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A Study of Multidimensional Impacts and Government Compensation Practices Related to the Xayaboury Hydroelectric Dam Construction

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Abstract

This research aims to study the results of the damage caused by the construction of hydroelectric dams and to study the implementation of regulations for compensating for damage caused by the construction of hydroelectric dams. The study compiled secondary data from the income - expenditure monitoring report. and assessing the living standards of the people after the relocation of the Xayabury Mekong Hydropower Project. The study results found that:

The construction of hydroelectric dams is not only about water management and electricity generation. In reality, the construction of hydroelectric dams also has both positive and negative aspects that cannot be avoided. The negative impacts include changes in the aquatic ecosystem, economic impacts, socio-cultural impacts, and people's lifestyles, including the spirit of the people. However, the positive aspects of dam construction are that electricity can be used for socio-economic development, as well as the use of electricity in daily life, and most importantly, it can also generate huge income for the country. In response to the impacts, compensation must be provided to those directly and indirectly affected, including the restoration and restoration of the environment so that development can proceed in a sustainable and socially acceptable direction. In this situation, the damages that have occurred have been surveyed and agreed on the most neutral compensation, including the relocation of villages, especially compensation for housing, production land, infrastructure, construction of schools, health centers, and construction of temples. and Improvement The roads to the village and the roads to the production areas and importantly, there is a promotion of occupations and strengthening of the community, especially the promotion of farming and animal husbandry, as well as the promotion of income generation to ensure that the displaced families are not affected. In the long term, the project and the company that is contracted to build the hydropower plant will continue to encourage the people in the area to create stable occupations and grow together. However, although the compensation is seen as reasonable, there are still many conflicts that still occur, including the fact that the living conditions of some families have not been improved as much as they should and should be resolved further.

Keywords: Impact, Compensation, Hydropower Dam, Socio-Economy

1. Introduction

After being liberated in 1975 until 1986, the Lao PDR opened up the country to the outside world in order to build and develop the country to prosper in each period, especially through cooperation with foreign countries in investing in infrastructure construction, based on the Laos's geographical location as a country rich in natural resources. Especially the abundant water resources Sambong and the Lao PDR have a favorable location and geography for building hydroelectric power plants. In the 9th Five-Year National Socio-Economic Development Plan (2021-2025), with the main goal of contributing to the average growth of the gross domestic product (GDP) of not less than 7% per year, striving to transform the economic structure in a quality, sustainable and green direction. By setting out the key tasks to achieve goal 1, the national economy grows in a quality, balanced and sustainable manner, which focuses on industrial development that can drive economic growth, production to reduce imports, production for export, production that is a regional and global value chain, and creating more jobs for the people, such as promoting energy, mining and hydroelectric power plants to be more effective for export and securing sales markets, improving infrastructure to connect with the region and the world. While ensuring that the material and

spiritual lives of the people are gradually improved. The development goal is green and environmentally friendly development (Ministry of Planning and Investment, 2019) [1]. Therefore, the Lao Party and Government have turned the construction of hydroelectric power plants into an important selling point and will build the Lao PDR into the powerhouse of Asia. From this event, there have been definitions and policies that facilitate the implementation of the strategic plan to become a reality (Electricity Generation Laos Public Company Limited, 2024) [4]. It can be seen that Laos has made a leap in the construction of hydroelectric power plants, meaning that in the past 50 years, Laos has built more than 30 hydroelectric power plants, including small and large hydroelectric power plants. However, the Xayabury hydroelectric power plant is an important hydroelectric power plant in producing electricity to meet domestic consumption and export to foreign countries, especially Thailand.

Xayabury Province is a province of Laos, which located northwest of People's Republic of China. To the east, it borders Oudomxay Province and Luang Prabang Province. and Vientiane Province; north bordering Bokeo Province; Thitta West and The south borders 6 provinces. Kingdom of Thailand Namely: Chiang Rai, Phayao, Uttaradit, Pitsanulok, Nan and Loei. Xayabury province It has an area of 16,389 square kilometers**,** with a population of the population is 411,893, with 202,288 females and 209,805 males**,** divided into 448 villages and 67,080 families. The average population density is 26 people. Per 1 square kilometer. Xayabury Province Divided into 11 districts Namely: Xayabury District, Khop District, Xieng Hon District, Ngan District, Hongsa District, Phieng District, Paklay District, Kenthao District, Boten District, Thongmixay District and Saystan District. Provincial Government Namely: Xayabury District. Xayabury Province Consists of 8 ethnic groups Namely: Lao, Lue, Yuan**,** Taidam, Kummu, Plai, and iewmian. and Hmong people. Some ethnic groups Still speaking and Dressed according to their ethnic traditions. The economy of Xayabury province has been growing continuously. The gross domestic product (GDP**)** has reached 8.5%, and the average per capita income is 1,057 dollars. Per person per year (2020). Xayabury Province A province with a long stretch of land along the Mekong River**,** which is rich in beautiful natural resources. There are natural tourist attractions and Many important ancient sites are scattered from north to south. However, Xayabury province still needs to develop further, as reflected in the provincial socio-economic development plan for 2021-2025, which emphasizes the continued production of hydroelectric power, especially the Xayabury hydroelectric dam.

Hydropower dams are important sources of electricity for environmental protection and sustainable electricity generation to meet the socio-economic development of the Lao PDR and the region in a green and sustainable direction. In addition, they are actively improving efficiency and developing in all aspects to become both producers and providers of management and maintenance services for power plants in the Lao PDR and focusing on creating added value in both the short and long term. In this context, dam construction, in addition to creating economic benefits, also causes environmental damage and also affects the Lao people, most of whom live along the riverbanks for their livelihoods. (Asian Development Bank, 2004) [7]. Therefore, the construction of hydroelectric dams is inevitable and will have an impact on the lives of people in the area, especially changing their lifestyles. (Goldman, 2005) [8] Although resettlement from construction or affected areas is an obligation for the Lao people to contribute to the development of the nation, (Decree of the President of the Lao PDR, 2005) [6]. But the result is: lack of understanding and compensation that is not in line with the needs of those affected. From the above-mentioned problem situation, researchers are interested in studying The damage caused by the construction of hydroelectric dams and to study the implementation of regulations for compensating for damage caused by the construction of hydroelectric dams.

2. Research objectives

1. To surveyed the economic, social, environmental, cultural, and anthropological impacts of hydroelectric dam construction.
2. To study the government's compensation practices for damages caused by the construction of hydroelectric dams.

3. Research methods

This research uses qualitative research methods with a qualitative data study as the main method, studying policy documents and statistical data, and compiling secondary data from revenue - expenditure monitoring reports. and Assess the standard of living of the people After the allocation - relocation Annually 2024 and Direction of the work plan Regular 2025 Xayabury Mekong Hydropower Project and In addition, the students are subject to the decision of the Governor of Luang Prabang, No. 069 / JK. Dated February 6, 2012 on relocation - allocation and Livelihood restoration Xayabury River Hydropower Project The details are as follows:

3.1 Data collection tools

The tools used to collect data include document synthesis forms, which are tools used to track income and expenditure. and Assessing the standard of living of the people (Luang Prabang Province, 2025).

3.2 Population and sample size

Study of the damage caused by the construction of hydroelectric dams and compensation for the damage, including the restoration of people's livelihoods 15 villages affected by rising water levels of 275 masl and Another 4 villages located near the construction site had to be relocated to newly allocated areas nearby.

3.3 Data collection methods

The study compiled data starting in 2011, the year in which the feasibility study for the dam was initiated and the ECP contact signed. On October 14, 2011, including a socio-economic impact assessment study, The initial phase of the dam construction began on October 19, 2011, and lasted until mid- 2019. The testing of the turbines was completed and electricity production began on October 29, 2019. During the initial phase of the dam construction, the impact of the dam construction was investigated, whether it was on the economy, Social impacts, environmental impacts, and cultural and humanitarian impacts, including the results of implementing regulations to compensate for damage caused by the construction of hydroelectric dams from the impacts in each of the aforementioned areas.

3.4 Data analysis

The information obtained was summarized and compared to determine whether the compensation was appropriate and in accordance with the requirements. By analyzing the content of the documents (Content Analysis) and then translating it into a description (Description) with the following scope of the study.

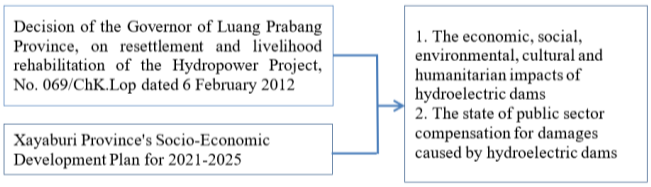

Fig 1: Conceptual framework

4. Results

4.1 Damages caused by the construction of hydroelectric dams

From the study and summary of the impacts or damages caused by the construction of the Xayabury River Hydroelectric Power Plant, which has 4 items such as:

- Economic impact:

The economic impact of building hydroelectric dams has both positive and negative aspects. and Negative side. Positive impacts include electricity generation for consumption and Export, water storage for drought relief and Agriculture. Negative impacts include loss of agricultural land. and Community, Impact on fisheries, Decrease in agricultural productivity due to lack of minerals in water and The potential for profit consolidation in the country, from the summary of data on the impact on the number of families in the dam construction area, is 458 Family From 19 villages But 15 villages have been affected by rising water levels. 275 months and Only 4 Villages located near construction sites that require relocation to newly allocated areas nearby.

- Social impact

The higher water level has many impacts on livelihoods and the other is the social impact, which has caused people living in the dam construction area or areas where the water level is high to be relocated. Although some families are not willing to relocate, they have been forced to relocate, causing communities to lose their land and traditional livelihoods. It also affects their way of life, which used to depend on this water source for their livelihood, especially fishing, which has an impact on food security. The main reason is the destruction of the Mekong River ecosystem. In addition, the profession that allowed them to make a living and provide additional income for some families from fishing has had to stop because they have moved their villages to other places and the fish they used to fish cannot be reached because they are protected areas and protected areas of the dam. This is related to the safety of the dam. For this reason, it is likely to cause further poverty for the local people, while most of the economic benefits are for the owners of foreign companies that have come to the concession.

- Environmental impact

The higher water levels are also causing impacts. In terms of Many environmental factors Including Change The Mekong River ecosystem, Loss of residence and Food for aquatic animals and Suppress The movement of fish between the front and back of the dam, It also affects the surrounding landscape, Water quality And it may cause people in the area to be displaced.

- Cultural and anthropological impacts

In addition to the impacts mentioned above, it also affects their production areas, especially causing loss of agricultural land, House and traditional lifestyle. There is also a loss of cultural heritage. Which may be submerged in water, Changing social relationships in the community and the impact on spiritual beliefs and practices related to rivers.

4.2 Results of the implementation of regulations on compensation for damage caused by the construction of hydroelectric dams

- **Economic compensation**

As a result of the damage that occurred, the Party and the government have coordinated with the company that contracted to build the dam to survey the damage that occurred, including the most reasonable compensation for the damage that occurred, especially: 1. Compensation for the affected properties, which has been delayed for a long time, and Income from old land acquisition, 2. Allocate land and new housing**,** build infrastructure and public utilities, 3. Allocate agricultural land to families 0.75 Hectare, 4. Paying assistance during periods of no income The one who is the 15 Dollar and 5. The quality of life is continuously restored in various aspects until it is assured that the displaced people have a better quality of life than before. Or The criteria for liberation from suffering have been met.

- **Compensation for social impacts**

As mentioned above, a survey was conducted and damage assessment was carried out on the houses. The houses were designed in a Lao style. 5 Types are: Type 1 Old house value 2,999 USD Compensated for a large house 6x8m, type 2 Value of old house 3,000-4,999 USD Compensated for a large house 6x9m, Type 3 Value of old house 5,000-6,999 USD Compensated for a large house 6x10m, Type 4 Value of old house 7,000-9,999 USD Compensated for a large house 6x11m and type 5 Value of old house >10,000 dollars Compensated for a large house 6x12m, the construction of the house is the same, but the size and All models will have a kitchen and bathroom with a white tiled roof. In addition, there will be a village office, a health center, Teachers' dormitories, doctors' dormitories, markets and sports fields, roads to the village and production areas, village funds and job opportunities, especially training in motorcycle repair, are also being built. There are also health checks for villagers, vaccinations for each type of livestock. As compensation, some families are given livestock such as: Promote goat farming 5 Person/ family This includes 11 Group = 128 families, promoting banana cultivation 56 Family, promote pig farming 6 Individual/ family 5 families, promote retail sales 4 Million kip / family feasible 1 Family and land sharing for production 0.75 ha/ family feasible 191 The family and the project also provide training to people according to the needs of each group, such as: training programs on poultry farming, frog farming and catfish breeding.

- **Compensation for environmental impacts**

The project sent a team to survey and periodically inspected the water quality above and below the dam to ensure that the water quality is free of toxins that could endanger the lives of people who use the water for consumption and

consumption, as well as harm aquatic animals around the dam.

- **Cultural and anthropological impacts**

The rising water level also affects buildings and other things. After conducting surveys, new temples have been built and various rituals are still being performed according to beliefs, especially the ceremony of saying goodbye to the old village. and cemeteries, including new home construction and housewarming ceremonies.

5. Discussion

The authors conducted an integrated analysis that encompassed both Research Objective 1 and Objective 2 simultaneously. The findings from the study on the impacts of dam construction and the implementation of compensation measures for the Xayaboury Hydropower Dam reveal that dam development generates both positive and negative effects. Prior to dam construction, an assessment of potential impacts was carried out, particularly regarding environmental changes, economic consequences, and socio-cultural implications. The survey team engaged local authorities, representatives from government and private sectors, as well as affected communities within the project area. They provided information concerning the benefits of hydropower development and the potential impacts on local conditions, especially issues related to compensation for losses that might occur. These losses include agricultural land and people's livelihoods, as well as damage to local infrastructure resulting from rising water levels.

Despite these efforts, many households still lacked understanding and satisfaction with the compensation measures provided by the project, particularly regarding productive land allocation, occupational arrangement, housing reconstruction, and capacity-building support in various domains. The findings of this study align with Asian Development Bank (2004) [7]; Goldman (2005) [8]; Imhof *et al*. **(**2005) [15]; GMS Nam Theun 2 Hydroelectric Project (2019*,* 2020**,** 2021) [9, 10, 11]; and Electricity Generating Authority of Thailand (2024) [2], all of which examined the environmental and social impacts of hydropower dam construction. These studies consistently highlight that dam development inevitably results in environmental impacts, ecological change, and alterations to community livelihoods. Moreover, unresolved conflicts persist and require further intervention to ensure sustainable and stable development outcomes.

The Xayaboury Hydropower Dam is recognized as an internationally acceptable model of hydropower development because it incorporates a navigation lock system that allows vessels to pass upstream and downstream, as well as a fish passage system that minimizes ecological disruption to aquatic species. These design features contribute to reducing the environmental impacts commonly associated with hydropower dams, consistent with findings from previous studies.

6. Conclusion

The findings of this study confirm that the construction of hydroelectric dams generates both substantial benefits and multidimensional impacts. On the one hand, dam development contributes positively to national progress through enhanced water management, reliable electricity generation, and notable economic gains for the country and investors. On the other hand, it produces a range of economic, social, environmental, cultural, and anthropological implications, including rising water levels, ecological disturbances, livelihood disruptions, socio-cultural changes, and significant adjustments in local ways of life. In response to these impacts, government-led compensation practices—grounded in systematic survey assessments—have focused on relocation, livelihood restoration, and community-strengthening initiatives. Continuous monitoring has been implemented to improve quality of life, create employment opportunities, and ensure stable household incomes for affected communities. Nevertheless, despite these efforts, unresolved challenges remain, as conflicts and dissatisfaction persist among families whose living conditions have not improved as anticipated. These findings highlight the need for more comprehensive and sustainable compensation mechanisms to ensure that dam development aligns with long-term social and environmental well-being.

According to these results, the administrators and the stakeholder or people should consider the following:

1) It is proposed that relevant parties should use the results of this study as basic information for an in-depth study of the satisfaction of those affected by the construction of this dam.
2) Further studies should be conducted on the impacts on occupations and livelihoods of local people, especially the impact of dams on local residents (agriculture, fishing, riverbank gardens, forestry*,* and gold panning along the Mekong River).
3) More research should be done on the impact of uncertainty on community well-being, such as poverty, income, and food security.

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