



Study on Impact and Monitoring of Transboundary Environmental Impact Assessment of Hydropower Projects on the Mekong Mainstream



Executive Summary

Submitted by

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Study on the Impact and Monitoring of Transboundary Environmental Impact Assessment of Hydropower Projects on the Mekong Mainstream reported in fiscal year 2019 by The Office of the National Water Resources (ONWR) in collaboration with Mahasarakham University. This study aims to 1) bridge knowledge and information from the project's study between 2014 and 2028 and local wisdom from the public in order to solve problems, expand, disseminate, exchange and improve communication with the stakeholders in risk-prone area, 2) initiate potential pilot activities at the local level to support the public to undertake mitigation measures, including environmental impact monitoring, and 3) strengthen public participation including, thinking, co-decision making as well as capacity building in order to lessen the problem of natural resource changes.

The project “Study on Impact and Monitoring of Transboundary Environmental Impact Assessment of Hydropower Projects on the Mekong Mainstream” operated continuously from fiscal year 2014 to 2018 by the Department of Water Resources. Since 2017 with the establishment of the ONWR, under the Prime Minister's Office is responsible for oversee and supervise the water resource management policy as Thailand's command center for management of the nation's water resources as well as to also serve as secretary of the Thai National Mekong Committee. Accordingly, in fiscal year 2019, the study was undertaken by ONWR.

In addition, the study results from 2014 to 2018, enabled more data and databases of transboundary environmental impacts, respectively. Throughout this previous study, the project focused on and improved the research approach. The study scope sought appropriate tools to study the transboundary environmental impact to gain scientific data, that was academically accurate thus enabling the identification of potential transboundary environmental impacts and led to an assessment of risk trends in different areas throughout the Mekong Mainstream in the territory of Thailand. This study focused on building public understanding by stakeholders to receive accurate, reliable information and created a process of public participation throughout the study process. The academic and scientific information of the study was linked to the assessment of the social and economic impact and People's



Well-being Information. In addition, the results of the study could also be used as documentation provided for public notification to the local and neighboring countries in the Mekong Region. Details of the main activities to be carried out in accordance with the project's operating plan between 2014 and 2028 are divided into 3 phases for a total of 15 years.

This project was carried out to provide a sound transboundary environmental impact database to assess risk trends in the area throughout the Mekong Mainstream in Thailand. The focus was to generate an understanding with the public and stakeholders in order to receive accurate information. ONWR updated the scope of the study in 2019 by focusing on the dissemination of information of past studies to the public as well as to monitor the transboundary impact and responded to provide accurate information in a timely manner. In addition, the study aimed to build capacity to reduce and mitigate impacts, to encourage problem-solving planning for residents in the areas most likely to be at risk, and to encourage the participation of people in areas that were potential risk area in 8 provinces along the Mekong River, namely, Chiang Rai, Loei, Nong Khai, Bueng Kan, Nakhon Phanom, Mukdahan, Amnat Charoen and Ubon Ratchathani, covering an area of 15 kilometers inland from the banks of the Mekong River including 50 districts, 1,699 villages with a total area of 13,029.91 square kilometers for conducting the pilot activities, in order to promote and implement mitigation measures or risk reduction measures for the people in the Potential risk area, according to the opinion of stakeholders in each province. One project with support personnel from local and community network was presented and selected by the Public Sector Network and Local Government Organizations, which were domiciled in and have work experience in the study area, acting as the manager of the province's pilot activities in the Potential risk area according to the study during 2014-2018. In addition there were 5 forums in 2019 to increase public participation and exchange opinions in order to create a database, local wisdom in the potential risk areas due to transboundary impact, the benefits include; 1) Report on Monitoring and Assessment transboundary impact from hydropower projects in the Mekong Mainstream. 2) The use of transboundary environmental mitigation measures in the Potential Risk Areas, as well as Risk Reduction Measures at the network and community level to support changes and environmental impact monitoring measures in the Potential Risk Area. 3) Formulate guidelines for transboundary environmental impact monitoring from the



Hydropower Project in the Mekong Mainstream, by the participation of civil society in the target area. 4) Form a network of cooperation between the government and the public sector with knowledge and understanding of the transboundary impact of hydropower development in the Mekong Mainstream and the coordination mechanism between the government and the public sector.

A summary of the study's results over a period of 6 months focused on networking as well as a pilot community plan of 8 provinces and summary of the Social Impact Monitoring and Vulnerability Assessment (SIMVA) results, offering guidelines for warning system of water situation. The lessons learnt from the pilot area were used as example to be applied to the rest of the community. Study on Impact and Monitoring of Transboundary Environmental Impact Assessment of Hydropower Projects on the Mekong Mainstream reported in fiscal year 2019, consists of.

1. Review of Related Document

The project has been ongoing for 5 years from 2014-2018. There was collection and analysis of physical, biological, and socioeconomic data. It was found that each year of study there was an increase in the level of data collection both quantitatively and qualitatively in order to study in Potential risk area, including the creation of civil society networks. There were criteria or measures to solve community problems, simulation development and database updates as follows:

1.1 Review of 2014-2015 Study

During 2014 - 2015 the study of physical, biological, economic and social information was conducted with a database on the Mekong Basin of Thailand and related environmental data. The study aimed to establish a system to monitor the situation of the Mekong River. 1) Hydrology and sedimentation, water levels after the construction of the Man Wan Dam. There was a downward trend in all stations. 2) High sedimentation in many districts from Chiang Saen to That Phanom district, areas at risk of flooding, namely Bueng Kan and Nong Khai provinces. 3) The water quality in the Mekong Mainstream was rated as “good quality” for irrigation and rice farming. In the wet season, there was recording of lower degrees of impairment (lower water quality standard scores) for health which was not suitable for consumption. 4) Socioeconomic impact, involved concerns about the construction of

dams, including beach front attractions and delta in the Mekong River which may be flooded. Natural Fishing Occupation, Fish Farming Shops and travel services may be affected.

1.2 Review of 2015 Civil Society Networking Project

The project established a civil society network. It was based on the process of participation between the government and the civil society of stakeholders in 8 provinces, focused on the public sector and builds cooperation between the public sectors to obtain environmental information, economy and society at the local community level.

1.3 Review of 2015-2016 Study

In 2016 the scope of work was expanded to cover detailed data collection, to expand the survey area and to begin the public engagement process. It was expected that civil society will become more involved both socially and, in the Mekong, situation monitoring as well as to start crafting policy recommendations and measures. Secondary data were reviewed to plan the project operations by determining the risk criteria for Transboundary Environment Impact Assessment for areas potentially affected from the Xayaburi Dam. The results of the Mathematical model found that the Chiang Rai Province was a low- potential risk area level (level 2), while Loei and Nong Khai Provinces were at a high- potential risk area (level 4). The simulation results of 3 provinces showed that the average water level in dry season increased by 0.5-1.1 M, while in rainy season the water level reduced from 0.4 to 1.03 M an effect on velocity of water in Loei and Nong Khai Province in the dry season decreases, the rainy season increases slightly. Sub-district areas with erosion rates of more than 3.7 meters per year were found in That Phanom district which was at a high- potential risk area level. The area where the sediment was buried greater 2.69 meters per year. For example, Chiang Saen District, Chiang Rai Province and Tha Bo and Sangkhom District, Nong Khai Province were classified as high-risk areas. This year, fishery and fish biological diversity have been surveyed to be used as an indication of fishery and ecological information to lead to the development of a database model related to transboundary environmental impacts.

1.4 Review of 2017 Study

During 2017-2018, refined research work methods were adjusted to complete and record detailed physical, biological, socioeconomic data. At the same time, risk assessment of the Mekong situation changes in eight provinces along the Mekong River covering an area of 15 kilometers from the impact of the Mekong River and the start of the prototype using the

technology and connected to the main websites of Thai National Mekong Committee-Information System (TNMC-IS) for the purpose of reviewing the data and thorough data access. This providing policy recommendations and mitigated measures to adapt to the impacts and the risk of people living in high-potential risk areas.

Special monitoring results were in the Chiang Saen district, Chiang Rai Province which was a potential risk area for velocity, riverbank erosion and sedimentation. In Tha Uthen District, Nakhon Phanom Province was a potential risk are for velocity, fishery and ecological service. Water in the Upper Mekong Basin was likely to have a higher amount of nutrients (nitrates) close to the standard, or above the standard during June-September period, in other words, more likely to be more affected than other provinces.

As a result of the public meetings, the impact of the Mekong changes was presented to the local and provincial community. The public information was proposed to participate in the monitoring of the common impacts that the public can access as reference documents and to clarify the impact.

1.5 Review of 2018 Study

This 2018 study has further improved the tools used in education in fisheries, water quality and ecological services as well as review criteria for determining areas that are likely to be at risk in some areas and the database will be updated as well as promoted a network between local community and related organizations. Two meetings were held for the 8 provinces, with 60 people each time. SIMVA has been adopted to achieve continuity, however, the questionnaire would be updated to provide insights that could be used to more clearly assess local utilization. The measures are divided into four stories below.

1) Mitigation measures

Hydropower Projects on the Mekong Mainstream were not in the sovereignty of one country leading to the transboundary environmental impact. Mitigation measures operated on an individual national level and increased activities in coordination with neighboring countries and to integrate operations with neighboring countries at the national, provincial and local levels. These were started from a unilateral action by a particular country to reduce and mitigate the impact of transboundary with urgency and carefully with information based on empirical study, and then increased coordination levels to neighboring countries to acknowledge and be aware of the challenging impacts that Thailand was facing.

This led to the level of cooperation, knowledge exchange, understanding, and mutual solutions with common measures, eventually resulting in joint action.

The three measures included Avoidance, Mitigation and Mitigation and Compensation. These must be defined in an activity plan that increases cooperation with the neighboring countries of the Mekong Basin from upstream to downstream to avoid conflict and leads to the integration of operational cooperation in accordance with all three measures.

2) Planning measures to address the impact and risk (adaptation measures)

Some residents living in the area that were in the Potential risk area have been affected by the environment or exposure risk in the past 5 years from the transboundary environmental impact. Some parts were sensitive to the effects and capable in solving different problems. However, some parts were insufficient to solve the problem and needs supportive solutions, as follows:

- Community-based adaptation solutions
- Ecosystem-based adaptation solution

3) Policy-driven measures

The Hydropower Project in the Mekong Mainstream might lead to the Transboundary Environment impact. Therefore, the study has been ongoing since the Resolution of the Thai Mekong National Committee of at the 1st Meeting of the 2013 held on January 10, 2013 led to the reduction and mitigate transboundary environmental impacts to people in vulnerable areas and play a role in cooperating with all relevant government agencies, consisting of 1) The study results was used to communicate with people in vulnerable areas and provided accurate and reliable access to databases to solve the problem of misunderstandings, relieve anxiety and doubt in uncertainty and ensure the performance of the relevant government sectors. 2) Publishing to establish understanding and acceptance of the study results with the Mekong, to gain understanding and respect in the sovereignty of the Mekong River in parts of Thailand. that has already been partially Transboundary Environment impact by a bilateral and multilateral dialogue and dialogue forum to ensure cooperation in avoidance, reduce and mitigate measures, as well as concrete remedies and solutions. 3) Further knowledge education was to keep track of changes and impacts. Cooperation and responsibility of the residents were distributed, supported by central, provincial and local organization. 4) People in high-risk areas were built capacity to implement problem-solving planning and mitigation measures with the support of government agencies.

4) Monitoring and surveillance measures for the Potential Risk Area

The project presents implementation of monitoring, and surveillance measures in the Potential risk areas. It focused on the creation of cooperative monitoring mechanisms and networks, which strengthens networks. After the project has been completed, all aspects of the collection and exploration have been carried out for further review based on Thailand's current situation and policies.

Study on Impact and Monitoring of Transboundary Environmental Impact Assessment of Hydropower Projects on the Mekong Mainstream during 2014-2018 period provided summarized trends and priorities in an area of 28 districts adjacent to the Mekong Mainstream.

2. Outcome of 2019 Study

This 2019 study project was conducted from the review of previous study. Moreover, collection of further information from the community forum by sharing with stakeholder opinions. The aims of the forum considered the community knowledges by insight interviews and also the group discussion of the representatives of civil society networks in the study area of the 8 provinces along the Mekong Mainstream by focusing on one pilot project area of each province to assess the vulnerability of the Potential Risk Area in the community by collecting quantitative data with the SIMVA tools from the Guideline for Social Impact Monitoring and Vulnerability Assessment Guide 2018 (5 dimensions basic data analysis) namely 1) Mekong River change 2) The way of life forms of the people on the banks of Mekong River 3) The Vulnerability of the people on the banks of Mekong River 4) Adjustment of the people on the banks of Mekong River and 5) The suggestion from the target groups which are; a) the group of household heads significantly reflecting the impact and situation at the household level, b) Community leaders significantly reflecting the community data and adjustment at the community level, and c) the public sector networks significantly reflecting study in the regional level.

Therefore, SIMVA tools were efficiently used in mass target groups via Google Form. Additionally, SIMVA should be improved for all community incident action plans and ecological changes. The benefits included:

1) Prototype area to create the community implementation plan in four criteria: (1) risk level, (2) Network strength and diversity composition network, (3) stakeholders

participation, and (4) knowledge and expansion possibilities. In 2019, Pho Sai District, Ubon Ratchathani was promoted as a pilot project area for passing on knowledge to support ecological changes

2) Community & Civil Society Knowledge, understanding and awareness of changes in physical and biological transitions as well as the changes in ecosystems along the Mekong Mainstream.

3) A network of cooperation between community and government organization with knowledge and awareness of the consequences.

The analysis of network-level measures plan is to strengthen the 8-province on the banks of Mekong River in fiscal year 2019, could be presenting the results of the studies to be considered to create the corresponding measures and the current situation decency. 30 plans could be analyzed and divided according to the objectives of the plan into 5 groups:

1) Knowledge Management Plans and Measures to create the method of adjustment and find out the solutions or mitigate the impacts as well as to develop information and warning systems.

2) Plans/measures to reduce economic impact, especially in the areas of vulnerable people group, such as the establishment of compensation fund for vocational rehabilitation and creating alternative career or reducing production costs for agricultural cultivation along the Mekong Mainstream.

3) Plans/Measures to create Conservation and Restoration of Mekong Mainstream Ecosystem to develop the community water management systems and ecotourism.

4) Plans/Measures to strengthen Civil Society Network to develop and strengthen the Mekong Basin Network partners have a process to integrate collaborative plans and create the participation of all sectors.

5) Work Plans/ Measures review and develop both of local and international rules and laws related to the Mekong Mainstream.

Under the 5 plans, there were differences of ecosystem which varied by geographical region. The plans or measures of the eight study project areas were planned to reflect willingness to build awareness of the Mekong situation and the participation process.

1) The Upper Mekong Mainstream area is Chiang Rai, Loei, Nong Khai.

2) The Central Mekong Mainstream area is Bueng Kan, Nakhon Phanom, Mukdahan

3) Lower Mekong Mainstream area is Amnat Charoen and Ubon Ratchathani

Each area has a roadmap and goal to achieve the impact of the situational changes of the Mekong Basin. The upper and central Mekong basin were interested in preparing plans related to the conservation of fish species while the lower Mekong basin, which was more affected than the upper Mekong basin. This still requires creating the awareness of on-going Mekong situation and the participation process, both information and operations at the Mekong level. In terms of awareness and understanding the Mekong Mainstream change, this covers velocity, sand suction activity and releasing water from dams, etc. However, the main cause of this change was due to the construction of dam in the Mekong Mainstream, the flow of unnatural currents. Most of the households require emergency warning systems through voice media. Consequently, ONWR provided guidelines for civil society to implement the network measures plan to strengthen the eight provinces along the Mekong Mainstream and organized activities in accordance with the conclusions of the study results in the year 2019, planning recommendations have been considered for projects or activities, measures, and policies to solve the transboundary effects.

This policy requires to be integrated on both issues and parties by considering introduction of new opportunities, technologies, innovations and local wisdom into the plan. The following details are required namely, Phasing, Type of Measures and Stakeholders.

1) Environmental Impact Management, Roadmap Networking and Research Studies

1.1) The Mekong Flood Notification Management Plan consists of minimization/mitigation measures covering database management issues, the creation of emergency warning systems, and public distribution to the target audience. The Office of National Water Resources, Department of Water Resources, Department of Disaster Prevention and Mitigation and Department of Meteorology is responsible.

1.2) The Fund and its remedies are compensation measures covering the content of the establishment of funds, fund regulations, and procedures or mechanisms to compensate the affected persons. The Department of Disaster Prevention and Mitigation and Ministry of Interior is responsible.

1.3) The Mekong Cooperation Network Strengthening Plan consists of minimization measures covering the strength of the network, database sharing, establishing laws and agreements

with local, regional and international networks. The Office of National Water Resources and the Mekong River Commission (MRC) are responsible.

1.4) The Project to undertake research on the impact of changes in the Mekong Basin consists of minimization measures covering the research aspects of the situation in the Mekong, comprehensive research on the changing situation in the Mekong Region Basin as well as Impacts of changes in the Mekong River, the preparation of the plan for the development of the Mekong Basin, as well as the evaluation of the development plan and the transfer of knowledge of the network and the people in the Mekong Basin. The Office of National Water Resources in cooperation with the relevant compliance units is mainly responsible for these actions.

2) Environmental conservation plan and vulnerable people group assistance are concerned with the conservation of the environment and the assistance of vulnerable and affected people group is to adapt to the situation in both economic and social aspects.

2.1) The Environmental Conservation Plan in the Mekong Basin is an adaptation measure covering the sedimentary accumulation, the bank erosion, changing of small islands and beaches, flooding, drought, unusual tidal water, water quality and contamination, and biological changes. The Ministry of Natural Resources and Environment is responsible for the current situation.

2.2) The Mekong River Cultural and Tourism Conservation Plan is an adaptation measures covering research studies on the cost of cultural, tradition, opportunities to develop tourism in the area to generate revenue for the community and to pass on to the target audience. The responsible authorities are the Ministry of Tourism and Sports and higher education institutions.

2.3) The Mekong Basin Fisheries Plan is an adaptation measures covering the research and development of fisheries situations. This leads to the preparation of the Mekong Basin fisheries plan and the distribution to the target audiences and the evaluation of the implementation of the fisheries plan. Department of Fisheries, The Ministry of Agriculture and Cooperatives is responsible.

2.4) The coastal farming and agriculture plan in the Mekong Basin is an adaptation measures covering the research of the current farming situation, development opportunities, and agricultural aspects. These lead to the preparation of farming plans in the Mekong Basin and the distribution to the target audience. The responsible agency is the Ministry of Agriculture and Cooperatives.

3) Roadmap, construction and infrastructure are concern the construction, building of infrastructure with a high investment budget to implement these adaptation measures which

included: Construction plan for water management in the Mekong Basin and the development of renewable water sources are adaptive measures covering the research on the situation of the presently water management. This leads to the preparation of plans or development guidelines to increase the efficiency of water management in the Mekong Basin, supply of water resources for consumption and implementation in order to meet the plan. The responsible authorities are the Ministry of Interior and the Ministry of Agriculture and Cooperatives.

In summary, this project emphasizes the importance of developing people/networks and social capital in the area, as well as the preparation of community-level plans and the 3 additional activities: organizing activities for the leaders and networks in all 8 provinces to conduct the information exchange, news, develop the potential of community plan. The proposals of promoted communities have been expanded in recent years: Phosai District, Ubon Ratchathani Province, and local researchers to monitor the aquatic ecology area and fisheries according to scientific principles. The company has also been able to expand its production of local wisdom and select additional pilot areas to be used as a prototype for further expansion of the community. There are 7 main recommendations for community adaptation, 1) finding reserve water sources, 2) modifying agriculture and fisheries, 3) modifying their way of life in accordance with changes, 4) environmental conservation, 5) understanding with the public, 6) creating disaster readiness alert, and 7) networking. The majority of households recommend that the community unity and build a natural resource conservation network.

As a result, in terms of awareness and understanding of the situation, it is was found that the basis of the corresponding Mekong River has been changed, including the flow of the currents, sand extraction activities and water discharge from dams, etc. However, most public networks have found that the cause of the Mekong change is due to the construction of dams. While most community leaders and household leaders see the basis of the Mekong change as an unnatural flow of currents, the majority of the community leaders and household leaders agree that the cause of the Mekong change is due to the unnatural flow of the river. In terms of alarm systems, most household chiefs have to have an alarm system through the audio media along the lines mentioned above, Therefore, the Office of National Water Resources has adopted a network-level plan to strengthen the 8-Mekong provinces and conduct activities in order to comply with the results of the study.

3. Action Plan of 2020 Study

Results of the Impact and Monitoring of Transboundary Environmental Impact Assessment of Hydropower Projects on the Mekong Mainstream from 2014 – 2018; physical, biological, and economic and social information have been collected and analyzed. Results showed that the level of data collection during each year of the study increased in both quantity and quality which provided the basis to determine the potential risk areas in various transboundary regions, which can expand the scope of transboundary impact assessments and expand the concept framework for the implementation of the project during the course of the project between 2019 and 2023. It is used to monitor and evaluate transboundary impacts in order to continuously develop databases as follows:

1. The physical aspects are analyzed and evaluated in various issues, including:

- The impact study on velocity
- The impact study on the erosion of riverbank
- The impact study on accumulation of sediment
- The impact study on water quality

2. The bio-analysis and evaluation of related issues consists of:

- Fisheries, Aquaculture and Aquatic ecosystem
- Riverbank ecosystem and Ecosystem services

3. The socioeconomic aspects are analyzed and evaluated on related issues by using SIMVA as follows:

- Riverbank plantation and fisheries harvest
- Exploitation of wetlands and biodiversity
- Travel & Tourism
- Cultural Exploitation Traditions and Lifestyle

As a result, in the proposed selection criteria for severely affected vulnerable areas in the 2020 study can be determined by the Natural Resources Index. The study was conducted continuously from 2014 - 2019, as well as providing integration of relevant issues and sectors. Additionally, it considered new opportunities and the integration of technologies, innovations and wisdom to solve problems to create measures, periods, and responsible entities ensuring sustainable problem solving. Hence, this will provide the basis and



mechanisms for sustainable collaboration and development within countries of the Greater Mekong Subregion.



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