATs), and Non-government organizations (NGOs). Stakeholders would be able to increase capital for each well-being dimension through many methods, such as policies, 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 were 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 with water quality and fish quality):* Based on the model, there are no statistically significant relationships between government intervention and OWB or between ENWB and OWB.

## Conclusion

Changes in structure or institute, as in cases of government helping to create sustainable livelihoods 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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